Successful Rescue of A Case with 100% BSA Scald Complicated by Pseudomonas Aeruginosa Septicemia

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[Abstract] This essay reports management of 1 case with 100% total scald area of high temperature alkali scald (50% III-degree) and complicated by pyocyanic toxemia and alimentary tract hemorrhage. The author discusses anti-shock transfusion, wound management, prevention and treatment of blood poisoning and proposes that infection of wounds above deep II degree may be effectively controlled by adopting the method of excision of eschar (eschar shaving) by operation combined with external application of MEBO and the goal of early reparation of wounds will be achieved.

In May 1992, our hospital successfully treated 1 case with 100% total scald area of high temperature alkali scald (50% III-degree) and complicated by pyocyanic toxemia and alimentary tract hemorrhage. Through effective anti-shock treatment, method of excision of eschar (eschar shaving) by operation combined with external application of MEBO [1] for wound treatment and taking comprehensive measures to prevent and treat complication, the patient well recovered and left hospital after 96 days of hospitalization, with no obvious scar contracture and functional disturbance left. It is now reported as follows:

Brief introduction to case history:

XXX, female, 39, a worker. She was injured of high temperature alkali scald from head to foot and was admitted to hospital for emergency treatment on May 14, 1992. Four hours earlier, the patient was unfortunately flushed by high-pressure water into a lye pool with a depth of 1.8m and a temperature of 80°C. She crawled and swam onto the land herself with scald from head to foot, and then was sent to a nearby hospital for emergency treatment, where she was administered 4000 ml intravenous transfusion (of glucose and sodium chloride injection). During this period, the patient threw up several times, felt thirsty with oliguria. Four hours later, she was transferred to our hospital. Health examination after admission: T38°C and R28 beats/min, heart rate of 140 beats/min with zero blood pressure. Scald from head to foot, exfoliation of most epidermis, red wound on calvaria, face and both upper arms and below the spilliness; pale or red and white wound on the neck, trunk, buttocks and upper arm; wax yellow hard wound with no elasticity of both upper arms, both hands, both lower extremities and hypogastric zone and no sense of pain in hair-pulling test. Admission diagnosis: 1. 100% high temperature alkali scald (50% III-degree, 40% deep II-degree and 10% superficial I-degree). 2. Hypovolemic shock.

Course of treatment

Intubation tube with discission of great saphenous vein was immediately set up after admission by adopting fast transfusion through two channels, with 200 ml of 20%
albumin, oxygen therapy, urethral catheterization (exported 40 ml of brown urine) and other symptomatic treatment. Two hours later, blood pressure went up to 13/gKpa and then debridement at operating room was performed; MEBT [1] was adopted on head, face and neck, perineum and buttocks, external application of enswathement was adopted on the four limbs and trunk with 10% SD-Ag gauze. The patient's condition was stable during the operation and anti-shock treatment was continued after operation. Total transfusion volume in the first 24 hours was 12700 ml with an average of urine volume of 4518 ml/h; transfusion volume in the second 24 hours was 8600 ml with an average of urine volume of 79 ± 16 ml/h (See the table for details). Anti-infection adopted cefazolin and amikacin. Variant dermepenthesis of excision of eschar of four limbs was performed four times in the 6th day and 8th day after scald, but hyperpyrexia of the patient reached 39~40℃ in the 9th day with tachypnea (32~36 times/min, with a heart rate of above 120 beats/min; accompanied with chilly, shiver, restlessness, delirium and abdominal distention and scattered massive necrotic lesions could be seen over the body; the wounds were coated with grass green substance; four times of bowel evacuation like asphalt in the 10th day about 500~1000 g each time; haemoglobin decreased to 7.8g/L; Fecal Occult Blood Testing (thirty)). Then treatment was given for pyocyanic toxemia and stress ulcer (it was later certified as pyocyanic toxemia through continuous hemoculture twice). Fortum was used for anti-infection treatment and the wounds were completely exposed and externally applied with MEBO four times daily; after 0.1% benzalkonium bromide was used to flush the wounds. In the same time, intravenous nutrition, blood transfusion and intravenous drip of ranitidine were reinforced and traditional Chinese and western medicines for hemostasia was applied in combination. Body temperature descended 3 hours after the above treatment, alimentary tract hemorrhage was gradually controlled and hemoculture turned negative. Stomachic traditional Chinese medicine was administered when alimentary tract hemorrhage stopped, and oral calorie intake was raised from each R500 calorie up to over 2000 calorie combined with intravenous nutrition to guarantee over 4000 calories of total calorie intake daily. Some deep I-degree wounds were naturally repaired by management of eschar shaving by operation combined with external application of MEBO. After three consecutive times of autograft and the follow-up external application of MEBO, Visible degree wounds were repaired 54 days after scald; the patient left hospital after 96 days of hospitalization with no obvious hyperplasia, contractile scars and functional disturbance remained.
Attached Table: Volume of intravenous transfusion and urine 48 hours after scald (Unit: ml)

<table>
<thead>
<tr>
<th>Time after scald</th>
<th>Colloid</th>
<th>Crystal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Whole blood</td>
<td>Albumin</td>
</tr>
<tr>
<td>First 24 hours</td>
<td>900</td>
<td>150</td>
</tr>
<tr>
<td>Second 24 hours</td>
<td>120</td>
<td>160</td>
</tr>
</tbody>
</table>

Discussion

Successful anti-shock treatment of burn is crucial for rescue at later stage. The longer the shock period of the extensive deep degree burn patient is, the more difficult the recovery, the more the complications [2] and the higher the mortality rate. This patient was transferred to our hospital 4 hours after scald with already severe shock, which was rectified 2 hours after admission, that is to say 6 hours after scald. Long period of shock causes some degree of pathological damage to the tissue cells of the patient. Pyocyanic toxemia and alimentary tract hemorrhage occurring on the patient in 9th day after scald was related to the pathological damage caused by shock.

There are different opinions on whether the colloidal resuscitation should be applied in early anti-shock treatment of extensive deep degree burn [2]. Some scholars believe that colloid may be reduced or canceled in the first 24 hours after burn for reason that telangiectasis and leakage are reinforced in early burn period and a large amount of plasma fluid will effuse into tissue space including macromolecule substance such as albumins. Others believe that colloidal resuscitation is helpful for relieving edema and improving the effect of resuscitation in early burn period [3]. According to our experience in successful salvage of exceptionally large area burn, we hold that [4] colloid solution should be added synchronously with crystalloid solution and the proportion of colloid and crystalloid solution shall be increased as much as possible if allowed. Because currently there is no effective method for osmosis resistance, this is extremely important for maintaining osmotic pressure of plasma colloid, reducing effusion to the greatest extent and stabilizing microcirculation. In addition, total anti-shock transfusion volume may be reduced and complication at later stage may be played down. For the patient already in shock or delayed resuscitation, the earlier the hyperosmotic crystal and hyperosmotic albumin infusion, the better. This patient had been infused about 4000ml of colloidal solution and glucose before she was transferred to out hospital but failed to escape shock. The condition was reversed by transfusion of 200mg of 20% human albumin. It is a hot potato to
treat with extensive deep degree burn wound. Though this case was adopted with SD-Ag, eschar shaving and covering of allografts in the early period, but occurrence of pyocyanic toxemia failed to be avoided; pyocyanic toxemia was controlled three days later by completely adopting the method of MEBT. Flushing the burn wounds with 0.1% benzalkonium bromide before applying MEBO, there was no obvious infection and healing up was well gained. Therefore, it is believed that even for typical III-degree burn, dermal allografts (heterogeneity) and dermal fibroblasts after excision of eschar by operation would still be an effective method; but excision of eschar for deep II-degree burn wound will inevitably damage more healthy tissue because it is difficult to control the depth in excision of eschar. Combination of excision of eschar by operation and application of MEBO may liquefy the remaining necrotic tissue as soon as possible, promote the repair of tissue and speed up healing up of the burn wound. One piece of experience in successfully treating this case is to prevent and treat complications by taking comprehensive measures. When the patient is suspected of complication of pyocyanic toxemia, fortum for anti-infection treatment should be used immediately and nutritional supportive therapy should be reinforced. Symptomatic treatment should be timely performed on alimentary tract hemorrhage and protection of stomach intestine should be stressed, which is the source of MSOF (multisystem and organ failure) [3]; medicines invigorating the spleen and stomach in improving gastrointestinal function should be used effectively [5] to promote the patient’s calorie intake and disease resistance of the organism.

References


[5] Luo Chengqun and others, Application of Medicines Invigorating the Spleen and Stomach in Nutritional Supportive Therapy with Extensive Burn, Chinese Journal of Integrated Chinese and Western Medicine, 1990, 10(1): 30