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30 Years of the Prague Burns Unit

This year, we in Czechoslovakia are commemorating the 30th anniversary of a special clinical unit for the treatment of thermal injuries as part of the Department of Plastic Surgery of Charles University Medical Faculty of Hygiene Prague. An excursion into history seems called for here to account for its foundation.

Up until the 2nd World War, thermal injuries all over central Europe were the domain of dermatologists on the grounds that they were a mere skin damage. The doctrine was that major burns covering more than 20 % of the body surface were invariably fatal. Infection in the course of treatment was taken for granted. Practically no attention was given to the body's overall response. People with extensive burns usually died of the burn shock and of internal systemic complications even before infection could develop. No skin transplantations were performed. Inveterate unhealed granulation areas, sometimes with malignancies, severe contractures and deformation often excluded people from the working process and from social life.

Academician František Burian, the founder of our plastic and reconstructive surgery, encountered the ill effects of thermal injuries already during and after the 1st World War. After his unit moved from its original small and inadequate premises to the compound of a large hospital in 1937, he did his best, within the limited scope of opportunities, to change the course of burns treatment by means of early transplantation in patients hospitalized at the dermatological ward. He and his pupils started a persistent campaign to make surgeons see that a burn as a severe injury ought to be treated at surgical departments by well trained surgeons and nurses in co-operation with many other specialists. He spent years seeking understanding among the extremely busy and largely uninformed surgeons of his day, running against stiff resistance by most of the dermatologists.

Burian's endeavour to transfer the treatment of thermal injuries to surgical wards was interrupted by the 2nd World War, during which much was to be changed and improved in the treatment of burns. Under the influence of experience gained by war and military surgeons, the conception of a specialized burns unit as advanced by Wallace, McIndoe and others in Britain, or by Postnikov in the Soviet Union, was gaining ground.

Prof. Burian and his assistants studied the wealth of new knowledge to develop a methodology of modern burns management for surgeons. With the dermatologists' resistance finally broken, a 1950 Ministry of Health decree eventually made surgery responsible for the treatment of burns. The Department of Plastic Surgery was given at its disposal a spacious, albeit remote, building of a former sanatorium for the purpose. Following some reconstruction, clinical work was started there in 1953. A few years later, Academician Burian's assistants started more such specialized units in Moravia and in the industrialized regions of Slovakia.

The Prague burns unit became a therapeutic centre for severe and complicated burns, a training centre for surgeons and traumatologists, as well as a centre for clinical research mainly as regards skin transplant operations. A large team of laboratory and clinical staff was built up. Early and late rehabilitation care and spa treatment were ensured. Leading staff members of the unit now have full-scale erudition in plastic surgery, permitting them to co-ordinate acute therapy, to perform all the necessary surgical operations and transplantations as well as subsequent repairs and reconstructions. Their patients receive long-term follow-up care for the detection of any possible late organ changes. On October 13, 1969, an intensive care unit was started there.

Members of the Burns Unit surgical staff publish their experience at home and abroad, taking an active part in the work of specialized international organizations, presenting their reports at congresses, and acquiring new knowledge by studying at similar units abroad. They also fulfil demanding teaching and research assignments. They took as tokens of appreciation of their hard work when Czechoslovakia was commissioned to organize the 3rd World Congress, and they are pleased to see so many foreign specialists taking part in our international symposia. This year, they are looking forward to their workplace, now situated in the middle of too much city centre traffic, being transferred to a building scheduled to be opened in a hospital compound close to the newly developed buildings of the Department of Plastic Surgery. They are all prepared to make solid contributions to the advancement of therapeutical care for the burned. Together with all the rest of our health workers they hope to be able to continue their work in peace in co-operation with fellow specialists all over the world.

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MORE EXPERIENCE WITH BURN SHOCK TREATMENT IN CHILDREN

I. NOVÁK, L. BROŽ, R. KONIGOVÁ, J. ŠPATENKA

INTRODUCTION

In 1981, we published our experience and views of infusion treatment in children in the emergency period of burn shock expressing our conviction, based on the successful treatment of our patients and supported by pathophysiological studies of internal environment changes under conditions of shock, particularly post-burn shock, that an adequate supply of the sodium ion was the most important ingredient of the solutions given to the affected child. As for the amount of the fluids supplied, we reported on our own original formula with regard to the body surface of the burned child. In the present communication we wish to offer more of our experience resulting from the treatment of burn shock in children.

OBSERVATIONS

A total of 94 children with serious burn injuries were treated at the intensive care ward of our burns units during 1980 and 1981. Thereof five burned children, i.e. 5.3 %, died. Concurrently with the procedure described in our previous studies we selected a group of children from those hospitalized at the intensive care ward who had, in the course of the two years, been followed up and given infusion therapy at our unit from the very beginning. Most of them were children admitted within four hours of the burn injury. Characteristics of the group are given in Table 1.

11 of the 16 burned children were boys. One of them had suffered an electric burn, four had flash burns (three of them as a result of a mass accident involving the explosion of propane-butane gas), and one burn resulted from contact with a red hot metal plate. The remaining eleven had scalds from boiling water which they had fallen into or poured themselves with. Two boys who died had flash burns involving 90 and 70 % of the body surface respectively. The average time of treatment at our unit until healing was reached was 26.5 days (10 — 91 day).

Table 1. Characteristics of children admitted at ICU within 4 hours of injury in 1980—1981

N	Age	Ø Age	Burned area	Ø Extent	Degree	Treatment /number of children	Deaths	Treatment time
16	1.5 — 14 yrs	8 yrs	8-90 %	29 %	2nd-3rd	Infusion/16 Pethidine/16 Prothazine/16 Calcium/16 Alpha-blockers/16 Dopamine/5 Methyl-pred-nisolon/3	2/10.2 %	26.5 days Ø (10-90 days)

Table 2 gives the average intake of infusion solutions during the first 24 post-burn hours with regard to the patients' weight and body surface. The Table also gives information on the make up of the solutions supplied. Crystalloid solutions represented 72 % of the total quantity of fluids supplied.

Table 2. Quantities of fluids and their formula in the first 24 hours

Fluids in relation to body surface Ø: 3 993 ml/m²/24 hours

Fluids in relation to body weight Ø: 122 ml/kg/24 hours

Ingredients of fluids supplied in %:	crystalloids	72 %
	colloids	6.5 %
	others	21 %
	(glucose, tea, milk)	

During the emergency period of acute shock, all the burned were continually monitored for pulse rate, blood pressure, respiratory rate, skin temperature — with recordings made every 30 to 60 minutes. Five of the patients had their central venous pressure (CVP) monitored using a Czechoslovak-made LDP 165 monitor (Tesla Valašské Meziříčí). All the patients were continuously checked for diuresis and specific weight of each portion of the urine related to time and body weight (with minimum diuresis amounting to 1 ml/kg/hour). Regular checks at intervals of 8—12 hours were made on the patients' internal environment through assays of its blood and urine components.

Three of the patients had serum osmolality tested at irregular intervals, and two were tested for blood lactate. Most of the patients had the infusion fluids supplied by means of an intravenous cannula introduced into the peripheral venous system. At CVP measurements, the catheter position in the vascular bed was identified in an X-ray check following contrast medium injection, and subsequently monitored using pressure curves registered on an OPD Tesla Valašské Meziříčí monitor. In two cases the fluids were supplied into venesected veins, in two other cases puncture with an injection needle was found adequate.

Table 3. Internal environment parameters monitored during burn shock

Serum: Na, K, Cl, creatinine, urea, AST, ALT, total protein

Blood: blood count, glycaemia, acid-base balance

Urine: glycosuria, specific weight, escape of Na, K, Cl, Hb casts

Given the above regimen of monitoring and treatment, the post-burn shock in 9 children lasted less than 24 hours, in three other children less than 30 hours, and in four children more than 30 hours. The last mentioned group included one of the two children who died, he being the only one to die as a result of unmanaged post-burn shock within five days of admission. Post mortem examination revealed shock changes in different organs and cerebral oedema.

DISCUSSION

As for the monitoring of basic physiological functions and internal environment, the monitoring of diuresis and assessment of the specific weight of each of the urine portions are of decisive importance for post-burn shock control. Also significant is blood pressure taking and, if our experience is anything to go by, it is immaterial if we use the standard method with cuff-equipped tonometer and Korotkov phenomena registering or just CVP monitoring. CVP monitoring is irreplaceable wherever conventional blood pressure taking is ruled out because of burns on all extremities. It can also provide interesting information on the rate of action of some drugs on blood pressure changes, as well as on the dynamics of those changes (calcium, methylprednisolon, etc.). To obtain a good idea of whether or not the anti-shock therapy has been successful it is also advisable to monitor peripheral skin temperature. Respiratory and pulse rate taking will not produce much of substance in children; besides, the two values are closely correlated to body temperature. As for the internal environment parameters, useful information on the burn shock dynamics can best be obtained by monitoring, in particular, the values of glycaemia, acid-base balance and natriuria, especially the Na:K ratio in the urine. The rest of the parameters examined exhibit non-specific variations, and tend to be influenced to a large extent by the rate, quantity and composition of infusion solutions. This is true of sodium itself where the values are, as a rule, found slightly decreased though mostly still at the lower limit of normal serum con-

centration matched by slightly decreased levels of serum osmolality as we were able to see in a number of our patients.

At the onset of burn shock, all patients had increased or normal values of blood pressure, low peripheral skin temperature, and oliguria with high specific weight. Most of the patients had metabolic acidosis, though with no direct correlation to the clinical relevance of the shock manifestations of hyperglycaemia. Provided the patient responds well to what is a correctly planned treatment, increased blood pressure is restored back to normal, diuresis will increase, the specific weight of the urine will drop, and the difference between central and peripheral skin temperatures will grow less (on palpation there is warm periphery). As the burn shock is abating the patient should, for several hours, have been producing, on average, more than 1 ml/kg/hour of urine, whose specific weight should be less than 1020, and the difference between central and peripheral body temperatures should be no more than 2 to 3 degrees Celsius. Blood pressure ought to be stabilized. There should be normal acid-base balance, normal or slightly lowered glycaemia, and natriuria more than 0.5 mmol/kg/4 hours. Sodium levels in urine samples should be double those of potassium.

Increased glycaemia and low natriuria are manifestations of disordered cell membranes affected by depolarization due to shock hypoxia. Hypoxia, in turn, is due to vasoconstriction (excluding the central arterial bed) designed to preserve an effectively circulating blood volume in vital organs under conditions of developing hypovolaemia. Sodium enters the cells to be followed by water and hydrogen. Potassium leaves the cells to escape increasingly into the urine. The resulting state of hyponatraemia will activate the aldosterone mechanism to protect the organism against sodium and water loss, which is another factor with a bearing on oliguria in burn shock.

The cells are no longer able to utilize glucose since their hypoxia-affected membranes fail to respond to insulin, of which there may be absolute deficiency at the onset of shock. Vasoconstriction in the splanchnic system, including the pancreas, is due to the immediate depressive effect that catecholamines have on the pancreatic beta cells. In addition, glucoso-6-phosphate dehydrogenase activity is also blocked with the cells unable to utilize saccharides dependent on the particular function of that enzyme (glucose, fructose and, consequently, sorbitol, too). The pathogenesis of metabolic acidosis and hyponatraemia follows from the above facts.

Arterial hypertension is due to the body's alpha-mimetic alarm reaction in the presence of growing hypovolaemia. Vasoconstriction in the skin and muscles is responsible for the peripheral skin temperature drop while vasoconstriction in the splanchnic system, along with hypovolaemia, accounts for shock oliguria. Both will disappear, however, if the blood volume is adequately replenished and if vasoconstriction is relieved by means of alpha-blockers. In case oliguria persists despite all fluid supply and alpha-blocking treatment, the following causes ought to be suspected: hyposystole, the adequacy of the supply of fluids in view of their escape from circulation,

and shock kidney. This is evidenced by an increase in blood pressure (increased central venous pressure) reflecting hyperhydration with the periphery well supplied with blood at a corresponding temperature, and by persisting oliguria marked by low specific weight of the urine (low osmolality) at a relatively high sodium output in the urine. This type of renal failure should be made distinct from situations suggesting shock oliguria due to hypovolaemia. There, too, oliguria is present but is marked by high urine specific weight and low natriuria. Apart from the shock kidney syndrome, oliguria may be concomitant to an inadequate supply of infusion fluids as regards their quantity or rate of supply or, also, as regards their formula. In our experience, strict precautions should be taken to make the fluid supply rate answer, if possible, to the following pattern:

- during the first two hours — 30—40 ml/kg b. w.
- during the first 8 post-injury hours — half the amount of total planned quantity of infusion fluids
- during the remaining 16 hours until the end of the first 24-hour post-injury period — the rest of the calculated amount.

If there is a delay in the fluid supply, oliguria becomes unnecessarily protracted, and there may also be signs of relatively excessive alpha-block due to a deficiency of fluids in the vascular system (drop in blood pressure and in CVP, low peripheral skin temperature). Oliguria may also be due to hyposystole resulting from the myocardium being affected by toxins released from heat-destroyed tissues, by hypoxia or metabolic changes. This will take the form of arterial hypotension, increased CVP, mildly decreased peripheral skin temperature, tachycardia unrelated to body temperature, galloping rhythm. If this is the case, we should consider if the patient is not given excessive amounts of the fluids and start giving dopamine in doses of 3—10 micrograms/kg/min. by instillation. No heavier doses were used. Within a few tens of minutes, blood pressure should rise by half its initial value, and sufficient diuresis should set in. In case the therapy fails, the dosage should not be increased since the alphanimetic effect of dopamine may easily prevail over the desired betamimetic effect.

The complexity of the situation in an adversely developing burn shock is illustrated also by the persistence of oliguria due to hypovolaemia in spite of satisfactory myocardial function, functionally intact renal parenchyma, and adequate fluid supply. This is a reflection of a state known as the sick-cell syndrome with sodium persistently escaping into the cells from the interstitium and with water subsequently escaping from circulation. In such cases there is normal or slightly decreased blood pressure and CVP, mild tachycardia, well supplied periphery, massively developing generalized oedema and oliguria. This is a situation calling for megadoses of corticoids. The primary choice there is methylprednisolone in doses of 30 mg/kg, or hydrocortisone 100 mg/kg in a single fast instillation or split into two fast infusions depending on the patient's condition. Furosemide in doses determined by the patient's weight is given simultaneously. This approach proves useful also in cases of transient

relative hyperhydration or in the presence of signs of myocardial failure — in the latter case — in combination with dopamine. If shock kidney is suspected, we start the course of therapy using the simultaneous infusion of furosemide and manitol in doses of 1 g/kg/2 hours. Unless adequate diuresis is obtained, the above doses should be repeated.

As regards the total amount of infusion fluids, we were able to confirm the advantage of our original formula:

$75 \times \% \text{ of burned area} \times \text{body surface in m}^2$

+ $1800 \times \text{body surface in m}^2$ (for children under 10 years of age, for those over the 10-year mark the usual coefficient is $1500 \times \text{body surface in m}^2$).

Children under the age of 3 are an exception where the old formula had better be adhered to:

$2 \times \% \text{ burned area} \times \text{body weight in kg}$

+ physiological daily intake of liquids.

The body surface formula, otherwise highly advisable and safe and giving a very good idea of the adequate fluid intake for children over 3 years of age, may give somewhat lower figures for children under the age of three years. In the youngest age category the demand in the first 24 post-injury hours is due to the fact that the balance of fluids is in better correspondence with the changing body weight (from birth to the age of three years the body weight will increase 5 fold, whereas the body surface only 3 fold; between the ages of 3 and 10 years the weight and body surface will grow proportionally to about double the initial values).

As for the composition of the fluids supplied, crystalloids constituted 71 % of the total volume of fluids in a group of 16 children receiving acute treatment for burn shock. Concordance with the group reported on in the present communication can be seen in that crystalloids there represent 72 % of the total volume of fluids delivered within the first 24 post-injury hours. One thing to be borne in mind always is that the sodium ion is the crucial element for keeping an adequate effectively circulating volume of blood. If the need arises to increase the blood volume rapidly as is often the case at the onset of burn shock or in transient hypovolaemia resulting from increased fluid escape from the vascular system in the course of the shock, the rate of crystalloid infusion should be increased to 30—40 ml/kg/2 hours. The adequacy or otherwise of using plasma or plasma volume expanders for the rapid restoration of the volume of blood in the treatment of burn shock in children will be the subject of the next of our communications.

CONCLUSION

Burn shock treatment in children requires intensive monitoring and comparisons of the dynamics of changes in essential physiological functions (with stress laid on diuresis, blood pressure and peripheral skin temperature) and in internal environment (with stress laid on natriuria, the urine Na : K ratio, glycaemia, and acid-base balance). The calculated amount of fluids should be delivered at an adequate rate to achieve the earliest possible restoration and

maintenance of sufficient blood volume in effective circulation. The administration of alpha-blockers proves helpful in children since burn shock is always accompanied by elevated alpha-mimetic activity of the sympathetic nervous system with all the adverse effect. Where in spite of adequate rate and volume of infusions there is persistent oliguria and signs of hypovolaemia due to hypovolemia or aggravation of the sick-cell syndrome, we give dopamine, furosemide and methylprednisone. Should a shock kidney situation arise we try and manage it by the simultaneous administration of mannitol and furosemide. We insist on the key importance of solutions containing sodium in quantities corresponding to ECT with a view to maintaining an adequate blood volume in effective circulation.

J. H.

SUMMARY

The authors report more of their experience with burn shock management in 16 children (average age 8 years) with burns involving 8—90 % of the body surface (average 29 %). In what is a follow-up to their communication published in the present journal in 1981 they confirm the validity of their own formula for fluid supply calculation with regard to the body surface in children —

$75 \times \% \text{ burned area} \times \text{body surface in m}^2$

$+ 1800 \times \text{body surface in m}^2$

for children over the age of three years. For younger children the following formula is more advisable

$2 \times \% \text{ burned area} \times \text{body weight in kg}$

$+ \text{physiological daily fluid requirement}$

Also included is experience concerning the comprehensive follow-up of vital physiological functions and internal environment in children during the period of burn shock as essential data for shock dynamics assessment and as a rational basis for therapeutical strategy. The salient therapeutical measure is the provision of adequate supply of crystalloid solutions containing sodium in quantities usual in ECT with the simultaneous administration of alpha-blockers. A list is added of indications for other therapeutical measures such as the administration of dopamine, methylprednisolone, mannitol and furosemide in cases of burn shock complications.

RESUME

Des expériences ultérieures du traitement du choc de brûlure chez des enfants

Novák, I., Brož, L., Königová, R., Špatenka, J.

Les auteurs apportent ses expériences ultérieures du traitement de choc de brûlure de 16 enfants. Les enfants étaient âgés de 8 ans, en moyenne. L'étendue des brûlures variait de 8 à 90 % de la surface corporelle (en moyenne 29 %). En rappelant leur travail, publié dans notre journal en 1981, les auteurs confirment l'avantage de leur propre formule pour le calcul des liquides, quelle respecte la surface corporelle des enfants:

pour les enfants à parti de 3 ans —

$75 \times \% \text{ de la surface brûlée} \times \text{la surface corporelle (en m}^2\text{)}$
 $+ 1800 \times \text{la surface corporelle (en m}^2\text{)}$
pour les enfants avant de 3 ans, il existe une formule plus convenable —
 $2 \times \% \text{ de la surface brûlée} \times \text{le poids corporel (en kg)}$
+ l'exigence physiologique journalière des liquides.

Ci-après on résume des expériences obtenues par l'observation complexe des fonctions physiologiques vitales et du milieu interne. Ces observations, exécutées sur les enfants à l'état de choc de brûlure, servaient comme fondement pour évaluer la dynamique de l'état de choc de brûlure et comme point initial de la thérapie. L'accent principal de la thérapie est posé sur l'amenée suffisante des solutions cristalloïdes comportantes le sodium dans la même quantité que celle du liquide extra-cellulaire. En même temps, on applique des alpha-bloquants. Les auteurs allèguent des indications d'autres procédés thérapeutiques comme, par exemple, l'application de dopamine, méthylprednisolone, manitole, furosemide qui sont recommandés au cours du choc de brûlure compliqué.

ZUSAMMENFASSUNG

Weitere Erfahrungen mit der Behandlung eines durch Verbrennung hervorgerufenen Schocks bei Kindern

Novák, I., Brož, L., Königová, R., Špatenka, J.

Die Autoren beschreiben weitere Erfahrungen mit der Behandlung eines durch Verbrennung hervorgerufenen Schocks bei 16 Kindern im Durchschnittsalter von 8 Jahren mit Verbrennungen im Umfang von 8 bis 90 % der Körperoberfläche (im Durchschnitt 29 %). Anknüpfend an ihre Mitteilung in der vorliegenden Zeitschrift von 1981 bestätigen sie die Vorteilhaftigkeit ihrer eigenen ursprünglichen Formel zur Berechnung der Flüssigkeitsmenge, die sich auf die Körperoberfläche der Kinder bezieht:

$75 \times \% \text{ der verbrannten Fläche} \times \text{Körperoberfläche in m}^2 + 1800 \times \text{Körperoberfläche in m}^2$ — bei Kindern, die älter als drei Jahre alt sind, während für jüngere Kinder die folgende Formel geeigneter erscheint:

$2 \times \% \text{ der verbrannten Fläche} \times \text{Körpermasse in kg} + \text{physiologischer taglicher Flüssigkeitsbedarf.}$

Ferner werden Erfahrungen mit der komplexen Behandlung der vitalen physiologischen Funktionen und des inneren Milieus der Kinder im Verlauf des durch Verbrennungen verursachten Schocks angeführt als Unterlage für die Einschätzung der Dynamik des Schockzustands und als rationaler Ausgangspunkt für die Behandlung. Im Vordergrund der Therapie steht die genügende Zufuhr Natrium enthaltender kristalloider Lösungen in einer im ECT bei gleichzeitiger Anwendung von Alphablockatoren üblichen Menge. Weiters wird die Indikation weiterer Behandlungsmassnahmen erwähnt, wie die Verabreichung von Dopamin, Methylprednisolon, Manitol und Furosemid bei einem komplizierten Verlauf des durch die Verbrennung verursachten Schocks.

RESUMEN

Nuevas experiencias en el tratamiento producto de quemaduras en los niños

Novák, I., Brož, L., Königová, R., Špatenka, J.

Los autores describen nuevas experiencias en el tratamiento de la conmoción por quemadura en 16 niños de una edad promedio de 8 años con quemaduras que afectan un 8—90 % de la superficie del cuerpo (un promedio de 29 %) Remitiéndose a su an-

terior información en esta revista (1981) vuelven a confirmar lo adecuado de su propia fórmula original para calcular la cantidad de líquidos a base de relación directa con la superficie del cuerpo del niño.

$75 \times \% \text{ de la superficie quemada} \times \text{la superficie total del cuerpo en ms}^2 +$
 $+ 1800 \times \text{la superficie total del cuerpo en ms}^2 -$ para niños mayores de 3 años.

Para los menores de tres años resulta más adecuada la fórmula

$2 \times \% \text{ de la superficie quemada} \times \text{el peso del cuerpo en kgs} +$ necesidad fisiológica diaria de los líquidos.

A continuación se describen las experiencias adquiridas por el control complejo de las funciones vitales y el ambiente interior de los niños en el proceso de la conmoción que sirven para evaluar el desarrollo de la misma además de ser un punto racional de partida para la terapia.

Los autores destacan la aplicación de suficientes soluciones cristaloides con contenido de sodio en cantidades acostumbradas en ECT, con aplicaciones simultáneas de alfabloqueadores. Es terapéutica también la aplicación de dopamina, metilprednizolona, manitol y furosema en caso de conmoción complicada.

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ELBOW JOINT ANKYLOSIS FOLLOWING THERMAL INJURY

B. VRBICKÝ, J. KUDEROVÁ, R. KÖNIGOVÁ

Post-burn trauma requires a team approach for the treatment of complications in all its phases. Extensive and deep burns cause not only soft tissue damage but also bone changes. Such burn trauma aftereffects are dealt with in co-operation with the 1st Department of Orthopaedic Surgery, Prague.

There are two types of skeletal complications:

1. Immediate exposure to high temperature results in bone cell necrosis, in intravascular blood coagulation, and in bone marrow dehydration. This is followed by necrosis of the affected part of the bone and its gradual demarkation with destruction of those articular portions seen in the epiphyses.

2. Apart from those immediate changes, however, bone tissue may exhibit changes also in those patients where there was no immediate thermal bone involvement. Those indirect changes can be divided into two groups:

a) Dystrophic changes taking the form of Sudek's syndrome are the most frequent occurrence. Theirs are complex causes such as the combined effects of long-term immobilization, impaired adrenocortical activity, concomitant infection of the burn areas, etc.

b) Calcification and ossification of soft tissues are less frequent, though equally serious changes. X-ray films will show cloud-like, spotted, striated or even homogenous opacities suggesting the presence of calcifications which may become ossified. The appearance inside the calcified opacity of trabeculae with a denser border of the cortical layer is X-ray evidence of that particular stage.

The elbow, and to a lesser degree the shoulder, knee and ankle joints are the most frequent sites of affection.

The calcifications and ossifications may take the form of either minor foci (e.g. in the knee joint gap as ossifications of the Stieda-Pellegrini type), periosteal borders extending along the bone, or, eventually, massive calcifications and ossifications of periarticular soft tissues limiting or completely blocking motion in the joint and, consequently, leading to extraarticular ankylosis.

Although there is no doubt that those calcifications and ossifications are directly related to the burn injury, their mode of genesis is vaguely understood. Unlike the metabolic type of calcification where increased blood serum

levels of calcium and phosphorus results in their being deposited in pre-disposed tissues, this is a dystrophic type of calcification where the serum levels of calcium and phosphorus are normal but where locally impaired tissue viability causes the minerals to be taken up in exactly that region. There are other factors at play, too, such as increased alkaline reaction in the traumatized tissue, nervous and vascular effects, e.g. soft tissue oedema.

Consequently, post-burn ankyloses can be divided as follows:

1. Intraarticular ankylosis resulting from:
 - a) the bone being directly exposed to high temperatures, a condition leading to bone necrosis and to the destruction of joints where those are involved
 - b) post-burn suppurative bone and joint complications
2. Extraarticular ankylosis of the dystrophic type resulting from massive peri-articular calcifications and ossifications after thermal injury.

In co-operation with orthopaedic surgeons, we treated patients with both types of elbow joint ankylosis resulting from burns. Most of them were cases of bilateral involvement. The elbow joints were in a functionally unusable (extension) ankylotic position, thus making the patients as much affected as those with bilateral upper extremity amputation.

The following four methods of surgical treatment can be considered in such cases:

1. Elbow mobilization by removing ossifications and calcifications
2. Elbow mobilization using resection plastic operation
3. Elbow mobilization using alloplastic replacement
4. Angulation osteotomy in the ossified elbow

Ad 1. Elbow mobilization by removing calcifications and ossifications

This operation is indicated in extraarticular ossifications. The original number of patients chosen for this type of operation was 9 but in the course of the operation we succeeded in restoring elbow motion removing all the accessible ossifications in only five of them. In the remaining four resection plastic operation had to be resorted to.

Ad 2. Resection plastic operation

This method is primarily indicated in cases of intraarticular ossification. The technique has been available for many years now. In this country it was used in rheumatics and reported on by Prof. Popelka back in 1957.

Since, however, there are certain specific features to post-burn ankylosis we decided to develop a method which is a modification and, to a certain extent, a compromise between techniques according to Herbert and Hasse.

A brief description of our own procedure:

a) we use a "lazy-S" rather than a longitudinal skin incision on the elbow dorsum according to Langenbeck.

b) Exposure of the ulnar nerve: what under normal anatomical conditions is an easy affair can prove an extremely difficult operation in burned elbows

for we often had to use trephination to free the nerve from bony tunnels in ossifications.

c) The bone can be approached using a longitudinal discision of the triceps according to Hasse. In our modification, considering the occasional difficulty in knowing beforehand which will be successful: whether the removal of ossifications or the resection technique in order to mobilize the elbow, we make a "V" incision of the triceps about 2 cm above the tip of the olecranon with the angle open distalward.

d) Preserving an adequate distance, we shape the humeral and ulnar ends of the elbow joint: the former to the shape of a split cylinder, the latter to the shape of a corresponding recess. Only two cases required resection of the radial head.

e) A dermal graft is taken from a thermally unaffected site. Unlike rheumatosurgery, the lifting poses considerable difficulty because of the scarring of a large part of the body surface. The graft complete with pre-drilled holes is sutured with silon material to the pre-shaped humeral and/or the ulnar stumps.

f) Redon's drainage, suture of the triceps incision (the defect can be filled with a graft from the fascia lata), subcutis and cutis. Then we immobilize the elbow in a functional position to start early rehabilitation.

The results of our resection plastic operations are as follows: we operated on 15 patients and checked up on the results two years after surgery. Thereof:

a) range of motion over 90°; with vacillation	3
b) range of motion about 90°; without vacillation	6
c) range of motion dropped to 45° in 2 years	5
d) patient died after operation	1

Note on patient who died after operation: he was operated on a year after he had sustained 60 % 2nd to 3rd degree thermal injury. Two days after resection plastic operation, which had passed without complications, he suddenly died. At post mortem there were no macroscopic signs of the cause of death. Adrenal failure following relatively inadequate stress of the operation was eventually stated. However, histological tests performed subsequently following a meticulous epicrisis revealed acute dystrophy of the liver. Proceeding from all the biochemical and virological tests repeatedly performed in the course of long-term therapy, the patient was found to have had a history of severe liver damage caused by cytomegalovirus. His condition had improved enough for rehabilitation treatment at the Kladruby rehabilitation centre to cause no deterioration of the hepatic lesion until general anaesthesia with Halothane at the time of the orthopaedic operation triggered off acute hepatodystrophy.

Ad 3. Elbow mobilization using alloplastic replacement

We have no experience of our own as regards this particular approach. Although a whole number of alloplastic types of replacement have been devised, they have so far failed to provide any longer-lasting substitution for classical arthroplasty, mainly because of the complexity of the elbow joint biomechanics. This is due to a combination of considerable extension, flexion and

rotation forces acting on the implant. Prolonged uses result in the intrusion of mainly the humeral body, a condition which may lead to porous bone structure.

Ad 4. Angulation osteotomy in the ankylotic joint

We perform this operation the same as arthrodesis of the elbow, indicating it in cases of bilateral elbow anyklosis combined with loss injuries (amputation of the hand, forearm) where prosthesis is planned. Our group includes one such patient with amputation for electric burns in both forearms and bony ankylosis of both elbows in extended position. Our procedure there is step-by-step angulation osteotomy of both elbows at right angles, to be followed by the provision of a cosmetic replacement on the left side and a myoelectric prosthesis on the dominant, right, side.

The above mentioned case should serve as a memento for several reasons:

- a) prior to indication for orthopaedic surgery, all possible complications of the burn disease should be considered.
- b) the operations should be performed at a burns unit where anaesthesiologists experienced in the problems of burns employ sparingly means of general anaesthesia with regard to previous complications.
- c) a burns unit is also adequately qualified and equipped for covering skin defects with local flaps or with grafts.

J. H.

SUMMARY

The authors give a list of the pathophysiological causes of ankylosis, particularly of the elbows joints, developing as a result of burns. The causes are classified in terms of surgical treatment with the following solutions proposed:

1. Elbow mobilization through the removal of calcifications
2. Elbow mobilization using resection plastic operation
3. Elbow mobilization using alloplastic replacement
4. Ankylotic elbow angulation osteotomy

The hazards are stressed of general anaesthesia; following an extensive burn trauma, this ought to be administered sparingly by anaesthesiologists experienced in burn treatment.

RESUME

Les ankyloses des articulations cubitales après une brûlure

Vrbický, B., Kuderová, J., Königová, R.

Dans l'article on résume des causes patophysiologiques de la création des ankyloses, surtout des joints cubitales, conséquences des brûlures. Du point de vue du traitement chirurgical proposé, on a partagé ces causes de la façon suivante:

1. mobilisation du coude par la suppression des calcifications
2. mobilisation du coude par une plastie résécatoire
3. mobilisation du coude par l'exécution d'une autogreffe
4. ostéotomie angulaire du coude ankylosé

Les auteurs avertissent le danger de l'anesthésie générale qui — dans le cas d'un grand trauma thermique — doit être exécuter par un anesthésiste rompu.

ZUSAMMENFASSUNG

Die Ankylose der Ellbogengelenke bei Verbrennungen

Vrbický, B., Kuderová, J., Königová, R.

In der Mitteilung werden die pathophysiologischen Gründe der Bildung von Ankylosen besonders der Ellbogengelenke angeführt, wie sie nach Verbrennungen entstehen. Diese Ursachen werden dann vom Gesichtspunkt der chirurgischen Behandlung eingeteilt, für die folgendes vorgeschlagen wird:

1. Mobilisierung des Ellbogens durch Beseitigung der Kalzifizierung
2. Mobilisierung des Ellbogens durch plastische Resektion
3. Mobilisierung des Ellbogens durch alloplastische Prothese
4. anguläre Osteotomie des ankylotischen Ellbogens.

Es wird auf die Gefahr der Gesamtanästhesie hingewiesen, die nach einem umfangreichen Verbrennungstrauma sehr vorsichtig von einem in der Problematik der Verbrennungen erfahrenen Anästhesiologen geleitet werden muss.

RESUMEN

Anquilosis de las articulaciones cubitales como consecuencia de quemaduras

Vrbický, B., Kuderová, J., Königová, R.

En el estudio se plantean las causas patofisiológicas de la creación de las anquilosis, en particular en las articulaciones cubitales producto de las quemaduras. Se ha realizado la división de dichas causas desde el punto del tratamiento quirúrgico para el cual se plantea:

1. movilización del codo al eliminarse la calcificación
2. movilización del codo por plásticas de resección
3. movilización del codo por sustitución aloplástica
4. osteotomía angular del codo anquilosado

Se hace observar el peligro al aplicarse la anestesia general que, en vista del amplio trauma producto de la quemadura, debe ser realizada cautelosamente por un anestesiólogo experto en la problemática de las quemaduras.

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BOOK REVIEW

W. Blauth, F. Schneider-Sickert: **Congenital Deformities of the Hand. An Atlas of Their Surgical Treatment.** Springer-Verlag, Berlin—Heidelberg—New York, 1981, p. 387, 426 illustrations.

The publication is an English translation of a 1976 German language edition by Prof. U. H. Weil of the United States. The reason for the German version was the thalidomide disaster in the German speaking countries in 1959—1962 when many children were born with deformities of the upper extremities. The book had been systematically prepared from the year 1964 on the basis of more than a thousand surgical operations, fully documented from skin incision up to healing and subsequent follow-up care. This is a serious work presenting the results achieved with long-tested satisfactory methods. There are 16 chapters each dealing with a particular type of congenital deformity, but no systematic classification as the book proceeds according to morphological

changes. Each chapter is introduced by information on the defect concerned, followed by general directions for surgical treatment, data about the optimum age for surgery, and details about post-operative care. Depending on the diagnosis, this is followed by a series of three-colour pictures showing each particular phase of the operation with details and explanations on the opposite side. The surgical drawings give a very good idea of the whole operating field with all the important structures and of the actual surgical procedure. The authors make experienced use of all the methods of plastic surgery except that there are no descriptions of microsurgical procedures which might be of good use in certain indications. However, all the methods listed there are easy to repeat. The book is an excellent textbook of surgery for inborn deformities, for surgery of the hand, for orthopedic as well as plastic surgeons.

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TOTAL PARENTERAL NUTRITION IN SEVERE PAEDIATRIC BURNS

J. PACHL, M. KRUF, V. ZÁBRODSKÝ, L. BROŽ, V. KYNCL, J. POKORNÝ, R. KÖNIGOVÁ

The treatment of the severely burned child may be complicated by vital functions failure.

The child's admission in a paediatric intensive care unit is indicated whenever surgical treatment and comprehensive burn injury therapy along with treatment for respiratory insufficiency, circulatory failure, brain swelling, renal failure and/or other disorders are necessary for the survival of the critically burned patient.

In the 1979–1982 period, 224 children were treated at the Prague Burns Unit, and 15 severely burned children, aged 0–15 years, TBSA 20–75 %, were referred to the Paediatric Multidisciplinary Intensive Care Unit in Prague-Motol Hospital. Mortality among that group of 46 %. The causes of the origin of critical conditions were respiratory insufficiency due to ARDS of different aetiology, septic shock, upper airway obstruction, aspiration, as well as circulatory failure resulting from uncontrolled shock, wound infection together with increased protracted stress due to repeated surgical procedures and pain stimulation from delayed burned surface healing. Brain swelling occurred in one case, and was consequent to asphyxia after aspiration. The disorders were handled observing general therapeutical principles employed in paediatric intensive care units.

Total parenteral nutrition (TPN) was used in all patients for 15 to 65 days. Central venous catheters, IVAC and PE 01 infusion pumps, Cathivex Millipore (pores 0.22 μ m) bacterial filters, and Czechoslovak-made infusion kits were used to complete the infusion lines. The generally accepted system of children's total parenteral nutrition was used at the Paediatric Multidisciplinary Intensive Care Unit.

Glucose failed as an adequate source of energy supply to critically affected children, and there were doubts also as to the employment of insulin in support of glucose utilization. The correct dosing of glucose had to be backed up by

respiratory quotient monitoring [1, 2, 3]. While fatty emulsions are contraindicated under certain circumstances, we believe the normal levels of essential fatty acids are needed at their accepted administration rate of 0.75 g/kg of BS per day of Intralipid emulsion.

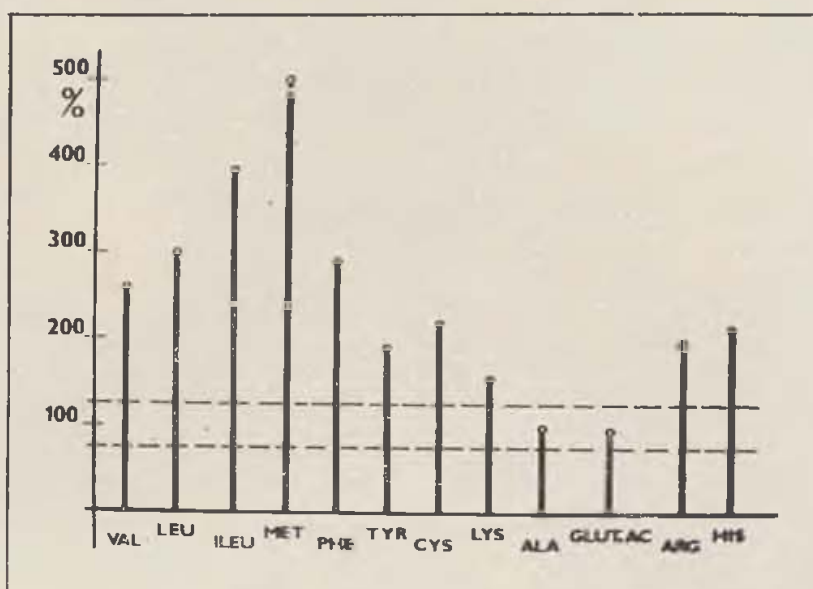


Fig. 1. Z. T., 1,5 years, boy, burn 45 % BSA. Terminal — Septic Phase Aminogram.

As to amino acid solutions, we used the Czechoslovak-made Nutramin — for general use, Nutramin C — for liver failure, Nutramin U — for renal failure, and Nutramin NEO and VLI which are still going through clinical trials.

In severe burn injury (more than 60 % TBSA) and in the case of one boy, aged 1.5 years, who suffered a burn (45 % TBSA total skin loss) the catabolic phase was altered for only a short period of time. Repeated surgical operations,

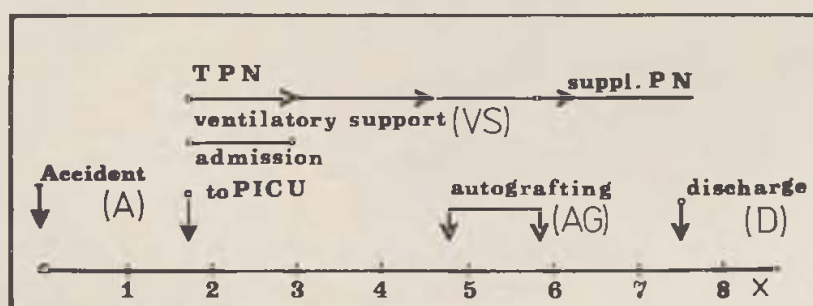


Fig. 2. During 44 days 24 procedures under GA, x — weeks,

infection and other complications caused disturbances in energy supply and homeostatic disbalance with signs of hyperosmolality, disseminated intravascular coagulopathy, terminal circulatory failure together with brain swelling. The dosage of amino acids remained under 3 g/kg of BS per day. In the terminal

phase of therapy, aminograms showed disorders typical of malignant sepsis or of burn injury with severe metabolic blocks (Fig. 1).

A boy, aged 2.5 (Fig. 2) suffered 55 % TBSA deep dermal scalp injury, of which 30 % proved total skin loss. Within 11 days of the injury he was admitted in the Paediatric Intensive Care Unit. The indication was respiratory

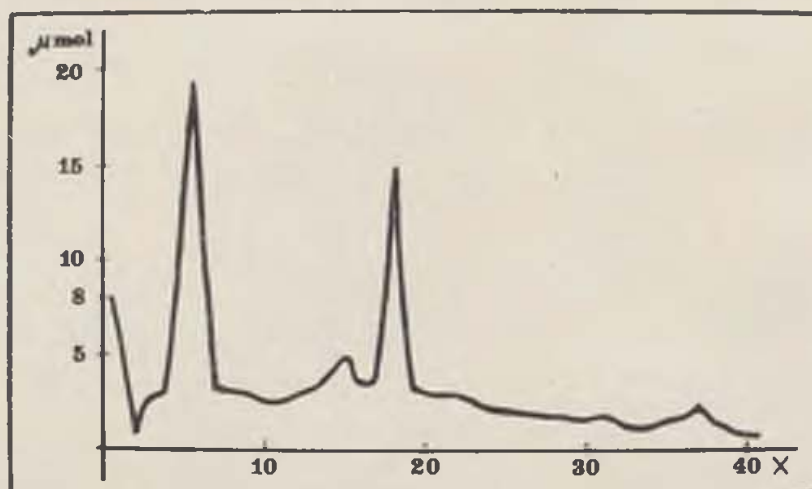


Fig. 3. Absolute value of urine creatinin in $\mu\text{mol/day}$, x — days.

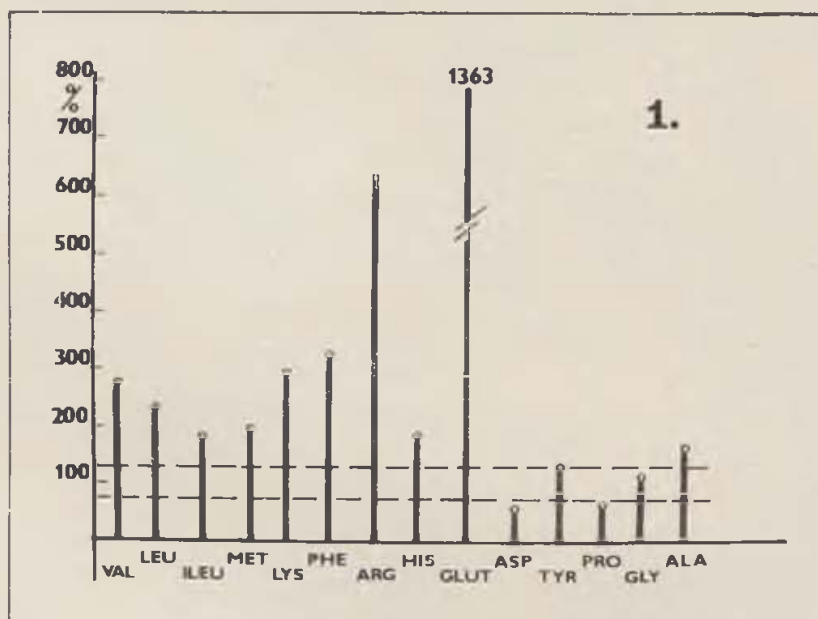


Fig. 4. 1. 5th day.

insufficiency and wound sepsis. Total parenteral nutrition was begun with higher energy-nitrogen ratio (500—800 kJs per 1 g of nitrogen). After three days, this ratio was gradually decreased to the level of 200-300 kJs per 1 g nitrogen. As the therapy proper began, the supply of amino acids was maintained at high levels of 5—6 g of amino acids per kg of BS per day (i.e., 0.43 g of nitrogen/kg/day).

A mixture of amino acid solutions Nutramin U (35 % of BCAA) and Nutramin for general use (11.4 % BCAA) with average AA mixture concentration near the 20 % BCAA mark was used.

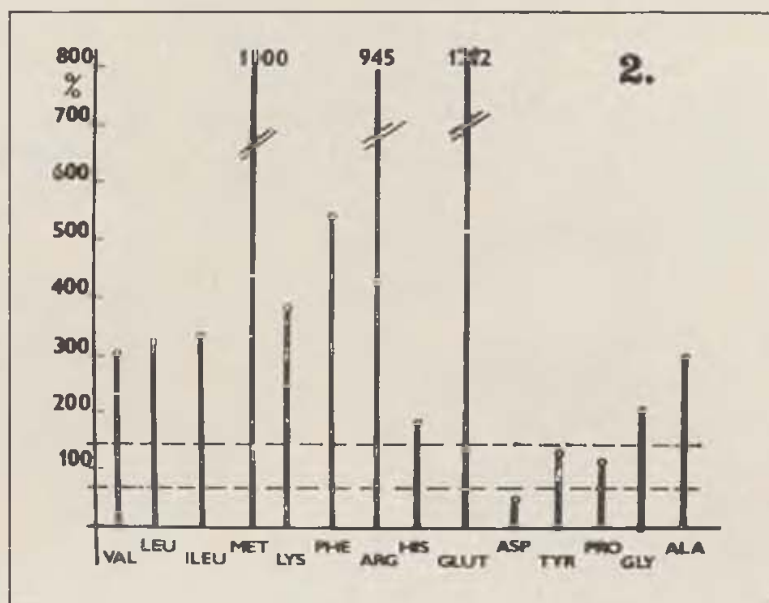


Fig. 5. 2. 6th day.

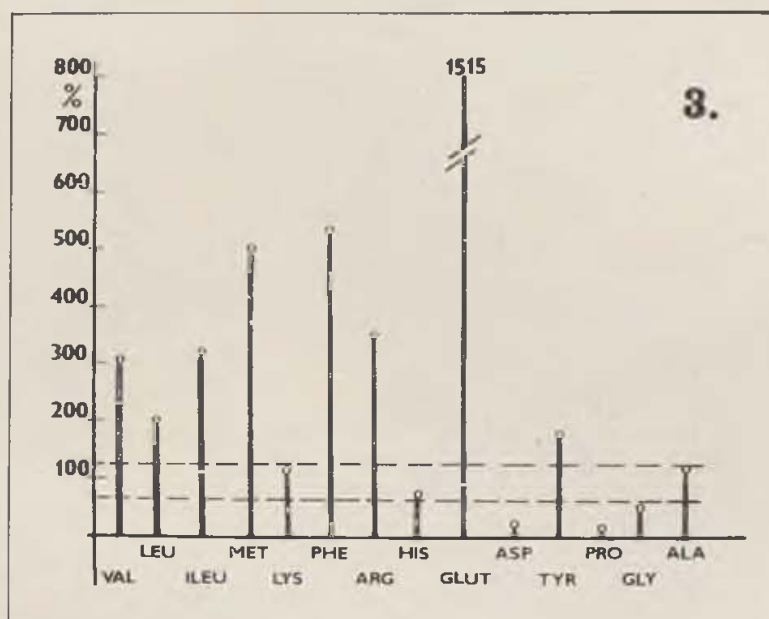


Fig. 6. 3. 7th day.

Except for the initial three days of total parenteral nutrition, positive (or slightly negative) nitrogen balance was achieved in a 12-hour interval. The amino acid mixture was well tolerated.

Urea creatinine was measured every day. The loss in urine gradually dropped except for 4 peaks correlating with the patient's clinical condition and with the nitrogen balance.

The creatinine/height index, on average, never fell below the 0.9 mark.

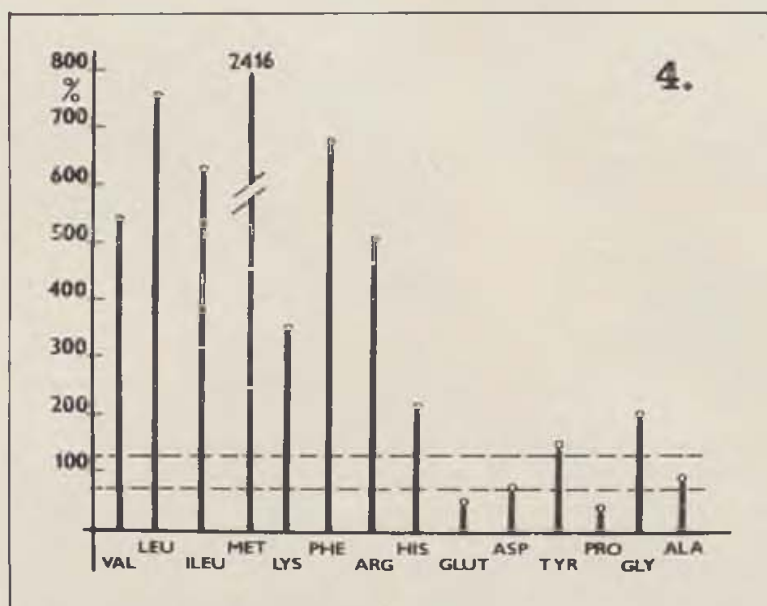


Fig. 7. 4. 10th day.

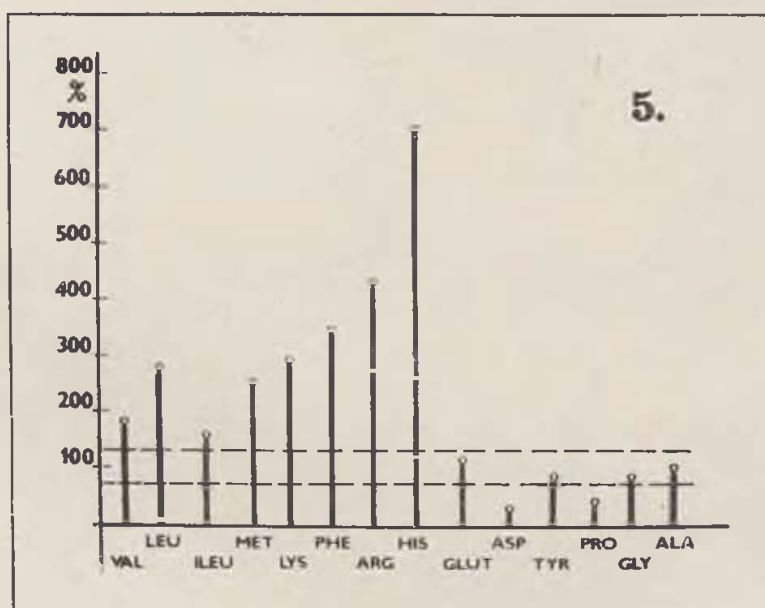


Fig. 8. 5. 14th day.

During the 44 days of total parenteral nutrition, intensive therapy and measuring, the burned surfaces healed, and the patient could be discharged.

In this case, we measured the amino acid levels in plasma throughout the period of total parenteral nutrition. The values are presented in per cent of normal level which is 100 % [Figs. 4, 5, 6, 7, 8, 9]. High levels of methionin,

phenylalanine and tyrosine indicate liver function impairment. The parenteral administration of heavy doses of amino acids (20 % BCAA mixture) applied at a rate of 5—6 g/kg of BS, increased the essential amino acid level 1.3—10 times, and the levels of the branch-chain amino acids 1.5—7 times the normal level.

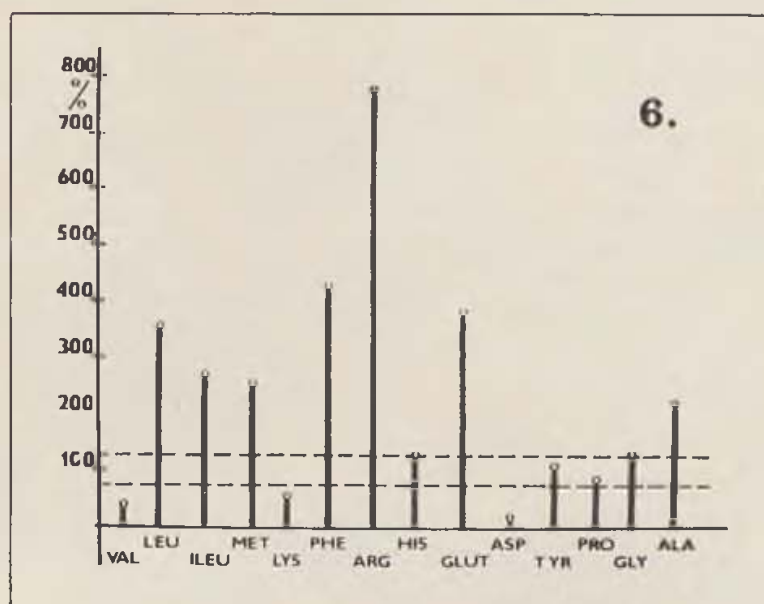


Fig. 9. 6. 28th day.

The high concentrations of branch-chain amino acids improved the proteo-synthesis and decreased proteolysis in muscles. They also decreased the levels of serum methionine, phenylalanine and tyrosine after two weeks of therapy.

The high amino acid levels initiated the pharmaco-dynamic effect, and contributed to good tolerance of amino acid mixtures (5). Incidentally, the normalization of amino acid levels during total parenteral nutrition of burned children, in our opinion, is not the purpose of therapy. The pharmacodynamic effect of high plasma amino acid levels can generate a positive nitrogen balance, good tolerance of amino acid solutions, and adequate energy supply, and probably also normalize amino acid levels in the intracellular region. This is the objective of total parenteral nutrition not only in severely affected children but in all critical medicine.

J. H.

SUMMARY

The authors report on their experience with parenteral nutrition in severely burned children with vital functions failure, stressing the need for supplying amino acid solutions rich in branch-chain amino acids to provide the patients with adequate energy and to maintain a favourable nitrogen balance. In one patient, high pharmacodynamic levels of valine, leucine and isoleucine were reached by an unusually high level of supply of a mixture of Nutramin U and Nutramin (20 % branch-chain amino acids in doses of 5 to 6 g/kg/day). The

mixture was well tolerated with the energy supply equal to 1 g nitrogen 200—300 kJ.

RESUME

La nutrition parentérale totale des enfants gravement brûlés

Pachl, J., Kruf, M., Zábrodský, V., Brož, L., Kyncl, V.,
Pokorný, J., Königová, R.

Les auteurs font un rapport de ses expériences avec la nutrition parentérale des enfants gravement brûlés dont les fonctions vitales sont en défaillance. Ils soulignent l'importance de l'application des solutions d'amines possédantes plus d'acides aminés ramifiés ce qui assure aux malades une situation énergétique favorable et un bon équilibre azoté. Chez un malade, on a obtenu un haut niveau pharmacodynamique de valine, leucine et isoleucine, en utilisant de hautes doses de la mixture de Nutramin U et de Nutramin (20 % d'acides aminés ramifiés à la dose de 5—6 g/kg/j). La mixture était bien tolérée en assurance énergétique 1 g d'azote 200—300 kJ.

ZUSAMMENFASSUNG

Die vollständige parenterale Ernährung von schwer verbrannten Kindern

Pachl, J., Kruf, M., Zábrodský, V., Brož, L., Kyncl, V.,
Pokorný, J., Königová, R.

Die Autoren beschreiben ihre Erfahrungen mit der parenteralen Ernährung von schwer verbrannten Kindern mit versagenden vitalen Funktionen. Sie betonen die Bedeutung der Verabreichung von Aminolösungen mit einem höheren Gehalt an verzweigten Aminosäuren zwecks energetischer Sicherung der Patienten sowie zur Aufrechterhaltung einer günstigen Stickstoffbilanz. Ein hohes pharmakodynamisches Niveau von Valin, Leucin und Isoleucin wurde bei einem der Patienten durch eine ungewöhnlich grosse Zufuhr eines Gemisches von Nutramin U und Nutramin erzielt (20 % verzweigter Aminosäuren bei 5—6 g pro kg täglicher Zufuhr). Das Gemisch wurde gut toleriert bei einer energetischen Sicherung von 1 g Stickstoff pro 200—300 kJ.

RESUMEN

Nutrición parenteral total en niños con quemaduras graves

Pachl, J., Kruf, M., Zábrodský, V., Brož, L., Kyncl, V.,
Pokorný, J., Königová, R.

Los autores informan sobre sus experiencias con la nutrición parenteral de los niños gravemente quemados cuyas funciones vitales fallan. Recalcan la importancia de aplicación de soluciones amínicas con alto contenido de aminoácidos ramificados para la estimulación energética de los enfermos y el mantenimiento de un favorable balance de nitrógeno. Niveles farmacodinámicos altos de valina, leucina e isoleucina fueron logrados en uno de los pacientes mediante aplicaciones abundantes de mezcla de Nutramina U y Nutramina (20 % de aminoácidos ramificados, aplicados en dosis de 5—6 g/kg/día). La mezcla fue tolerada bien con una estimulación energética de 1 g de nitrógeno 200—300 kJ.

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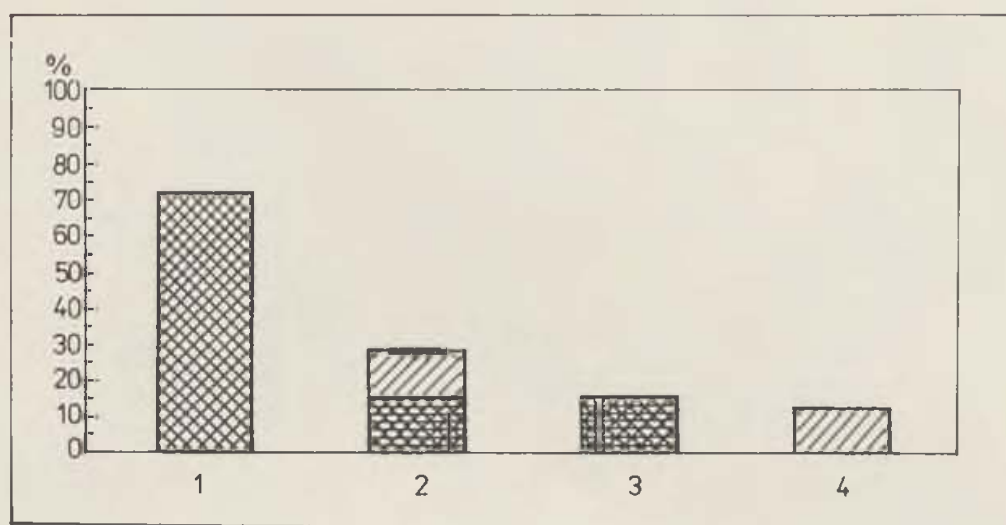
VALIDITY OF CLINICAL ASSESSMENT OF THE DEPTH OF A THERMAL INJURY

P. HLAVA, J. MOSEROVÁ, R. KÖNIGOVÁ

An early correct assessment of the depth of a thermal injury still represents a problem, specially to the less experienced surgeon. Numerous studies have been devoted to this problem and many diagnostic methods developed. Most of the methods nevertheless are based on the actual blood supply to the injured area, as for instance vital staining by Bromphenol Blue (ZAWACKI, B. E., WALKER, H. L., 1970) or the fluorescence method with the use of high Tetracycline doses (ZAWACKI, B. E., WALKER, H. L., 1970) and thermography and thermophotography (ANSELMO, V. J., ZAWACKI, B. E., 1977; HACKETT, M. E. J., 1974). The blood supply to the injured area may be though influenced by several factors which are not connected with the thermal injury (preexisting changes of blood supply specially in lower extremities, a transient vasoconstriction, secondary local changes caused by evaporative water loss from the wound (WINTER, G. D., 1975). These methods therefore are not totally dependable, as far as the assessment of the actual depth of a burn or a scald is concerned. At the moment, the best information can be obtained from a biopsy (SEVITT, S., 1957), yet even with a biopsy the situation can be clarified only 48 hours following injury until then the border line between viable and non-viable tissues is not obvious (BERLIN, L. B., 1966). Needless to say, that no surgeon is prepared to take biopsies from thermal wound regularly, not to talk of the fact, that histological examination yields delayed results. Most of the other methods require technical equipment, which is not always readily available. It appears, that none of the methods mentioned can give a better information than the judgement of an experienced specialist, who evaluates the depth of a burn or scald with his naked eye. (he judges the colour of the wound, the capillary return after pressure, etc.) and by palpation (toughness of the injured skin, sensitivity), taking into account the cause of the thermal accident, the patients' age and past history etc.

The authors evaluated statistically the percentage of errors in the initial assessment of the depth of burns in a group of 951 patients, treated in the Prague Burns Center of the Department of Plastic Surgery. In this study, the authors aimed to show, to what degree is the initial diagnosis influenced fa-

vourably or unfavourably by the following factors: the age of the patient, the time, that elapsed from the accident till the admission of the patient, the colour of the wound, capillary return after pressure applied to the wound. Many other factors were also followed, but are not included in this short study.



Graph 1. Initial diagnosis 1 — correct, 2 — incorrect, 3 — underrated, 4 — overrated

METHOD

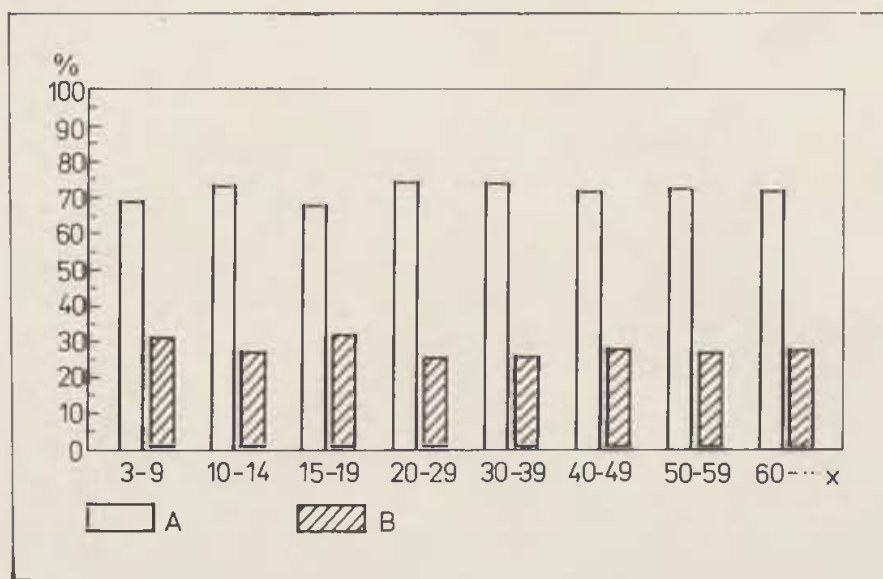
The documentation (records) of 951 patients was analysed. The thermal wounds did not extend over 15 % of BS. More extensive burns were not included into the group under observation, as in these the local state of the wound may be influenced by many factors triggered by changes of the general state of the patient. A computer programme including 46 items of relevant informations was prepared. The items included: past history, sex, age, cause of accident, the time which elapsed from the injury, the extent of the injury (% BS), anatomical locality, infection, the colour of the wound, presence of blisters, sensitivity of the wound, capillary return. Initial diagnosis, definite diagnosis and duration of hospital treatment. Various items of relevant information were correlated by a computer.

RESULTS

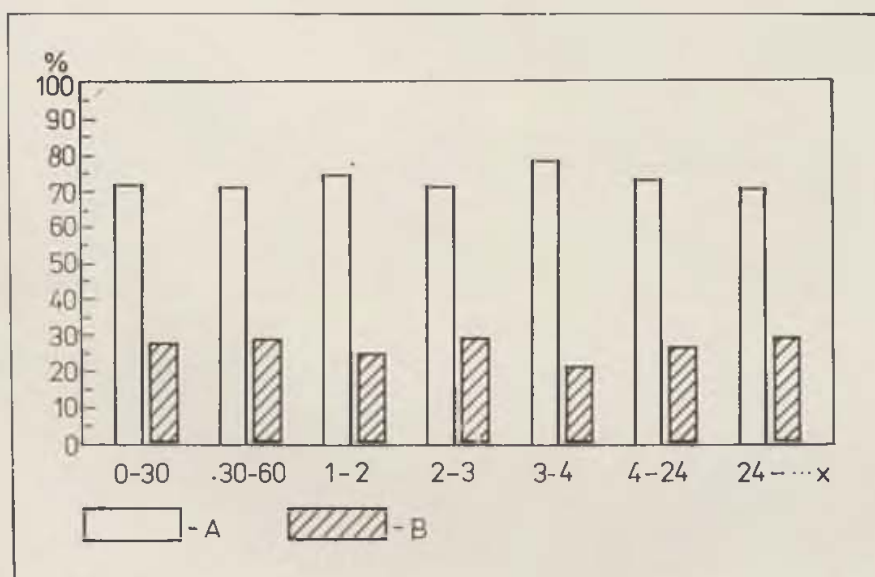
Of all the cases analysed, the initial diagnosis corresponded with the final diagnosis in 689 cases out of the 951, i.e. 72,5 %. The initial diagnosis differed from the definite in 262 cases, i.e. 27,5 %. In cases of erroneous initial assessments the depth of injury was underestimated in 146 cases, i.e. 15,5 %. The burn proved to be less severe than originally assessed in 116 cases, i. e. 12,2 %. (Graph No. 1).

On graph number 2 the relation between the age of the injured and the correctness of the initial assessment of the depth of injury is demonstrated.

Graph number 3 illustrates the relation of the assessment to the time, which elapsed since the injury until hospital admission. As can be seen, no significant differences were found.



Graph 2. Correct diagnosis by age x — years, A — correct diagnosis, B — incorrect diagnosis

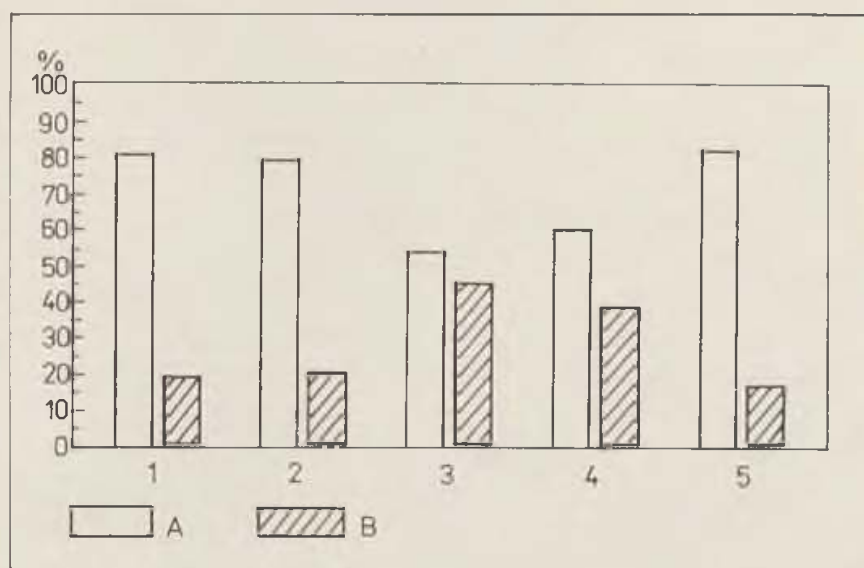


Graph 3. Correct diagnosis and time [from injury to admission] x — time (minutes, hours), A — correct diagnosis, B — incorrect diagnosis

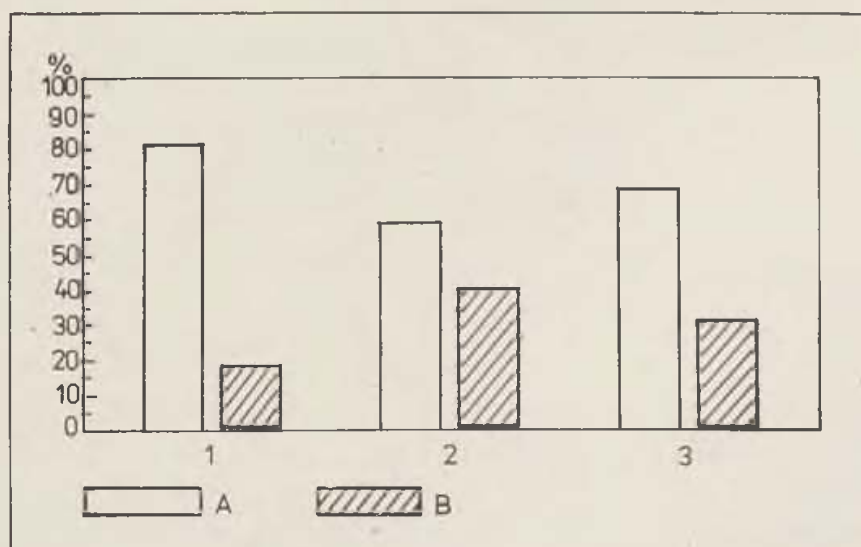
Graph number 4 shows correct assessments and errors in the initial diagnosis in relation to the colour of the wound bed. In cases of pink colour there were 73 cases (19,5 %) of incorrect assessments, bright red 18 cases (20,5 %), brownish to yellowish colour 20 cases (17,4 %) incorrect assessments, while

in cases of dark purple colour 5 cases (45,5 %) and white 137 cases (39,0 %). There were 12 missing cases.

Graph number 5 shows the relation to the capillary return observed in the wound after short pressure. In cases of a good capillary return, the initial



Graph 4. Correct diagnosis by the base colour 1 — pink, 2 — bright red, 3 — dark red, 4 — bleaching, 5 — yellow-red, A — correct diagnosis, B — incorrect diagnosis



Graph 5. Correct diagnosis and capillary return A — correct diagnosis, B — incorrect diagnosis, capillary return: 1 — positive, 2 — retarded, 3 — negative

diagnosis proved to be correct in 360 cases (81,3 %), incorrect in 83 cases (18,7 %). With slow capillary return there were 86 (59,3 %) correct, 59 (40,7 %) incorrect results. With no capillary return, the diagnosis was correct in 236 (68,6 %) cases, incorrect in 108 (31,4 %).

DISCUSSION

The above results show, that in almost one thousand cases analysed the initial diagnosis proved to be correct in 72,5 %. The average surgeon might find this fact surprising, but for a burn specialist the number of erroneous assessments of the depth of burn will be quite understandable. As a matter of fact, in the initial diagnosis, a burn specialist is not attempting to state definite determination of the depth of burn, but he is making a prognostic evaluation which may or may not prove to be correct. Even in less extensive burns the further development of pathologic changes depends on many factors, such as initial local treatment, the type of wound cover used (MOSEROVÁ, J., 1980) etc., there is no doubt about that. To err in 27.5 % of cases, and that mostly in cases of deep dermal burns, is perfectly normal. The authors presumed, that very often an underestimation of the vertical extent of pathologic changes that occurred or will develop could easily be made in extreme age groups, for instance in children, whose skin is very thin with a minimal protective stratum corneum layer, and in the aged, with preexisting circulatory changes and blood vessels changes. As the above results indicate, the correctness of burn assessments carried out in the Prague Burns Center, was not influenced by the age of the injured at all. Surprisingly the length of time which elapsed since the injury till the assessment, does not play a significant role either. (It may be expected, that the actual extent of thermal changes would be clearer 24 hours following injury than immediately after the accident.)

Graphs 4 and 5 show very clearly, that the deep dermal burn is the most difficult thermal injury to be assessed correctly. (Again it must be stressed, that the initial diagnosis has practically only a prognostic value, though it serves as a guideline to further therapy.) In deep dermal burns, the zone of potentially irreversible changes reaches throughout the whole thickness of the skin, and it is indeed hard to predict, whether the deepest layer of dermis will undergo necrosis or if it will survive. Much of course depends on local treatment, as already stated. The authors believe, that the simple diagnostic methods which were used, have a value, specially when applied by experienced specialists who are also able to evaluate such factors, as age, specific anatomical localities of the injury etc.

It may be worth mentioning at this point, that as far as the cause of a thermal injury in relation to the assessment of the depth of burn is concerned, the best assessment were observed in non-contact burns (as compared with contact burns and scalds).

Special diagnostic methods, mentioned in the introductory paragraphs, are of course of major importance too, for instance in experimental burns, or as an orientation control of a clinical assessment in clinical research. They cannot though be used regularly, even if they are not connected with any risk to the patient. With the use of vital staining methods, there is a risk for the medical personnel, as even a patient with a minor burn may die unexpectedly for some other cause, and a discoloured cadaver might cause great difficulties with the relatives of the diseased.

If any "objective" methods are to be used, then methods that leave no visible trace and cannot possibly harm the patient, should be preferred. It is to be expected though, that with the use of optimal initial local treatment, the number of diagnostic "errors" will decrease no matter which method of primary assessment of the depth of burn may be applied.

SUMMARY

The authors present a statistical analysis of correct (or incorrect) initial assessment of the depth of burns in a group of 951 patients, treated in the Burns Centre of the Department of Plastic Surgery in Prague. There were analysed only less extensive thermal injuries, where changes of the general state do not affect the development of local changes. The analysis showed consent of initial diagnosis with the final one in 72,5 %, and in 27,5 % of cases the initial diagnosis proved to be incorrect. Most of the incorrect assessment were observed in cases of deep dermal burns. The evaluation of the depth of the thermal injuries was made by simple clinical methods and the true vertical extent of the injury was judged from the further course of healing.

RESUME

La justesse de l'appréciation clinique de la profondeur d'une lésion thermique

Hlava, P., Moserová, J., Königová, R.

Les auteurs présentent l'analyse statistique de la justesse (ou de l'erreur) des diagnoses initiales. Ils analysent un groupe de 951 malades brûlés qui ont été traités dans le département des brûlures de la Clinique de la chirurgie plastique. On n'a apprécié que des brûlures moins vastes dont le développement local ne serait pas influencé par des changements généraux. L'analyse a montré que la diagnose initiale était identique avec la diagnose finale dans 72,5 %. Dans 27,5 % des cas la diagnose initiale était erronée. La plupart des erreurs diagnostiques se touchait des brûlures dermales profondes. La profondeur d'une brûlure était appréciée par de simples méthodes cliniques, l'étendue verticale réelle était conclue du développement de la guérison d'une lésion thermique.

ZUSAMMENFASSUNG

Die Richtigkeit der klinischen Einschätzung der Tiefe einer Verletzung durch Verbrennung

Hlava, P., Moserová, J., Königová, R.

Die Autoren legen eine statistische Analyse der Richtigkeit (oder des Irrtums) der anfänglichen Diagnose bei einer Gruppe von 951 Verbrennungen vor, die an der Abteilung für Verbrennungen der Klinik für plastische Chirurgie behandelt wurden. Es wurden dabei nur wenig umfangreiche Verbrennungen beurteilt, bei denen man keinen Einfluss auf die Entwicklung lokaler Veränderungen durch die Gesamtveränderungen erwarten kann. Die Analyse zeigte, dass in 72,5 % der Fälle die anfängliche Diagnose mit der Diagnose bei der Entlassung übereinstimme, während in 27,5 % der Fälle die anfängliche Diagnose irrtümlich war. Die meisten irrtümlichen Diagnosen

kamen bei tiefen Dermalverbrennungen vor. Die Einschätzung der Tiefe der Verbrennungen wurde mit einfachen klinischen Methoden vorgenommen, wobei vom weiteren Verlauf der Heilung der Verletzung durch Verbrennung auf den tatsächlichen vertikalen Umfang geschlossen wurde.

RESUMEN

La exactitud de la evaluación de la profundidad de un trauma térmico

Hlava, P., Moserová, J., Königová, R.

Los autores presentan un análisis estadístico de los diagnósticos iniciales exactos (o erróneos) en un grupo de 951 quemados, sometidos al tratamiento en la Sección de Quemaduras de la Clínica de Cirujía Plástica. Sólo fueron analizadas quemaduras de extensión menos grande donde no se prevé que el desarrollo de las alteraciones locales sea influido por las alteraciones generales. El análisis arrojó que en un 72,5 % de los casos el diagnóstico inicial coincide con el de la salida del paciente, en un 27,5 % el diagnóstico inicial resulta equivocado. La mayoría de los diagnósticos equivocados se produjo en el caso de quemaduras dérmicas profundas. La evaluación de lo hondo de la quemadura fue realizada por sencillos métodos clínicos, la real extensión vertical se evaluó en base al subsiguiente desarrollo de la cicatrización del trauma térmico.

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NBT TEST VALUES IN BURNED PATIENTS

B. HEJCMANOVÁ, L. PAVKOVÁ, L. BROŽ, J. KUDEROVÁ, Z. KONIČKOVÁ

INTRODUCTION

Infection represents one of the gravest complications in burns, and it tends to be one of the main causes of death in the severely burned [1, 13]. The use of more and more new antibiotics often proves inadequate for the management of infection in burned patients as the course and development of infection complications suggest impaired capacity for resistance due to extensive burn trauma [10].

This kind of situation calls for simple methods, with which to prove the body's reduced defence capability, such as, for instance, the NBT test. This consists in monitoring nitrotetrazolium blue in granulocytes being reduced to blue formazan (formazan cells production) [5, 6, 12]. The capacity to reduce tetrazolium blue is seen as an indicator of the functional activity of neutrophil leukocytes, i.e. cells with an important role to play in the body's defences [7, 8, 9].

Our experiments were designed to monitor NBT test values in a group of severely burned patients undergoing treatment. The aim was to correlate the values obtained with the patients' general condition and with the course of the burn disease.

METHOD

NBT test: Glass slides with two drops of blood each are incubated at 37 °C in a humid chambre for 25 minutes. Following incubation, the drops of blood are washed away with saline until only the granulocytes remain adhering to the slide. One slide is covered with solution A, the other with solution B, and both are then incubated for 20 minutes, again at 37 °C. With the incubation over, the solution is poured away, and the granulocytes are fixed with methanol for a period of 1 minute. Rinsed with water and dried, they are stained for 10 minutes with 0.1% Kernechtrot solution in 5% Al₂(SO₄)₃ solution.

Washed and allowed to dry, the slides are placed under the microscope for counting the percentage of formazan cells. Normal values should be within the range of $33 \pm 12 \%$.

Agents used:

Solution A: 1 ml normal human serum

0.6 ml physiological saline solution

1.2 ml nitrotetrazolium blue solution (NBT) produced by Lachema Brno

Solution B: 1 ml normal human serum

0.4 ml physiological saline solution

0.2 ml latex suspension for the RF test — manufactured by Imuna Šarišské Michalany

1.2 ml NBT solution — Lachema Brno

Tetrazolium blue solution formula: 0.28 % NBT in physiological saline solution is brought to boiling point, filtered and tempered down to 37°C . The solution should be prepared fresh prior to each new use.

Patients: in Group I, repeated tests were made in 10 burned patients with 2nd to 3rd degree burns involving 30—75 % of the body surface. Group II were patients with 2nd to 3rd degree burns affecting less than 20 % of body surface. In the control group, three healthy individuals were repeatedly tested. Blood samples were taken from their fingertips at different intervals: twice weekly during the first fortnight, later on — at longer intervals.

The t-test at the 0.05 level of significance was used for statistical evaluation.

RESULTS

In the three healthy controls, the NBT test values were near the upper limit of the range stated, an average of 43 %.

In group II (patients with less than 20 % of the body surface burned) the number of formazan cells rose to 59 % in the first five post-injury days, and to 74 % in the following days. It is only after the first five days that the increase in the share of formazan cells becomes statistically significant compared with normal values. The difference between the values obtained during the first 5 post-injury days and the subsequent period is of no statistical significance.

In the severely burned group (over 20 % of the body surface) the proportion of formazan cells rose to 51 % during the first five post-injury days, and to 66 % in the following days. Like in Group I, the increase compared with normal values did not become statistically significant until after 5 days. However, there was also a statistically significant difference between the average values obtained in the extensively burned within the first five post-injury days.

Latex particles were found present in all the granulocytes; their addition to the incubation medium proved of no consequence to the formazan cell production.

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DISCUSSION

As the results show, the proportion of formazan cells indicating granulocytic functional activity rises, in comparison with normal values, already within the first few days of the injury, practically regardless of the extent of the burn. In severely burned patients the values are, admittedly, relatively lower, though the difference is very small and — considering that the increase in itself is for both groups statistically non-significant — negligible, too.

In the subsequent period, the percentage of formazan cells keeps rising and — unlike the immediate post-injury period — exhibits statistical significance in comparison with normal values. Contrary to our expectation, the situation is similar in both groups of burned patients with extensive and non-extensive burns, although again the average proportion of formazan cells in the extensively burned is a little lower than in patients with smaller burns. However, the difference is non-significant, and rather than by impaired functional activity of neutrophil leukocytes in the severely burned it seems influenced by differences in the size of each group and in the number of tests performed in individual patients. The significant increase in the number of formazan cells in the later post-injury period appears to be due to infection (2, 11, 12) which occurs, as a rule, as from the 5th post-injury day (1). There was, however, no apparent correlation with the seriousness of the infection or with the gravity of the patient's general condition. Contrary to literary information, there was no drop in the NBT test values proportional to either improvement in the patients' general condition (3) or to the onset of sepsis as reported by other authors (4).

The appearance in all the granulocytes of latex particles added to the incubation medium suggests that the phagocytic capacity of those cells remains unimpaired.

To sum up our results suggest no reduction in the functional activity of neutrophil leukocytes identifiable by the NBT test performed in burned patients. Likewise, the results of the NBT test do not reflect either the gravity of the patient's general condition or the virulence of the infection.

J. H.

SUMMARY

The NBT test was used in burned patients to monitor the functional activity of neutrophil leukocytes. The results shows that: a) leukocytic function as reflected in the NBT test in burned patients was unimpaired, and b) the NBT test did not appear to be a reliable criterion of neutrophil leukocyte function as part of the system providing for the body's resistance capacity.

RESUME

Des valeurs du test NBT des malades brûlés

Hejčmanová, B., Pávková, L., Brož, L., Kuderová, J., Koníčková, Z.

Les auteurs ont suivi l'activité fonctionnelle des leukocytes neutrophiles des malades brûlés à l'aide du test NBT (nitro-bleu-tetrazolium). Les résultats ont montré que la fonction des leucocytes, marquée par le test NBT, ne s'abaisse pas chez des brûlés.

Donc, le test NBT ne semble pas être un critérium véridique pour apprécier la fonction des leucocytes comme partie composante du système assurant la capacité de défense de l'organisme.

ZUSAMMENFASSUNG

Werte des NBT-Tests bei Verbrennungen

Hejčmanová, B., Pávková, L., Brož, L., Kuderová, J., Koníčková, Z.

Die Autoren beobachteten die Funktionsaktivität neutrophiler Leukozyten bei Verbrennungen mit Hilfe des NBT-Tests. Die Ergebnisse erwiesen, dass die vom NBT-Test erfasste Funktion der Leukozyten bei Verbrennungen nicht reduziert erscheint, und dass der NBT-Test kein zuverlässiges Kriterium zur Einschätzung der Funktion der Leukozyten als Bestandteil eines die Widerstandsfähigkeit des Organismus sichernden Systems bildet.

RESUMEN

Valores de la prueba NBT en los quemados

Hejčmanová, B., Pávková, L., Brož, L., Kuderová, J., Koníčková, Z.

Los autores observaron la actividad funcional de los leucocitos neutrófilos en los quemados mediante la prueba NBT. Se demostró que la función de los leucocitos registrada por la prueba NBT, no resulta reducida en los quemados y que la misma prueba NBT no constituye un criterio confiable para la evaluación de la función de los leucocitos como parte del sistema que se encarga de la defensa del organismo.

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ROLE OF "ACCOMPANYING" RELATIVES IN BURN CARE

I. PONDĚLIČEK, R. KONIGOVÁ, L. BROŽ

The somatopsychic character of burn diseases and the mental complications caused by the burn trauma require the application of the imperative of the modern medicine — the comprehensive approach. "Burn team" includes many specialists, not the least important of whom are clinical psychologists.

The very act of admittance of the patient, particularly one with severe Burns Center confirm the necessity of developing mental defence mechanism endangered patient, of treating and healing him, and of adapting him for social existence, for making the most of his life. Thirty years experience of the Prague burn center confirm the necessity of developing mental defence mechanisms in burned patients, and the effort of the medical team seeks to stimulate them.

In a number of cases — in the case of many adults and almost all child patients — the presence of near relatives plays an important role in burn care. They can provide important psychological support for the patient. Communication between the child and its mother, presence of the marriage consort, contact between parents and children and vice versa, are all of emotional character of the kind, which the surgeon in charge can achieve only by long effort, and sometimes never, because of objective difficulties, lack of time, and lack of psychotherapeutical experience. The presence of relatives as the patient's bed "companions" at the burns center often facilitates the treatment of his traumatized psyche, provided positive conditions exist.

As to the nature of the "positive conditions": they are inherent in the personality of the man or woman who has voluntarily decided to assume the "accompanying" role, to remain with the patient at the time of his heaviest suffering.

The person who has put himself or herself forward for the "accompanying" role, has to pass psychological examination and interview, and is accepted after consultations between all physicians involved in the case. After his admission, he is told what is expected of him, and during his stay with us we maintain continuous contact with him with regard to any possible new instructions, and what is expected of him in the nursing of "his" patient. The group of 103 "accompanying persons" selected by us by means of psychological testing was not allowed to include anyone with depressive symptoms, let alone neurotic symptoms. Analyses of such "accompaniment" have shown

the ideal model to be based on phlegmatic or sanguinic temperament, as well as on natural (genetic) dispositions towards maternal or similar care.

Vital indication is the prime reason for adopting the "accompaniment" approach. Our clinical experience indicates that, at the present state of the art in the treatment of burns, measures involving "accompaniment" of the patient are no less important than, for instance, pharmacological treatment. It is known that burns very often involve decompensation of the mental state, which can act as a brake on surgical treatment, or make it totally ineffective. Any means of making the patient resistant, self-willed or optimistic (with reliance on stimulation of strong defence mechanisms, particularly of the "denial" type) is welcome in the treatment of burns. In our experience, the presence of a near person, decided upon after well-considered and thorough psychological examination, is a crucial factor in the establishment of the patient personality's mental defence. In many cases treated by us, patients managed to overcome the worst sort of mental stress thanks to the presence of the mother, the father, the brother, the sister, the husband or the wife. In patients whose survival had been in doubt, the presence of relatives managed to mobilize their mental strength to a point when they ultimately survived and resumed their vocation. By very strict statistical criteria, 6 severe cases of the group 103 patients survived thanks to their "accompaniment", while in the case of another 52 the psychological support was a clearly striking factor of their survival.

The role of "accompaniment" appears to be particularly important in the case of mothers or fathers attending their children. Indeed, there is no way of compensating for the presence of one of the parents from the psychological angle.

Along with the vital indications, certain subsidiary — but no less important — reasons play a role in the acceptance of "accompanying" persons: those of assistance to the nursing personnel. Mothers and fathers can often attend to certain life necessities of their — and other — children more efficiently — for emotional reasons — than hospital personnel however devoted.

The moment we realize that the accompanying relatives are no longer useful to our Center (after the patient has been through the worst, and once the mechanism of dependence must be replaced with self-reliance attitudes), we release the accompanying persons and turn the patients over to necessary psychotherapeutical care.

The Prague Burns Center regards the patient not only as an object whose organs or parts of his or her body are to be treated, but as a subject of the disease process, in which the patient himself must play a highly active and fruitful role in combatting the disease. Nevertheless, the patient must be offered all-round and comprehensive assistance in the challenge to which he is stimulated by his physicians, the challenge to strive for fashioning his own defence mechanism against burn. In that effort "accompanying" near relatives, (parents, husbands, wives and children) do play a significant role.

SUMMARY

This report deals with an innovation in the total care of severely burned patients, utilizing assistance of members of patient's family throughout the long term course of treatment.

The authors consider the methods of choosing the "accompanying" person, that is admitted together with the severely burned or at any time which is decided by the psychologist. The choice of the "companion" is strictly individual. The persons who offer their help are thoroughly examined by the psychologist and the admission is consulted by the medical staff who must consent to it.

This practise was started in the pediatric burns. The companion having his bed in an other ward assists the nursing during the day and when necessary even during the night. The admission of a family member is often of vital importance. The authors call the attention to the role of psychological support and compensation of pathopsychological condition in presence of patient's relatives. The cases are discussed in which the psychical stress markedly improved as soon as mother, husband or wife were close to the severely burned. Assistance of relatives in nursing regime must be organized and supervised by the head nurse and prepared by the psychologist.

RESUME

L'importance des «personnes accompagnantes» pour des gravement brûlés

Pondělíček, I., Königová, R., Brož, L.

La communication s'occupe de la sélection et de ses méthodes qui décide l'admission de «l'accompagnement» des hospitaliers au Département des brûlures. Elle explique des raisons de cette habitude qui est bien répandue et attestée par des expériences de chez nous.

L'accompagnement est admis à la base d'une sélection individuelle. Dans la plupart des cas, il s'agit des enfants (mais pas de tous les enfants hospitalisés). La personne, choisie comme accompagnement d'un malade, doit passer une exploration psychologique d'orientation. Ensuite, il est possible de l'admettre, après l'accord de tous les médecins participants au traitement du malade.

Ce sont souvent des raisons vitales qui exigent l'admission de l'accompagnement. Dans beaucoup de cas, on a remarqué que la présence de mère, de père, d'un des époux (de grand-mère ou de grand-père, chez des enfants) a significativement amélioré l'état psychique du malade en stress. On discute la question du soutien psychologique (support) et de la compensation d'un état clinique patopsychologique au cas, où une personne proche soit près du malade. Si on élimine des raisons vitales pour admettre l'accompagnement du malade, il nous reste encore une, c'est-à-dire l'aide aux auxiliaires médicaux.

ZUSAMMENFASSUNG

Die Bedeutung der „Begleitpersonen“ bei Fällen schwerer Verbrennungen

Pondělíček, I., Königová, R., Brož, L.

Die Mitteilung behandelt einerseits die Auswahl und die Auswahlmethoden bei der Aufnahme von Begleitpersonen hospitalisierter Patienten an der Abteilung für Verbrennungen und andererseits die Gründe für diese bei uns eingeführte und bewährte Praxis.

Begleitpersonen werden auf Grund einer individuellen Auswahl aufgenommen. Zum grössten Teil wird diese bei Kindern praktiziert (jedoch nicht bei allen). Die als Begleitperson eines Patienten in Betracht kommende Person wird einer psychologischen Orientierungsuntersuchung unterzogen und wird mit dem Einverständnis aller an der Behandlung des Patienten beteiligten Ärzte aufgenommen.

Die Gründe für die Aufnahme sind häufig vital indiziert. In einer ganzen Reihe von Fällen konnten wir feststellen, dass der Patient bei persönlicher Anwesenheit der Mutter, des Vaters, des Ehemanns oder der Ehefrau (bei Kindern auch des Grossvaters oder der Grossmutter) rascher aus dem schlimmsten psychischen Stress herauskam. Diskutiert wird das Problem der psychologischen Unterstützung (support) und der Kompensation des eventuellen pathopsychologischen klinischen Bildes bei physischer Nähe eines Verwandten.

Ausser vitalen Indikationen gibt es hier noch Gründe, die sich aus der Hilfe für das behandelnde Personal im technischen Sinn ergeben.

RESUMEN

Importancia de las personas que "acompañan" a los gravemente quemados

Pondělíček, I., Königová, R., Brož, L.

La información trata sobre la selección y los métodos de la misma al admitir en la Sección de Quemaduras a los "acompañantes" de los pacientes ingresados, así como sobre los motivos que justifican esta práctica implementada con éxitos en nuestro país.

La selección del acompañante es según los casos individuales. Mayormente se practica con los pacientes infantiles (aunque no con todos). La persona seleccionada como acompañante del paciente es sometida al examen psicológico de orientación y es admitida en base previa consulta entre todos los médicos que participan en el tratamiento.

Los motivos para la aceptación del acompañante con frecuencia son de indicación vital. En muchos casos comprobamos que la presencia física del padre, la madre, el esposo o la esposa (o incluso abuela o abuelo cuando se trata de los niños) pudo ayudar al paciente a superar el momento más crítico del "stres" psíquico. Se discute el problema del apoyo (support) psicológico y la compensación de una eventual manifestación clínica patopsicológica en caso de la cercanía física del familiar.

Aparte de las indicaciones vitales, el acompañante representa también una ayuda al personal sanitario en el sentido técnico.

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LATE REHABILITATION OF SEVERELY BURNED PATIENTS

V. POLÁČEK, R. KONIGOVÁ, I. PONDÉLIČEK

Late rehabilitation of severely burned patients is conceived as a complex of measures to restore the ability of the affected patient to return to normal life in the physical as well as psychological sense. Success of late rehabilitation is directly associated with the results of early rehabilitation and thus a sharp line cannot be drawn between them (Fig. 1).

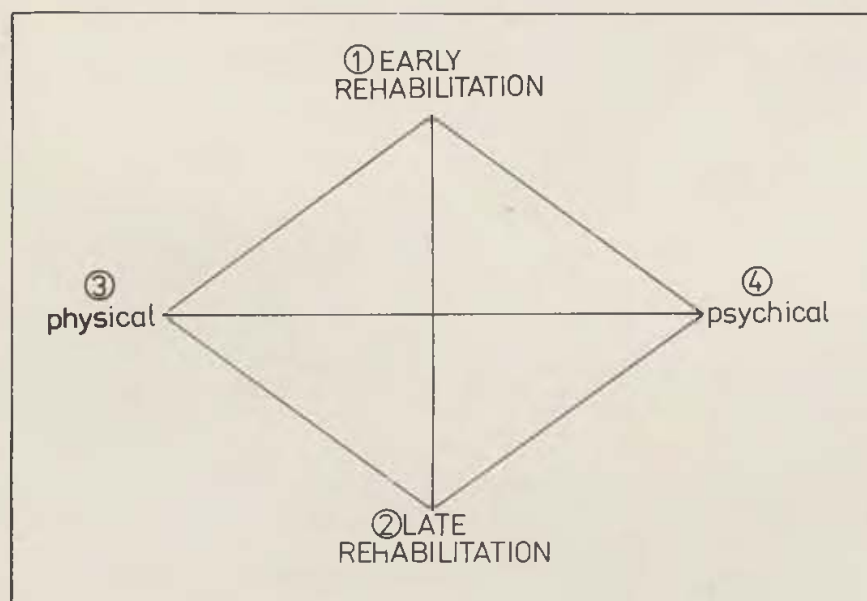


Fig. 1. Rehabilitation of burned patient

In extensive burns and burns severe with regard to the patient's age and the site of burn wound we focus our rehabilitation efforts on the restoration and promotion of the most severely threatened functions of personality. And because we conceive burn illness as a somatopsychic pathological process, rehabilitation is focused on both basic components of the organism and personality.

While physical and mental early rehabilitation is mainly passive, during late rehabilitation active therapy predominates. It depends mainly on the

mental state of the patient and on the results of previous therapy. If the patient has not yet mentally "matured" for the initiation of active rehabilitation and is unable to cooperate, any further treatment cannot be successful (Fig. 2).

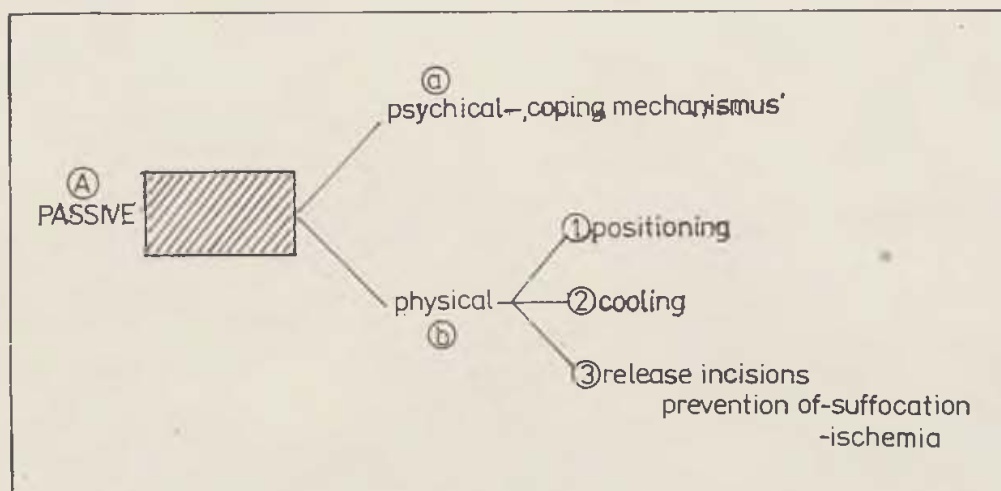


Fig. 2. Emergency phase.

Specific rehabilitation efforts correspond to stage of the burn illness. We try to overcome the emergency period with minimum sequelae which might complicate later therapy (Fig. 3).

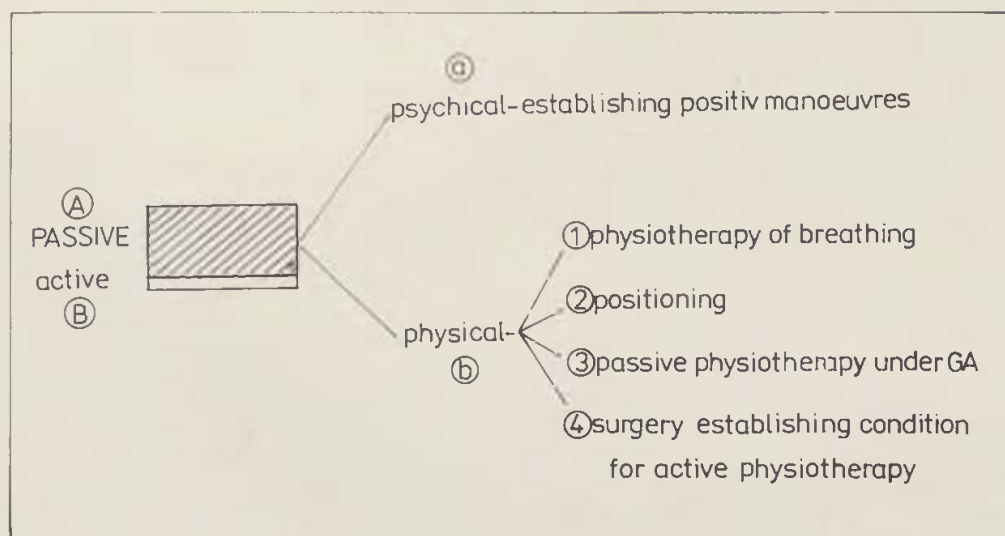


Fig. 3. Acute phase.

During the acute stage of burn illness our aim is focused mainly on prevention and early adequate treatment of systemic complications.

As regards the local care, we try to prevent the development of contractures and bed sores by means of positioning, splinting and exercise under general anaesthesia during changes of dressing and operations. Thus passive rehabilitation is involved.

During this period we prepare the patient mentally for active cooperation as regards local rehabilitation, the nursing team distracts the patient's attention from the sequelae of the injury and helps to change the mental state of the patient — who is already exhausted — to the attitude of "denial". The denial mechanism is perhaps the most important defense mechanism of burned patients and it is important to foster its development. A possible means is to stress the perspectives of surgical and rehabilitation treatment, and to emphasize the importance of those organs, which remained intact (Fig. 4).

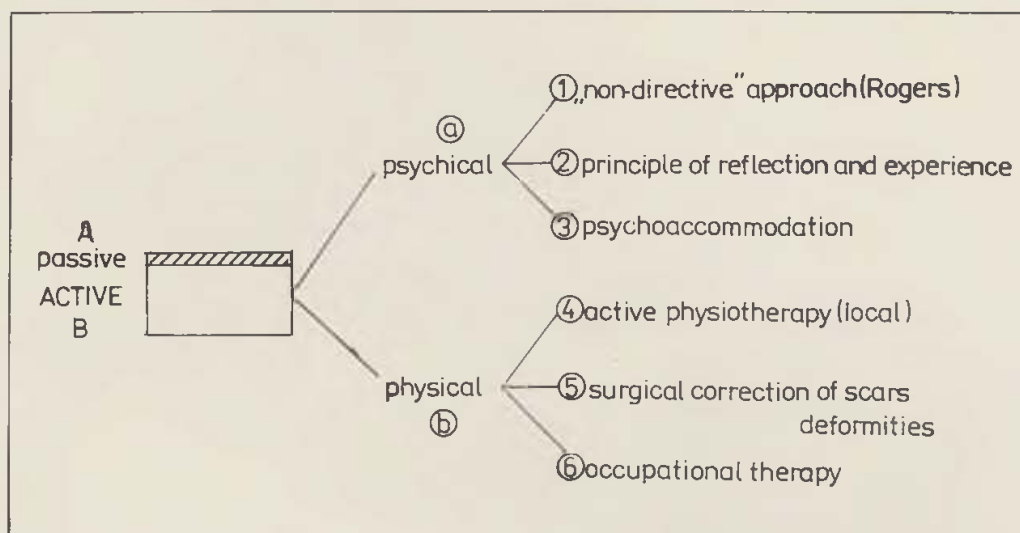


Fig. 4. Convalescence phase.

During the convalescence period we draw attention to stimulation of self-confidence and at the same time to active physical rehabilitation. We impress on the patient gradually a state of — at least partial — self-sufficiency and fix the latter immediately also in the mental sphere. Depending on the premorbid type of patient's personality or on the actual situation, we apply either anaclitic or rational or emphatic psychotherapy.

In mental rehabilitation of thermal injuries with subsequent scar deformities we follow as a rule Rogers principles. First, the non-directive principle is applied. It calls for the creation of a suitable atmosphere which is characterized: 1. by a steady sensitive effort to understand the thoughts, feelings and manifestations of the patient — at first without any attempt to alter them, 2. by a constant effort to establish verbal contact where we express what was understood in paragraph.

The emphatic sensitive and sheltered atmosphere enables the patient to transform consciously and unconsciously his own personality. He begins then to understand himself in his invalidity and subvalidity.

The subsequent two principles, the reflective one and experience follow already on a prepared background. The therapist becomes more active and in his verbal statements he tries to reflect the patient's feelings and experience

and thus fixes them and makes them more permanent. And because he tries at the same time to make the patient accept his feelings and integrate them in his own ego, he helps him to find his dispersed or lost identity. This implies transfer. Classical psychotherapy is used in our burn centre only exceptionally, e. g. in psychotherapy of chronic psychogenic pain which develops already in the acute but mainly in the convalescence period. The resistance of the patient is as a rule known and we need not seek it in the depth of subconsciousness, and the sessions do not take long.

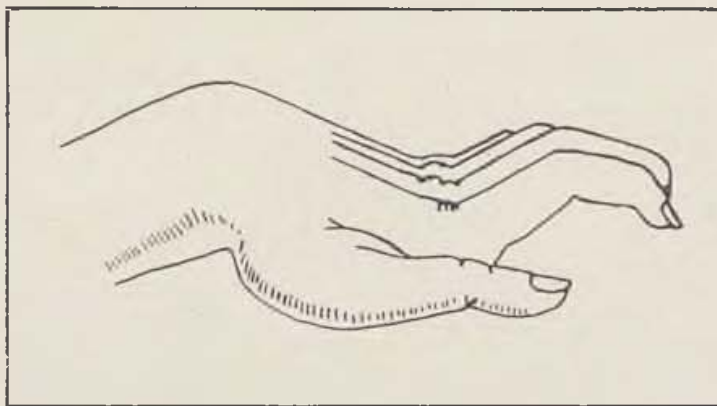


Fig. 5. Combined contracture of hand.

The methods of local physical rehabilitation in this stage are pressure massage, active movements of the joints after previous massage and application of oil or fatty substances, prolonged traction to stretch contractures, and splinting, using readily moulded materials (Dr. Bláha) and surgical procedures where we stabilize even a minor success by application of a new splint "made to measure".

In this stage of treatment we recommend also an elastic garment which is made to measure. Transfer to the State Rehabilitation Institute is the next stage of physical and mental convalescence.

The sites which are in the foreground of our rehabilitation care are in all stages of treatment the same and are also the sites where the surgery is performed most frequently. Those are: flexion and adduction contractures —

- a) anterior surface of neck,
- b) shoulders,
- c) elbows,
- d) hips and knees,
- e) ankles

and a combined contracture of the joints of the hand (Fig. 5).

In the development of these deformities participate psychic factors (antalgic position due to pain and to fear of pain) as well as morphological ones.

The latter include desmogenic and myogenic components — secondary deformations of joints, periarticular calcifications,

nervous disorders associated with deep circular involvement of the extremities.

The most frequent nervous disorder is paresis of the peroneal nerve of various degrees which is usually reversible (at least partially).

Throughout the period of hospitalization and the course of longterm follow-up care the patient is controlled by a team of specialists who determine the extent and character of rehabilitation and indicate reconstructive operations with regard to surgical, internal, psychological, orthopaedic aspects, and if necessary any others. In this respect special emphasis is laid on stable collaborators who are familiar with the problems of burns and do not overestimate or underestimate the patient's condition

It is important to keep in mind that mental and physical rehabilitation of patients with extensive burns is never finished completely.

The perspectives of better physical abilities and appearance with which the patient connects — not always quite correctly — his perspectives of mental health, become also his perspectives of life. Much depends then on the patience, willingness and intelligence of the patient and the understanding of his environment which influence equally as the standard of the specialized care, to what extent these hopes will be fulfilled.

It is the task of advanced health service all over the world to foresee this development, to promote it and to realise it with the patient, together with his family and employers.

SUMMARY

All severely burned patients treated at the Prague Burns Unit are subject to continual follow-up care. Individual attention is paid not only to their condition and physical rehabilitation but also to their psychosocial needs. These "aftercontacts" taking the form of later rehabilitation are preceded by early rehabilitation starting on the very day of the patient's admission and proceeding in the course of the emergency and acute phases of burn rehabilitation. A list of methods of physical and psychic rehabilitation is presented: positioning, splinting, and meticulous pressure massage followed by rehabilitation exercises in accordance with the pre-determined programme.

Early psychotherapy aims at overcoming the period of shock (coping mechanism = "Notfallpsychotherapie" according to Freyberger) to be continued during the nursing period. This is followed by advice given to the patient's family and co-workers designed to create an environment appropriate for late psychoaccommodation.

Burned patient care often involves the handling of what are known as problem patients who require differentiated approach.

A special sheet given to the patient on discharge contains instructions and directions designed to help him overcome the stress of the first few weeks. The programme of reconstruction surgical operations is planned on an individual basis with regard to each patient's psychic and physical condition. The authors stress the need for multidisciplinary approach to early and late rehabilitation in the severely burned.

RESUME

La rééducation physique des malades gravement brûlés

Poláček, V., Königová, R., Pondělíček, I.

Au département des brûlures à Prague, tous les malades gravement brûlés sont soignés continuellement. L'attention individuelle est prêtée non seulement à l'état de santé ou à la rééducation physique, mais aussi aux exigences psychosociales des malades. Des contacts «ultérieurs», exprimés comme rééducation postérieure, sont précédés par une rééducation prompte qui commence le jour d'admission du malade et se déroule continuellement dans la phase immédiate aussi que dans la phase postérieure de la maladie de brûlure. On allègue des méthodes de la rééducation physique et psychique: changement de décubitus, application d'attelles, massage de pression soigneusement effectué, suivi d'une gymnastique rééducative selon un programme déterminé.

La psychothérapie pratiquée le plus tôt possible est visée à surmonter la période de choc (coping mechanismus = «Notfallpsychotherapie» sensu Freyberger). Après, elle continue pendant tout le temps de traitement. Elle se réalise par des conseils à la famille et au collectif des collaborateurs, où nous souhaitons créer un milieu favorable pour la psychoacomodation tardive.

En soignant des brûlés, il arrive souvent de s'occuper des malades soit-disant difficiles qui nécessitent un accès différent.

Au bout de l'hospitalisation, chacun malade reçoit un formulaire des instructions qui aident à surmonter des obstacles des premières semaines. Le programme des opérations reconstructives est individuel par rapport à l'état psychique et physique de chaque malade. Les auteurs avertissent la nécessité d'un accès interdisciplinaire, en pratiquant une rééducation immédiate ou postérieure de graves brûlés.

ZUSAMMENFASSUNG

Nachträgliche Rehabilitation schwer verbrannter Patienten

Poláček, V., Königová, R., Pondělíček, I.

An der Prager Abteilung für Verbrennungen werden alle ernstlich verbrannten Patienten laufend beobachtet. Individuelle Aufmerksamkeit wird nicht nur ihrem Gesundheitszustand und ihrer physischen Rehabilitation gewidmet, sondern auch ihren psychosozialen Bedürfnissen. Solche „nachträglichen“ Kontakte, die als nachträgliche Rehabilitation angesehen werden, folgen aber auf die frühzeitige Rehabilitation, die bereits am Tag der Aufnahme des Patienten beginnt und während der unaufschiebbaren und akuten Phase der Verbrennungserkrankung ihren Fortgang nimmt. Es werden die Methoden der physischen und psychischen Rehabilitation angeführt: Positionieren, Schienen, sorgfältige Druckmassage mit darauffolgenden Rehabilitationsübungen nach einem festgelegten Programm.

Die frühzeitige Psychotherapie zielt auf die Überwindung der Schockperiode ab (coping mechanism = Notfallpsychotherapie nach Freyberger) und wird während der ganzen Behandlung fortgesetzt. Später kommen Ratschläge für die Familie und das Arbeitskollektiv hinzu, die eine für die nachträgliche Psychoakomodation günstige Atmosphäre schaffen sollen.

Bei der Fürsorge um verbrannte Patienten sind wir häufig sogenannten Problempatienten ausgesetzt, zu denen man sehr differenziert zutreten muss.

Ein besonderes, dem Patienten bei der Entlassung überreichtes Formular enthält Instruktionen, die die ersten Wochen zu überbrücken verhelfen. Das Programm der Rekonstruktionsoperationen wird individuell geplant mit Hinblick auf den psychischen

und physischen Zustand des einzelnen Patienten. Die Autoren machen auf die Notwendigkeit eines multidisziplinären Zutritts bei der Leitung der frühzeitigen und der nachträglichen Rehabilitation bei ernstlichen Verbrennungsfällen aufmerksam.

RESUMEN

Rehabilitación posterior de los pacientes gravemente quemados

Poláček, V., Königová, R., Pondělíček, I.

En la Sección de Quemaduras de Praga todos los pacientes con quemaduras graves son sometidos a exámenes continuos. Se presta una atención individual no sólo a su condición de salud y su rehabilitación física sino también a sus necesidades psicosociales. Estos contactos "posteriores" denominados rehabilitación posterior son precedidos por la rehabilitación temprana que comienza el mismo día del ingreso en el hospital continuando durante la fase aguda de la enfermedad. Se describen métodos de rehabilitación tanto física como psíquica: cambio de posiciones, aplicación de férulas así como masajes de presión efectuados con esmero y precisión con subsiguiente gimnasia de rehabilitación según un programa establecido.

La psicoterapia temporada que es encaminada a superar los períodos de conmoción (coping mechanismus = "Notfallpsychotherapie" sensú Freyberger) continúa durante el tratamiento. Esta es seguida por instrucciones para la familia y el colectivo de trabajo impartidas con el objetivo de crearle al paciente un ambiente correspondiente para una psicoacomodación posterior.

En la práctica, a menudo tenemos que enfrentarnos a los pacientes difíciles a tratar, cuyo tratamiento requiere un acceso diferenciado.

Un formulario especial entregado al paciente a su salida del hospital contiene las instrucciones que le ayudan a sobrepasar las primeras semanas. El programa de las operaciones reconstructivas es planificado a base individual de acuerdo a las condiciones psíquicas y físicas de los diferentes pacientes. Los autores señalan la necesidad de un procedimiento multidisciplinario al efectuar la rehabilitación temprana así como posterior en casos de quemaduras serias.

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"SSI CLINITRON" AIR-FLUIDIZED BED IN SEVERE BURNS

L. BROŽ, R. KONIGOVÁ, V. ŽELIZKOVÁ

The following is a report on our experience of the clinical uses of the SSI Clinatron air-fluidized bed which we started using in January 1980 and which we have so far used for the treatment of 42 severely burned patients (Fig. 1).

The method, its principle and potential uses

The air-fluidized bed devised in 1968 at the surgical department of Charles-town University (South Carolina) is designed to support the patient on a floating mass of ceramic sand, whose particles (microspheres) 75—105 microns in diameter are brought into a fluid-like state under the effect of evenly streaming air. The bed contains some 750 kg of microspheres with a total surface area of some 7 million square kilometres. The mass of this fluidized sand has double the density of water, thus making the patient float on the bed, not in it. There is a sheet-like screen of monofil polyester to separate the patient from the layer of ceramic sand. Each mesh has a diameter of 30 microns, which prevents the microspheres from escaping while allowing the free passage of air driven in at a speed of some 0.6 m per minute. The patient floats on this dry floating cushion very much like in a state of weightlessness. At the bottom of the layer of ceramic dust there is a small-mesh wire screen to collect afunctional microspheres clustered as a result of contact with the patient's excreta. Those contaminated particles pass from the more superficial to the deeper layers of the bed; once a day, the wire screen should be taken out, the clusters removed, and whatever weight loss there is — replenished. The air bed temperature can be controlled within a range of 31—30 °C. The motor and, indeed, the whole system of the air-fluidized bed is attached to a water-cooling system which, in turn, is connected to the water mains; the water supplied should, however, be well filtered as impurities from the pipes might impair the proper service of the bed. Similarly, air sucked in is made rid of all mechanical impurities with an air filter.

The air-fluidized bed was originally devised as a means for the prevention of bed sores, and utilized mainly at traumatological wards for paraplegic care. In that respect, some excellent results were achieved regardless of the patient's

condition, body weight, respiratory complaints and diet. Soon, it was found to be an equally outstanding contribution to intensive burned patient care especially because blood supply at the pressure-exposed points is not impaired because of the patient's body weight, but also because the stream of air evenly

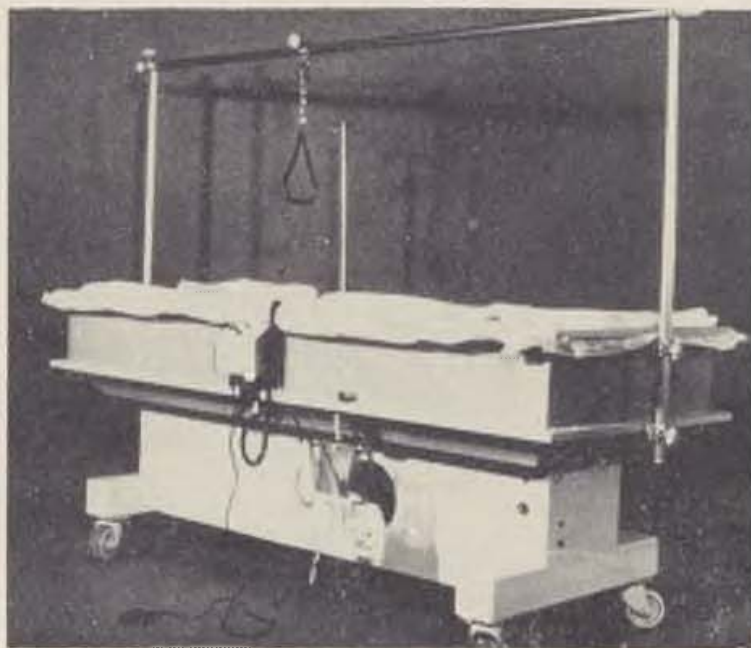


Fig. 1. SSI CLINITRON air-fluidized bed

distributed all over the bed can prevent the development of humid compartments and macerations, thus curtailing microbial growth, too. The bed then has not only antidecubital but also antibacterial effects.

The floating, drying and heating have favourable effects on the treatment of burns of different degrees and according to different methods. The stream of

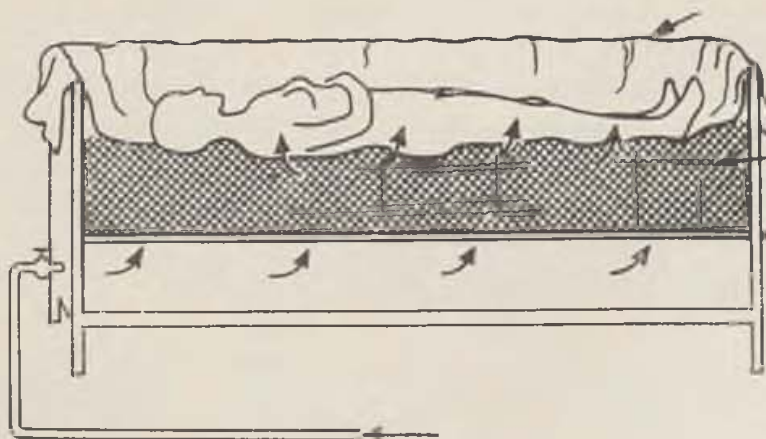


Fig. 2. Diagram of the air-fluidized bed. Dry particles of sand enveloped in a thick layer of silicon are bubbled through under pressure so that the body of the patient in a supine position is held above the surface by one third of his body.

air accelerates the production of scabs while reducing exudation, but at the same time it increases evaporative water loss, which is why it has to be covered. The average daily fluid consumption in a patient kept on an SSI bed will increase by about 2.5 litres.

Burns of the dorsum of the trunk or lower extremities are the main indications for placing the burned patient on an air-fluidized bed. By creating a warm but dry environment, the bed protects the patient against the effects of endogenous sepsis caused by conditioned pathogens. No antibacterial means such as all manner of creams and lotions need be applied to the dorsal area of patients kept on the air-fluidized bed. These are applied solely to ventral areas free from contact with the bed. If necrectomy is needed followed by provisional covering with xenografts, the patient should be placed in the activate bed and the bed activating system should subsequently be switched off. This will develop compression of the grafts applied while preventing bleeding. The same kind of procedure is used in cases where autografts are taken from the patients back and thighs. A switched off air-fluidized bed will then compress the donor areas.

DISCUSSION

A total of 42 patients, thereof 9 women and 33 men, have so far been treated kept on the air-fluidized bed which forms part of the equipment of our intensive care unit. The youngest patient was four, the oldest 84 years old. Burns on the dorsal portions of the body surface, sepsis and decubiti were the main indications for placing the patients on the bed. The longest period of staying in the bed was 59 days, the shortest 3 days. The average period of treatment was 14.4 days. Only one patient — after autotransplantation of the upper part of his back — used the bed switched off. Following his placement in the bed and the shaping of his imprint, the bed activation system was switched off to be switched on only in case the mass of ceramic sand had cooled down or in case the damaged mould had to be restored.

Altogether 9 of the total number of 42 patients died, thereof three due to bronchopneumonia as the main cause, one due to massive pulmonary arter embolism, one due to acute hepatodystrophy, and one due to acute respiratory insufficiency resulting from upper respiratory tract obstruction by dried respiratory secreta. Three other patients referred to our unit from other hospitals in a septic state were placed in the air-fluidized bed with regard to curtailing infection in the burned areas and, consequently, to blocking more sepsis. There was also an epidemiological objective — the prevention of cross infection. While this particular objective was successful, the patients themselves fell victim to sepsis (the gram-negative type) within a week in spite of all intensive and extensive comprehensive treatment. In contrast to the three deaths due to sepsis, it is only well to bear in mind the cases of six septic patients who survived only thanks to the use of the air-fluidized bed.

By way of conclusion, let us point to a few important facts: The bed itself and its accessories are examples of perfectly designed modern equipment. Con-

sequently they call for qualified treatment, first-class maintenance, and adequate environments at the intensive care unit. All this is indispensable wherever high-quality products are used. Thus, for instance, the bed requires the supply of high-quality water or else the cooling system will become blocked with impurities, a situation encountered in our air-fluidized bed after a year's use. The ambient air, too, is to be as clean as possible, otherwise the air filter should be exchanged more frequently than indicated in the directions for use.

The use of the air-fluidized bed — including any type of repair work — is more expensive under what are not exactly optimum conditions than in the countries of its origin. Those, in our view, are the reasons which limit full and general uses of the bed. It is obviously only through the successful management of the adverse technological and economic conditions that the problem of putting the air-fluidized bed to general use in many countries can be contemplated.

J. H.

SUMMARY

42 severely burned patients, 33 men and 9 women, were treated in the air-fluidized bed starting with February 1980. The extent of deep involvement ranged from 20 % to 80 % of the total body surface. The indications for using the SSI Clinitron were: the localization of the burn on the dorsal surfaces of the trunk and lower extremities, pressure sore development in extensive burns. The longest period of Clinitron treatment was 59 days, the shortest — 3 days (average 14 days). There were 9 fatal outcomes: the micro-organisms most frequently associated with burn wound sepsis and septic pulmonary complications were *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Enterobacter*. Epidemiological follow-up of the bed and of the environment (aeroscopic studies) were performed regularly. The bactericidal effect of the bed was proved repeatedly.

RESUME

L'utilisation d'un air-lit «SSI CLINITRON» chez des malades gravement brûlés

Brož, L., Königová, R., Želízková, V.

Depuis février 1980, on a traité 42 malades dans l'air-lit. C'étaient 33 hommes et 9 femmes avec de graves brûlures. L'étendue des zones atteintes variait de 20 jusqu'à 80 % de la surface corporelle. Les indications pour le traitement par l'air-lit CLINITRON étaient suivantes: brûlures des surfaces dorsales du tronc et des membres inférieurs, meurtrissures décubitales en développement, septicémie. La durée du traitement dans l'air-lit la plus longue était 59 jours, la plus courte 3 jours. Neuf malades sont décédés. Des septicémies et des complications pulmonaires septiques étaient causées le plus souvent par *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Enterobacter*. La situation épidémiologique était régulièrement suivi pendant toute la durée du traitement (des examens aérosopiques). Des examens exécutés plusieurs fois ont prouvé l'effet bactéricide de l'air-lit.

ZUSAMMENFASSUNG

Die Anwendung des Luftkissens „SSI CLINITRON“ bei schweren Verbrennungen

Brož, L., Königová, R., Želízková, V.

Seit Februar 1980 wurden auf dem Luftkissen 42 schwer verbrannte Patienten behandelt, davon waren 33 Männer und 9 Frauen. Der Umfang der Verbrennungen betraf 20–80 % der Körperoberfläche. Indikationen für die Lagerung auf den Luftkissen CLINITRON waren lokalisierte Verbrennungen an den Dorsalflächen des Rumpfes und der unteren Gliedmassen sowie sich entwickelnde Drucksetllen und Sepsis. Die längste Aufenthaltsdauer auf dem Kissen betrug 59 Tage und die kürzeste 3 Tage. 9 Patienten starben dabei. Die häufigste Ursache einer Sepsis und septischer Lungenkomplikationen war pseudomonas aeruginosa, staphylococcus aureus, enterobacter. Die epidemiologische Beobachtung des Kissens und seiner Umgebung wurde regelmässig ausgeführt (aeroskopische Studien). Die bakterizide Wirkung des Kissens wurde wiederholt nachgewiesen.

RESUMEN

Utilización del lecho aereado "SSI CLINITRON" en casos de quemaduras graves

Brož, L., Königová, R., Želízková, V.

Desde fevrero 1980 fueron sometidos al tratamiento en el lecho aereado 42 pacientes con quemaduras graves, de ello 33 hombres y 9 mujeres. La envergadura de la afectación era entre el 20 y 80 % de la superficie del cuerpo. El tratamiento en el lecho aereado es indicado por la localización de las quemaduras en las partes dorsales del tronco y las extremidades inferiores, desarrollo de magulladuras y la sepsis. La máxima permanencia en el lecho fue 59 y la mínima 3 días. 9 pacientes se murieron. La causa más frecuente de la sepsis y complicaciones sépticas pulmonares fue la Pseudomonas aeruginosa, Staphylococcus aureus, Enterobacter. Regularmente se llevaba a cabo el control epidemiológico del lecho y sus alrededores (estudios aeroscópicos). Reiteradamente fue comprobado el efecto bactericida del lecho.

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OUR EXPERIENCE WITH He-Ne AND CO₂ LASER

J. HUBÁČEK

Laser radiation has been applied in medicine in:

1. laser diagnosis (photodiagnosis, photochemodiagnosis, optical and acoustic holography),
2. laser phototherapy and photochemotherapy,
3. laser coagulation and laser scalpel.

Laser coagulation and the laser scalpel enjoy the greatest popularity in surgery, although there has recently been growing interest in the diagnostic and phototherapeutic methods, primarily in oncology. For this reason they will be mentioned in brief here.

1. Laser photodiagnosis makes use of the processes of fluorescence and phosphorescence produced by laser radiation in the molecule under scrutiny. Photodiagnosis can be utilized for the detection of diseases noted for the accumulation in some organs and tissues of substances not present there under normal circumstances (e. g. copper in the cornea in Wilson's disease).

Photochemodiagnosis (sensitized photodiagnosis requires the creation of a complex of the molecule studied and some other molecule, usually a dye). In clinical practice, the properties of some dyes accumulating in tumour cells are made use of. After laser irradiation tumour cell fluorescence can be detected on the body surface or endoscopically.

A quite separate chapter is represented by holography (laser photography). Holography presents a three-dimensional image of the laser-irradiated object. Optical holography can be used to study the surface of the human and, endoscopically, organ surface; acoustic holography helps in detecting the tissue and organs otherwise not penetrated by visible light. The diagnostic value of holography, particularly of acoustic holography, will undoubtedly rise in future.

2. Laser phototherapy and photochemotherapy is utilized for the stimulation of biological processes and for photodestruction of cells and tissues. The radiation of a ruby, He-Ne, or Argon laser stimulates a number of biological processes, and it has found wide application in clinical practice. In surgery, it is mainly the therapy of poorly healing wounds. The effect of laser radiation can be potentiated by the concomitant action of chemical substances, and then we speak about photochemotherapy. Photodestruction occurs when the biomolecule absorbs a photon of such energy that it passes into the ionized

or excited state, in which the binding forces are disturbed. The molecule then breaks down and the cell dies. In clinical practice, photodestruction of tumorous tissues is made primarily with a nitrogen laser, though ruby and argon lasers are used as well. Photochemodestruction (biochemical photodestruction) is based on the photodynamic action of dyes, which provokes oxidation in conjunction with radiation. The dyes used include eosin, hematoporphyrin, acridine, methylene blue, and other vital dyes. The aim is to achieve quicker destruction of the tumorous tissue. The dye can be applied locally on the tumour surface, injected into the tumour or parenterally. This is followed by irradiation with a visible or ultraviolet laser device. A greater effect is achieved by radiation in the ultraviolet spectrum.

Selective laser action upon biological complexes has recently become a matter of foremost interest.

3. Laser coagulation and laser scalpel hold a dominant position in surgery. Tissue absorption of laser radiation is followed by molecular kinetic changes reflected to various degrees of temperature rise according to radiation intensity. Within 37°—58 °C no harmful alterations arises in the tissue, proteins start denaturing above 60 °C, cellular fluid begins to evaporate at about 100 °C, the temperature of several hundreds of degrees bring about tissue charring and vaporization. This means in practice that according to the selected intensity laser radiation either heats, coagulates or vaporizes the tissue, which is the basis of dissection. The dissection quality depends not only on the intensity but also on the wave length of the laser. A CO₂ laser operates in the distant infrared area, its radiation is remarkably absorbed in water and shows little dispersion over the tissue, it is advantageous for the dissection, though its coagulation properties are poorer. An argon laser radiates in the visible area and its radiation is markedly absorbed in hemoglobin, and is suitable for coagulation. A neodymium laser radiates in the near infrared area, it shows marked coagulation qualities, and its section capacity is poorer due to dispersion.

The most experience has so far been obtained with the use of biostimulating lasers and laser scalpel. It is in these fields that we could make our own experience.

A. The biostimulating effect of laser radiation was used for

1. general irradiation of the body,
2. local irradiation in the area of the pathological process or as a means for quicker healing of wounds,
3. irradiation of Haed's zones,
4. irradiation of the ear and body points of acupuncture.

Of special importance for surgery is the healing of wounds. Mester et al. made use of both ruby and He-Ne lasers to irradiate both surgical wounds and poorly healing skin defects of various etiology, and they proved both experimentally and clinically that laser radiation:

- a) stimulates the production of collagen, of lysosomatic intracellular bodies, mitochondria, and the production of vesicles with bioactive substances,
- b) supports mitotic activity,

- c) activates succinyldehydrogenase, lactadehydrogenase, non-specific esterase near the wound margins during the early phase of healing,
- d) remarkably increases vascular neoformation,
- e) raises the levels of PGE₂ and PGF₂ prostaglandines in the wound area,
- f) raises the levels of albumin, alpha 1 lipoprotein, alpha 1 antitrypsin, alpha 2 macroglobulin, of transferin and Ig G, Ig A, and Ig M immunoglobulins in the wound secretion,
- g) favourably influences the healing of autografts.

The biostimulating effect of the laser was proved by the authors to last up to a certain irradiation dose limit followed by an inhibitory effect when exceeded.

At the Otolaryngological Clinic in Olomouc, a biostimulating He-Ne laser LA 1002 Metra Blansko was used both in experiments and in clinical practice. The output in the terminal is 20—25 mW. Our own experimental work concerned:

- 1. the growth of microbes irradiated with the laser,
- 2. T and B lymphocytes in tonsillary tissue,
- 3. lysozyme values in the saliva.

The following conclusions were drawn:

- 1. Cultivations of the *Staphylococcus aureus*, *Streptococcus beta haemol.*, *Streptococcus pneumoniae*, *Neisseria catarrhalis* microbes exposed to 0.5, 1, 2.5, 5 and 10 min irradiation did not show any changes against the control groups. When irradiated in their lag phase, which is the most sensitive to external influence, a 10 min exposure to laser radiation was followed by higher growth activity in the irradiated microbe culture, of a significant order in staphylococci.
- 2. Rosette tests (types E, EA, EAC_m, EAC_h, E_M, and E_s) from excised tonsillary tissue were made in 15 patients with recurrent tonsillitis. The numerical values of B lymphocytes, notably those of T lymphocytes in the patients' tonsillary tissue were found to be decreased. When irradiated, B and, primarily, T lymphocyte values approached the norm, plasma cells having multiplied considerably. The tonsil was irradiated for 1 min from a 1 cm distance, the excision being made 24 hours following the second irradiation.
- 3. Fifteen patients were examined for lysozyme in their saliva before and after the irradiation of the bucal mucosa. Thirteen of them had chronic tonsillopharyngitis, 2 apthous stomatitis. Two thirds of them showed decreased values of lysozyme in their saliva. After two irradiations with the laser (3 min each) the lysozyme values had substantially increased in 10 patients.

The conclusion from our observations for surgery can be that laser irradiation can raise the growth activity of staphylococci, but on the other hand it has a favourable effect on the production of lysozyme, B and especially T lymphocytes, in this way stimulating the healing processes.

In clinical practice, the biostimulating laser was used in the following indications:

- 1. Laser acupuncture proved useful in patients with headache (favourable effect in 8 out of 10 cases), rhinitis vasomotorica (4 patients, 2 healed, 2 improved).

and frontal sinusitis (3 patients healed). A beneficial effect was noted in trismus as well, particularly following ORL and stomatosurgical operations (5 patients). Neuralgia of the n. V, resistant to other therapy, was favourably influenced in 3 cases. The treatment proved of no effect in 4 patients with tinnitus aurium.

2. When treating palate tonsil inflammations we obtained excellent results in recurrent inflammations. Of the 35 patients only 5 relapses were seen. Similarly, the irradiation of acute catarrhal tonsilopharyngitis shortens the disease (30 patients). Wound healing following tonsillectomy is not distinctly shortened (10 patients).

3. In ear diseases, laser irradiation proved beneficial in managing eardrum perforations of various etiology and in persisting discharge from the trepanation cavity. The results are seen in Table 1.

Table 1

Diagnosis	Number	Number and length of applications	Healed	Improved	Unimproved
Traumatic eardrum perforation	7	2-7 (every other day 1 min.)	6	1	—
Eardrum perforation after otitis	6	5-7 (every other day 1 min.)	—	3	3
Perforation in graft of tympanoplasty	4	5-7 (every other day 1 min.)	3	1	—
Discharge from trepanation cavity	5	5-9 (every other day 1 min.)	4	1	—

4. Of greatest importance for surgery is the application of laser to poorly healing postoperative wounds, especially following laryngectomy when actinotherapy has failed. The favourable effect of irradiation is documented in Table 2.

In four cases included in the complication group, the wound either healed completely or substantially improved after a series of irradiations, but shortly after the laser therapy was discontinued, the tumour recurred. They were 2 patients after laryngectomy, 1 after an operation for nose cancer, and another one after the operation of a cancerized cervical cyst. In all the patients the tumour recurred after the first surgery (partial laryngectomy, cyst extirpation, excision of the nose tumour). Actinotherapy was therefore introduced in its full extent and a radical operation was made for the new recurrence followed by laser irradiation of the poorly healing wound. Although the cancerogenic effect of the radiation produced by biostimulation is denied in literature (Mester, Oláh et al.) and in two cases the surgical intervention had a palliative effect, the mentioned facts require caution and careful consideration of laser application in patients with cancer.

Table 2

Diagnosis	Number of cases	Application		Healed	Im-proved	Compli-cations
		min.	number			
Unhealing retroauricular wound	3	every other day 3 min.	3	3	—	—
Fistula after parotidectomy	3	every other day 3 min.	3	3	—	—
Disturbed healing of s.in grafts	4	every other day 3 min.	4	4	—	—
Disturbed healing of skin flaps	4	daily 5 min.	10—30	2	—	2
Disintegration of wound after operation on neck, nose and earlobe	9	daily 5 min	10	8	1	—
Disintegration of wound after laryngectomy	10	daily 5—10 min.	30—40	4	4	2

B. Laser surgery makes use of the coagulation, dissection or vaporization effects. Coagulation is the first and most frequently used method in ophtalmology, recently utilizing in the first place the coagulating qualities of the neodymium laser to stop endoscopic bleeding primarilly in the gastrointestinal tract, respiratory tract, and in repeated metrorrhagia. These are now the well elaborated methods of microwelding in the gastrointestinal tract, microwelding of collagen and hydron "patches" in cardiovascular surgery. Coagulation destruction of tumours is performed primarilly in skin tumours, in ophtalmology, and in urology.

Most suitable for the laser scalpel, used in all surgical branches, is the CO₂ laser as it has the best cutting properties. The Neodymium beam is preferred in operations on parenchymatous organs while the argon laser is favoured in the surgery of blood vessels and vascular tumours because of its extraordinary affinity to hemoglobin. For this reason, the most modern laser devices are designed by combining the CO₂ and neodymium lasers, CO₂ and argon lasers, or all the three basic types.

Our own experience was obtained with the CO₂ laser developed by the staff of the Department of Optoelectronics, Faculty of Natural Sciences, Palacký University in Olomouc. The output of the laser scalpel is about 60 W.

Our experimental experience was derived from operations on piglings and rabbits. In piglings we made excision of the skin and the subcutaneous part, partial resection of the earlobe, tonsillectomy and chordectomy per laryngofissuram. In rabbits, we performed excision of the skin and subcutaneum,

deep excisions with a part of the muscle mass, and, in cooperation with stomatologists, dessection of the lower lip with the following suture, tongue tip resection, excision of the cheek and palate mucosa, tonsillectomy.

On the evidence of both macroscopic and microscopic controls, we can state that wounds with laser output of 50—60 W healed promptly and without complications. With the falling output to about 20 W, the tongue and cheek and palate mucosa heal well, skin wounds taking longer as compared with the classical scalpel interventions. Even in cases of longer healing recorded in rabbits with dissected lips it was remarkable that the laser-operated rabbits took food without problems from the first day, while the control groups operated on with the classical scalpel did so from the 2nd to 3rd days.

At the clinic, 26 E. N. T. patients and, in cooperation with the stomatologists, another 3 i. e. a total of 29 patients, were operated on with the laser scalpel. The surgeries are summed up in the Table 3.

Table 3

Diagnosis	Intervention	Number
Naevus pigmentosus faciei et colli	excisio	6
Basalioma faciei	excisio	3
Leukoplakia cavi oris	excisio	2
Basalioma dorsii et apicis nasi	excisio excisio cum plastica	6
Basalioma alae nasi	excisio cum plastica	2
Carcinoma auriculae	resectio auriculae partialis	3
Carcinoma palati molle	resectio palati molle partialis	1
Carcinoma plicae vocalis	chordectomia per laryngofissuram	1
Melanoblastoma cavi nasi sinus maxillaris et ethmoidalis	resectio maxillae part. ethmoidectomia conchotomia	1
Metastasae post laryngectomiam	vaporisatio	2

When operating in the oral cavity and pharynx we were aware of the risk of burning through the endotracheal tube meaning serious complications. But a moist gauze was enough to prevent this. The patients healed without complications.

The CO₂ laser scalpel of 50—60 W output means a contribution to the surgery of the head and neck for the following reasons:

1. the effects of section, coagulation and vaporization can well be combined to suit the operational situation,

2. bleeding restriction is welcome not only because of the smaller blood loss but also for a better view of the operational field,
3. the blockade of lymphatic vessels and microthrombozation of the vascular supply eliminate the possibility of tumour cell dissemination,
4. also important is the alleviation of postoperational pain and reduction of edemas.

The terminal of the first Czechoslovak laser scalpel is easy to handle. But for work in the oral cavity, nasal cavity, and inside the pharynx it is too bulky. The suction during operation, particularly in the course of vaporization, must also be improved. As the air protecting the lens in the terminal comes from the central compressor, there is some risk of contamination with microscopic particles brought into the operational field. An efficacious filter should therefore be interested to make the lens cooling safe.

In order to support the necessary development of laser surgery in Czechoslovakia in the coming period it is indispensable:

1. to increase the output of the contemporary type of the Czechoslovak laser, adding the possibility of current control and production of various types of terminals,
2. to modify the device for microsurgical interventions,
3. in addition to the CO₂ laser to design a neodymium laser endoscope,
4. to establish experimental departments and clinics equipped with modern laser technology, health and technical staffs,
5. to support international cooperation with visits to important institutions.

J. H.

SUMMARY

Laser radiation is applied in surgery for (1) laser photodiagnosis and photochemodiagnosis, (2) laser phototherapy and photochemotherapy to stimulate biological processes, or the opposite, to destroy tumours, (3) laser coagulation or laser scalpel.

Our own experience concerns the biostimulating He-Ne laser and the CO₂ scalpel.

A. Apart from experimental studies, the biostimulating effect of the 20 mW He-Ne laser was used at our clinic (1) in treating acute and chronic inflammations of palatine tonsils, (2) in treating traumatic perforations of the ear drum, (3) as laser acupuncture, (4) in complicated postoperative healing particularly of patients after laryngectomy in the irradiated area.

B. The 50—60 W laser scalpel was used in a total of 29 surgical operations from simple excisions of basalomas and naevi to larger surgeries (chordectomy, operation of paranasal cavities).

The CO₂ laser has the following main advantages when used in operations: (1) the effects of section, coagulation and vaporization can be usefully combined to suit the operational situation, (2) the reduction of peroperational bleeding is welcome both for lesser blood loss and for better orientation over the operational field, (3) the blockade of lymphatic vessels eliminates the possibility of tumour cell spreading, (4) of importance is also the reduction of post-

operative pain and edema. Our experience obtained so far shows both the biostimulating laser and the laser scalpel to be a contribution to surgery.

RESUME

Nos expériences avec le He-Ne et CO₂ laser

Hubáček, J.

Dans les domaines chirurgicales, le rayonnement du laser est utilisé comme:

1. photodiagnostic et photochimiodiagnostic,
2. photothérapie et photochimiothérapie soit pour stimulation des processus biologiques soit pour destruction des tumeurs,
3. laser-coagulation et laser-bistouri.

Nous avons obtenue de propres expériences avec le He-Ne laser-bistouri et le CO₂ laser-bistouri pour biostimulation.

A. A l'exception des études expérimentales, nous avons utilisé l'effet biostimulateur de He-Ne laser de puissance 20 mW à la clinique:

1. au traitement des tonsillites aiguës et chroniques,
2. au traitement des perforations traumatiques du tympan,
3. laser-acupuncture,
4. en guérison postopératoire compliquée, surtout chez des malades après laryngectomie dans le terrain irradié.

B. Avec un laser-bistouri de puissance 50—60 W on a effectué en somme 29 interventions, des excisions simples — des basaliomes et des naevi — jusqu'aux opérations plus compliquées (chordectomie, opérations des sinus).

L'utilisation opératoire de CO₂ laser est avantageuse surtout dans les cas où:

1. on peut effectivement combiner l'effet d'incision avec celui de coagulation et de vaporisation, selon la situation opératoire,
2. la diminution du saignement peropératoire est souhaitable non seulement du point de vue de la réduction de la perte de sang mais aussi pour la clarté du champs opératoire,
3. la blocage des vaisseaux sanguins et lymphatiques diminue la possibilité de dissémination des cellules tumorales,
4. l'étouffement des douleurs postopératoires et diminution des oedèmes est aussi important.

Nos expériences actuelles témoignent que le laser biostimulateur aussi que le laser-bistouri présentent un apport important pour la chirurgie.

ZUSAMMENFASSUNG

Unsere Erfahrungen mit dem He-Ne und CO₂-Laser

Hubáček, J.

Laserstrahlung ist auf chirurgischem Gebiet zur Geltung gekommen als:

1. Laserfotodiagnostik und fotochemodiagnostik,
2. Laserfototherapie zur Stimulierung biologischer Prozesse oder im Gegenteil zur Zerstörung von Tumoren,
3. Laserkoagulation und Laserskalpell.

Eigene Erfahrungen haben wir mit dem biostimulierenden He-Ne Laser und dem CO₂-Laserskalpell gewonnen.

A. Ausser bei experimentalen Studien haben wir den biostimulierenden Effekt von He-Ne Lasern von 20 mW Leistung klinisch angewendet:

1. bei der Behandlung akuter und chronischer Entzündungen der Gaumenmandeln,
2. bei der Behandlung traumatischer Perforierungen der Ohrtrommel,
3. als Laserakupunktur,
4. bei komplizierter postoperativer Heilung, besonders bei Patienten nach Laryngektomie im bestrahlten Terrain.

B. Mit dem Laserskalpell von 50—60 W Leistung wurden insgesamt 29 Eingriffe ausgeführt, von einfachen Exzisionen von Basaliomen und Naevi bis zu grösseren Interventionen (Chordektomie, Operationen der Paranasalhöhlen).

Das CO₂-Laserskalpell eignet sich für Operationen, weil:

1. man den Effekt des Schnitts, der Koagulation und der Vaporisierung je nach der Operationssituation zweckmässig kombinieren kann,
2. die Verminderung des Peroperationsblutens nicht nur vom Gesichtspunkt geringerer Blutverluste sondern auch wegen der Übersichtlichkeit des Operationsfelds begrüssen muss,
3. die Blockade der lymphatischen Gefässe die Möglichkeit eines Aussaens von Tumorzellen vermindert,
4. auch die Verringerung der postoperativen Schmerzen und Ödeme von Bedeutung ist.

Unsere bisherigen Erfahrungen legen Zeugnis ab dafür, dass sowohl der biostimulierende Laser als auch das Laserskalpell vorteilhafte Beiträge für die Chirurgie darstellen.

RESUMEN

Nuestras experiencias con los lasers He-Ne y CO₂

Hubáček, J.

En las especialidades de cirugía, los rayos de laser tienen las siguientes implementaciones:

1. fotodiagnóstico y diagnóstico fotoquímico por laser,
2. fototerapia por laser tanto para estimular procesos biológica como para destruir tumores,
3. coagulación mediante el laser y el bisturí de laser.

Adquirimos nuestras propias experiencias al trabajar con el laser biostimulador He-Ne y con el bisturí de laser CO₂.

A. Además de estudios experimentales, el efecto biostimulador del laser He-Ne, de potencia 20 mW, lo utilizamos en la clínica:

1. en el tratamiento de inflamaciones agudas y crónicas de las amígdalas,
2. en el tratamiento de las perforaciones traumáticas del tímpano,
3. como acupuntura por laser,
4. en caso de cicatrizaciones postoperativas complicadas, particularmente en los pacientes que se sometieron a laringoectomía en el terreno irradiado.

B. Mediante el bisturí de laser de potencia de 50—60 Ws. fueron realizados en total 29 operaciones, de simples excisiones de basaliomas y nevos a operaciones de mayor importancia (cordectomía, operaciones de las cavidades paranasales).

El laser CO₂ resulta ventajoso en las operaciones ya que:

1. podemos combinar eficazmente el efecto del corte, de la coagulación y la vaporización según la situación operacional,
2. la reducción de las hemorragias peroperativas no sólo es positivo ya que minimaliza las pérdidas de sangre sino también porque mejora la orientación visual en el campo de operación,

3. el bloque de los vasos linfáticos limita la posibilidad de propagación de células tumorosas,
4. es de importancia igualmente el alivio del dolor después de la operación y reducción de edemas.

Nuestras experiencias adquiridas hasta ahora son testimonio de que tanto el laser biostimulador como el bisturí de laser constituyen un aporte para la cirugía.

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The VIth International Congress on Burns in San Francisco

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The VIth International Congress on Burns in San Francisco, California, was organized by the International Society for Burn Injuries, in cooperation with the World Health Organization, from August 29th till September 4th, 1982. The emblem of San Francisco bears the following inscription: "It is only through giving that we truly receive." These words express the aim of all those who devoted their lives, their knowledge and abilities to the thermally injured patients.

The General Director of WHO, Dr. H. Mahler, greeted the Congress with a formal address which was included in its official programme. The authors should like to quote the following: "The WHO considers health as a state of a complete physical, mental and social well-being and not merely as the absence of disease or infirmity. In no sector of our profession is this more true than in burns, where the anguish of the victim is not only physical but to a great extent social and mental."

The opening ceremony of the Congress was held in the Masonic Temple on Nob Hill. The participants were addressed by Dr. S. W. A. Gunn, Director of the Emergency Relief Operations. Doctor Gunn stressed the great importance of the cooperation between the WHO and the International Society for Burn Injuries. The WHO, a health organization attached to the United Nations, operates through the ministries of health of the member states, these ministries being official partners of the WHO. On the other hand, the WHO operates also with the help of specialist groups, such as the ISBI. Doctor Gunn also mentioned the possible need to recruit medical staff volunteers in cases of mass burn disasters. Both experienced doctors and nurses would then be needed.

The International Society for Burn Injuries, which organizes international congresses every four years, has grown considerably since its foundation in 1965 (at the Edinburgh Congress). Although this society is now a world society, it nevertheless has retained its original name of International Society, in honour of the long tradition of the society and in honour of its founder, Mr. A. B. Wallace, who gave the name to this prominent organization.

The number of ISBI members has grown considerably, the number of specialized Burn Centres and units has also increased dramatically (during the last decade the number of specialized units has doubled) on all continents. Consequently, international congresses present now an ever increasing organizational problem. The San Francisco Congress presented no doubt a difficult task for its organizers. The local committee saved no effort to solve all the problems involved. As far as technical equipment and organization were concerned, the efforts were successful. Nevertheless, it was rather difficult for the Congress participants to get well orientated during the scientific programme with several simultaneous sessions as the Congress materials did not include

abstracts of the papers included in the different sessions. The participants, therefore, when making a decision on which sessions to attend, had to study the programme carefully and had to be guided by the reputation of the various speakers and the reputation of the centres, in which they work. Thus it might happen that small, new units, where excellent work might be done, could be easily overlooked.

The scientific sessions took place at the Fairmont Hotel on Nob Hill. Every day, there were several parallel sessions in two morning and two afternoon sections; besides, there were several luncheon and breakfast sessions. This system was no doubt chosen for the great number of papers accepted (400); the presentation of so many papers could otherwise not have been crowded in the short time space of five days. The participants there included top specialists from 46 states; these were not only burn surgeons, but also border specialists, whose cooperation in burn care is indispensable, including paramedical specialties (i.e. physiotherapists, sociologists, psychologists, dieticians, hospital administrators, etc.). The nursing personnel was also very well represented.

During the Congress, there was an exhibit by many firms producing special equipment, materials and drugs for the treatment of burns. The participants could view and discuss different new types of dressings, elastic compressive garments for the treatment or prevention of scar formation, all kinds of disposable items (without those the fight against nosocomial infection would be unthinkable) and many different agents for topical and general treatment.

During the five days of the scientific programme, the basic problems of burns treatment were discussed from all possible angles by specialists from all parts of the world. In the treatment of extensive burns, fluid replacement in the shock period is of primary importance as well as parenteral nutrition. 25 sessions and 10 luncheon and breakfast workshops were devoted to this topic. The best up-to-date monitoring systems were described by specialists from Japan, USA, Canada, Denmark and many other countries. Results obtained with the help of top modern equipment could well be correlated with the results obtained when using long-term clinical observations by highly experienced workers. It was stressed that while the majority of burn units throughout the world so far did not have such modern equipment, severely burned patients in these units must also be treated adequately. This statement was very much acclaimed, especially by burn surgeons from Australia and France. During the ensuing discussion many agreed that the excellent technical equipment, which still is not available to all, could be outweighed by the efforts of highly experienced surgeons and nurses; in the less sophisticated units (as far as equipment is concerned) the medical staff has to work harder and think harder, yet they establish a better contact with the patient, which is often lacking in this computerized world of ours.

Similar problems were also discussed in sessions devoted to the subject of Planning and Designing a Burn Unit (34 papers). All sessions were chaired by top burn specialists from the best known Burn Centres in Europe and the USA. In the conclusions reached in discussions, the importance of the medical personnel, its morale and ethics and high qualification was stressed.

Another group of sessions was in a way closely related to the above problems: cardio-vascular complications. It appears that many experienced workers share the belief that the more complex methods of monitoring and dynamic diagnostics based on the access to the venous system lead to new dangers, often fatal (complications connected with intravenous cannulation). The frequently diagnosed cannula infection may lead to cannula sepsis.

Infection as the main danger to an extensively burned patient still attracts the greatest attention of all burn units, no matter whether they be the top centres (such as Shriners Institutes in Boston, Cincinnati or Galveston), or small, modestly equipped units. Infection is always a threat though it may travel by different routes from different sources. It must be conceded that while, as far as we are concerned, infection still poses the greatest risk for the extensively burned, in some of the centres in several states this risk is slowly receding. In some centres nosocomial infection is found only in 6—5 %, while in other, less well designed centres, which have to improvise, nosocomial infection is as high as 29 %. The low percentage of nosocomial infection is very likely due to better isolation system, to laminar air flow with bacteriological filters, to air fluidized beds, to disposable items, to sufficient amount of linen, and last but not least to the good work of the personnel (sufficient number of high-quality nurses is also decisive). The personnel must have sufficient time to establish good contact with the patient, to take a painstaking care of the patient and to think of him.

This reasoning leads us to one of the highlights of the Congress, to the sessions devoted to psychology (24 papers). In these sessions, as well as during breakfast and luncheon sessions devoted to this topic, all possible known aspects of psychological alterations in the thermally injured were discussed. Psychotherapy, social needs of burned children, the problem of accompanying persons and their role in burn care, psychic decompensation as well as prevention of suicidal tendencies in convalescence and the problems of the period of reconstructive surgery were discussed. Psychological alternations may also be caused by pain or by fear of pain. Special sessions were devoted to pain control and were very well attended.

The interest of specialists is still centred on problems of local therapy, especially on problems of temporary skin substitutes in more extensive burns. The method, used for many years in the Prague Burn Centre, i.e. the use of fresh xenografts, is not universally acclaimed, mostly for the high price of commercially obtainable xenografts. Allografts, of course, still play a major role, yet papers on skin tissue typing are disappearing, as compared with the recent past. The attention of many specialists is centred on synthetic skin substitutes, which are more easily obtainable and easy to store. The results obtained with various skin substitutes differ considerably, though. Most of the papers presented dealt with one kind of temporary skin substitutes, mostly with the more recently developed synthetic ones (for instance Biobrane). Only in few papers a comparison of different skin substitutes was presented.

It is to be highly appreciated that during the San Francisco Congress all sessions devoted to the prevention of thermal injuries were very well attended (in the past attendance at these sessions was rather poor, though those who did attend, were the most highly experienced and dedicated workers). The good attendance at the Prevention Sessions could be ascribed to the initiative of the organizing committee, who enlisted not only medical but also paramedical personnel. Many nurses, teachers, social workers and others contributed to the success of these sessions. Efforts to prevent thermal injuries, mostly caused by human carelessness, are obviously of high importance.

Another major problem is the possible prevention of mass burn disasters. Bearing this in mind let us recall the main aim of all medical personnel stated at the meeting of the International Committee of Experts in Medical Sciences and Health, in April 1982 in Geneva: "Health for all by the year 2000." Prevention of mass burn disasters is synonymous with the prevention of nuclear war. Criteria accepted for civil organizations can be applied in catastrophes involving hundreds, a thousand people, at the most. Should the number of victims be higher, none of these criteria could be applied. Civil organizations could function only in the outskirts of the area involved and can only

serve in the control of psychic decompensation connected with a global mass disaster. Triage would be impossible, as it would be very difficult to distinguish the dead from the injured and from those suffering from psychic shock. In case of such a situation, the medical personnel would be also faced with the terrible ethical problem whom to treat and which of the injured should be left to die. The ISBI Disaster Planning Committee was founded in 1978 at the Stockholm Congress, its aim being to set criteria for mass disaster organization for different parts of the world taking into account different moral and ethical values observed in different countries. The Committee defines as a mass disaster a situation, in which the number of victims, the severity of their injury is highly disproportionate to the facilities available. In both "small" and "great" mass disasters it is the burn surgeon who must to the triage and decide which of the victims are to be treated in a specialized facility. Cooperation with WHO, the Red Cross Society and national representatives of the ISBI in case of a mass disaster is indispensable.

It was regrettable that none of the participants could attend all sessions. But this is true of most big congresses. It seems clear that monothematic conferences centred on one or two important topics will grow in importance.

The next international congress, the Seventh Congress, will be held in Melbourne, in 1986. Until then, many small, informal meetings will be held all over the world. It is to be expected that these meetings will also filter out the most outstanding studies which should be presented at the great international forum in Melbourne.

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Report from meeting of Physicians of the World Assembly for Peace and Life, against Nuclear War

Prague, June 24 — 25, 1983

Some 120 physicians from 52 countries of all continents met for two days at the Prague World Assembly for Peace and Life, against Nuclear War.

S u g g e s t i o n s

1. Physicians' groups in all countries should endeavour to have included in the medical students' curricula the subject of the medical consequences of nuclear war, preferably on a multidisciplinary basis.
2. The IPPNW appeal on the prevention of nuclear war for signature by physicians should be fully supported.
3. Consideration should be given to the organization of a "Medical Day of Peace" annually.
4. Several proposals were made for scientific research relating to the medical consequences of wars on subjects such as children and war, hunger and war.
5. Physicians' groups in developing countries should be encouraged to get established and are recommended to seek help from existing national and international physicians' organizations.
6. In the present situation the physicians call for urgent actions to bring about:
 - a nuclear-weapon freeze, to include manufacture, testing and deployment of any additional warheads of delivery vehicles,
 - the subsequent deescalation of the nuclear weapon arsenals,
 - the creation of nuclear-weapon-free zones wherever possible,
 - declarations by all nuclear-weapon States for no first use of nuclear weapons.
7. The physicians also endorse the natural public revulsion on chemical, biological and radioactive weapons, including "neutron bomb", and urge the Geneva Committee on Disarmament to discuss formulating a comprehensive ban on all disease — including methods of warfare.
8. The physicians also urge the transfer of resources to problems of Third World development; in particular medical support should be given to the WHO, UNICEF and FAO objectives on primary health care, basic nutrition and clean water for all by the end of the Century.

The participants were confident in the value of their contribution towards the aims of eliminating nuclear weapons and creating peaceful world.

Advance Notice

**"Plastic Surgery of the Face" by the late Sir Harold Gillies, CBE, FRCS,
originally published in 1920 by the Oxford University Press.**

The President and Council of the British Association of Plastic Surgeons wish to announce that by kind permission of Lady Gillies and the Oxford University Press, arrangements have been made with Gower Medical Publishing Ltd., of London, to reprint a facsimile edition of the original work with a new foreword by Sir Benjamin K. Rank, CMG, FRCS. There will be two editions. a cased facsimile edition (approximate price \$ 100) and a special numbered facsimile edition (limited to 250 copies) with half-leather binding (approximate price \$ 200).

Readers who wish to place an order for this reprint are advised to make an early application direct to the Publishers: Gower Medical Publishing Ltd., Middlesex House, 34—42 Cleveland Street, London W1P 5FB (Telephone: 01 580 9327, Telex: 21736).



LEONID ILYICH BREZHNEV DEAD

Dec. 19, 1906 — Nov. 10, 1982

News of the sudden death of Leonid Ilyich Brezhnev — the Soviet Union's leading statesman — immediately reached the remotest corners of the world, the world that had known him as an outstanding politician and a tireless champion of mankind's happy life in peace and understanding among nations of all continents.

Leonid Ilyich Brezhnev clearly understood the absurdity and horrors of war which he encountered personally as a direct participant in the 2nd World War from its onset up to Czechoslovakia's liberation in 1945.

We, health workers, shall forever cherish his words "man's foremost right is — the right to life", whose every single hour all of us are pledged to fight for all over the world.

Long live his memory!

Editorial staff



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STOP FOR A MOMENT AND CONSIDER YOUR HEALTH



DAY AFTER DAY AND YEAR AFTER YEAR YOU ARE CONSTANTLY CHASING SOME AIM OR ANOTHER, YOU STRETCH THE MAINSPRING OF YOUR HEALTH TO THE VERY MAXIMUM. AND HOW LONG DO YOU THINK YOU CAN CONTINUE TO DO SO? REMEMBER THAT YOU HAVE ONLY ONE HEALTH AND FINALLY MAKE UP YOUR MIND TO GRANT IT, AT A VERY REASONABLE PRICE, WHAT IT DESERVES: COMPLEX TREATMENT AT ONE OF THE OLDEST AND THE MOST WIDELY RECOGNIZED SPAS IN EUROPE.

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