THE EARLY SURGICAL TREATMENT OF CHEMICAL BURNS

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THE EARLY SURGICAL TREATMENT OF CHEMICAL BURNS

Following is the translation of an article by Candidate of Medical Sciences M. I. Bystritskiy and V. P. Skorokhodov entitled "Raneye Operativnoye Lecheniye Khimicheskikh Ozhogov" (English version above) in Khirurgiya (Surgery), Vol. 36, No. 5, 1960, pages 104-106.

From the orthopedic-traumatological section (Head M. I. Bystritskiy) of the First Krivoy Rog Municipal Hospital.

We have been occupied for a number of years in the treatment of chemical burns in miners and have become convinced that their healing proceeds exceedingly slowly in the presence of conservative treatment, via the tearing off of necrotized tissues and the formation of sluggishly granulating wounds.

The accumulator lamp with which miners are equipped in the mining shaft, is charged with an alkaline electrolyte. When it gets on the skin, the electrolyte as a rule evokes burns of the third degree.

The tissues are not coagulated in the presence of alkali burns, as a consequence of which alkalis penetrate to the subcutaneous cellular tissue and deeper. In view of their slow action on the tissue, after the tearing away of the scab a granulation surface remains. The slow, gradually developing cicatrization often leads to the disfiguration of the integuments in the area which has been subjected to the burn.

Some surgeons have already for a long time used resection of the injured tissues in the presence of third degree thermal burns (V. I. Belyayeva and B. N. Postnikov, 1934; F. L. Gektin, 1937, and others); this method is, however, still not very widespread.

The treatment of burns, in particular, of chemical burns, by conservative methods is accompanied by a prolonged period of incapacity for work. When the method of resection of the burns is used, these periods are shortened by three to four times.
Chemical burns by electrolytes are almost never extensive. Their maximal area reaches dimensions of 15 X 15 cm. In the majority of cases the operation is limited to the resection of the necrotized tissues and to the application of sutures. Sometimes one is forced to resort to the transplantation of skin.

Fifty-two patients with burns due to alkaline electrolyte from the battery of an accumulator lamp have been under our observation from January 1957 on. Of them 39 individuals were subjected to operative intervention and 13 to conservative treatment. The localization of the burns is shown in the table.

As is evident from the table, burns of the lumbar region predominate, in connection with the circumstance that the batteries of the accumulator lamp are attached to the belt from behind at the time of work.

<table>
<thead>
<tr>
<th>Localization of the burn</th>
<th>Number of patients operated on</th>
<th>Number of patients treated conservatively</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoulder girdle</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Forearm</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Chest</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Lumber region</td>
<td>27</td>
<td>9</td>
<td>36</td>
</tr>
<tr>
<td>Buttocks</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Thigh</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Shin</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>39</strong></td>
<td><strong>13</strong></td>
<td><strong>52</strong></td>
</tr>
</tbody>
</table>

A bacteriological investigation was performed on 16 victims before the operation. Staphylococcus albus and staphylococcus aureus and streptococci were isolated.

The operation of resection of the injurec tissues, as a rule, was performed by us in the hospital on the second and third day after the burn. In this period the contours of the necrotizing area had already clearly appeared. Under local penicillin-novocaine anesthesia, keeping a distance from the edge of the burn surface of 0.5 cm, we resected the entire
area of injury with the subcutaneous cellular tissue. After
careful hemostasis we loosely applied nodular sutures. In
two cases after the resection of the injured tissues a defect
was formed to gather in which with sutures did not seem to be
possible and we had to resort to free transplantation of the
skin by the method of B. V. Parin. In both cases the skin
flaps took root.

The sutures, applied after the resection of the injured
tissues, could be expediently removed on the ninth to the tenth
day. Early removal of the sutures (on the sixth to the seventh
day) leads to a partial, and sometimes to a complete dehiscence
of the edges of the wound.

It is necessary to underline, that, keeping a distance
of 0.5 cm from the edge of the injured area, we nevertheless
did not resect it in the limits of healthy tissues, as certain
authors recommend (A. I. Antonov, 1957; G. Ts. Sarkisyan, 1957,
and others). In the limits of 0.5 cm from the edge of the in-
jured area the tissues were edematous and in places are found
in a state of necrobiosis, as a consequence of which adhesion
of the edges of the wound after the application of sutures
and the process of repair proceed more slowly.

In two patients the edges of the wound separated, in
one suppuration arose in the wound and its healing proceeded
by a secondary tension.

We present brief excerpts from the histories of the
disease.

Patient O., 28 years in age mining drifter, admitted
into the section 13 May 1957. A burn of the left lumbar region
had been received 6 May. He was treated ambulatorily. The
injured area of 8 X 5 cm had necrotized. Around the necrosis
the tissues were slightly hyperemic and edematous. After the
resextion (13 May) sutures were applied with some tension of
the skin. After five days the sutures were cut through, the
edges of the wound separated. The wound healed with secon-
dary tension on the 45th day.

Patient A., 20 years old, driller, admitted into the
division 2 July 1957, on the second day after a burn of the
lower external quadrant of the left buttock and the posterior
surface of the upper third of the left thigh 15 X 12 cm in
dimensions. The resection was performed 3 July. The sutures
were successfully applied after mobilization of the edges
of the wound and of tension of the skin. The sutures were
cut through on the sixth day and were removed, the edges of
the wound separated. Healing was by secondary tension on
the 32nd day.

Patient S., 28 years old, timber. A burn of the
left upper arm 7 X 5 cm in dimensions had been
received 25 June 1957. The resection was performed 27 June. To contract the edges of the wound and apply the sutures, slackening incisions were performed. On the fifth day suppuration appeared in the wound; pus began to exude between the sutures. The latter were removed. Healing was by secondary tension on the 25 day.

The periods of treating chemical burns subjected to resection, are exceptionally short. The duration of lack of capacity to work of the 36 patients (of the 39 operated on), in whom the wounds healed by primary tension, was equal on the average to 13.5 days. In the 13 patients treated conservatively, the average periods of incapacity to work were equal to 43.2 days.

We have come to the conclusion that resection of burns obtained by alkaline electrolyte, with the application of primary sutures reduces the periods of treatment and incapacity to work by three to four times; it is more expedient to conduct the operation of resection of the injured tissues on the second to third day; the excellent results obtained by the method described permit us to recommend it for wide use.

Bibliography

8. Silayeva, S. S., Svobodnaya peresadka tolstykh loskutov kozhi pri vosstanovitel'nykh operatsiyakh (Free Transplantation of thick skin flaps in restorative operations), Moscow, 1955.