Clinical Experience with MEBT/MEBO in Treating Gas Explosion Victims in Group

Liu Fuqing¹, Qu Guangya¹, Li Zhaolong¹, Yin Jianhua¹, Zhang Juan¹, Xu Yakun¹, Song Dongqi²

1. Department of Surgery, Ningxia Coal General Hospital, Shizuishan, Ningxia 753400
2. Department of Surgery, Xiagukou Coal Mine Hospital of Hancheng Mining Administration, Hancheng, Shanxi Province 715404

[Abstract]: Objective: To discuss convenient and economic therapeutic methods with good clinical effect by summarizing the clinical treatment of mass gas explosion burns in nearly 8 years. Methods: Analyzing the diagnosis and treatment process of 69 cases of gas explosion burns patients with moist exposed burn therapy (MEBT/MEBO). Results: 64 cases were cured and 5 died. Conclusion: (1) A treatment and cure system shall be established, and patients shall be grouped reasonably. (2) The early state of illness shall be decided and the wound management shall be conducted in time. MEBT/MEBO is a therapeutic method for treatment of mass explosion burns.

Key words: Mass gas explosion burns, MEBT/MEBO, treatment

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We have achieved a good curative effect and accumulated some clinical experiences in acceptance and treatment of 69 cases of coal-mine gas explosion burns patients in batches in nearly 8 years with moist exposed burn therapy (MEBT/MEBO) through the efforts of all staff of the hospital. Now, it is reported as follows.

1. Clinical data

1.1 General data

There were 69 cases of 5 batches in this group, all of them were male, aging from 19 to 50, and their average age was 26.5 years old. The maximum patients were 24 in one time, and the minimum patients were 5 and the average patients number was 14. 18 cases had the burn surface of 10-30%, 37 cases of 31-50%, 9 cases of 51-80%, 5 cases of more than 80%, and averagely 14 cases had the burn surface area in each range respectively. The depth of burns was mainly second-degree burns and superficial type of deep second-degree burns, 25 cases were deep type of deep second-degree burns, and 6 were third-degree burns wounds. The wounded parts extended to all over the body, and mostly exposed parts. All of them had concomitant inhalation injury at varying level and 12 cases had concomitant head injury, 6 cases had fracture of rib, 9 cases has CO intoxication and 5 cases had cerebral edema, and 11 case had drumhead perforation. The time for treatment was 1-20 hours after injury and 26 cases were in severe conditions.
1.2 Wound management

The early wounds after were heavily contaminated, with a large amount of coal dust covered. In the past, warm soap, lukewarm water or normal saline, and 0.1% benzalkonium bromide were used to clean wounds or the skin of whole body. At this moment, patients usually had pain in wounds, and tissues had exudate, such treatment would aggravate tissue injury and sometimes could lead the patients to shock. Our treatment method was that after patients were hospitalized, simple debridement was carried out, without cutting blisters, so as to preserve relatively complete rotten skin as more as possible. We open the MEBO packed in a tube and squeezed it into a dressing bowl, wore a pair of sterile emulsion gloves properly and then applied the MEBO on cloth and wounds quickly. The thickness of medicine for the first application could be a little thick, such could not only stop pain quickly but clear away the coal dust attached on wounds and skin gradually through absorbing the MEBO for first coating (the dust would be completely removed in 3 to 4 times). The method could reduce the pain and re-injury caused by the regular debridement. The time for application of medicine was short, averagely 3-5 minutes for each patient, which saved sufficient time for the treatment and cure of patients in severe conditions, and was especially practical when there were few medical staff. The further wound management was carried out when the state of illness was stable and the rotten skin should be preserved with all efforts, and the large blisters could be cut at the lower position to drain the liquid. MEBO could be applied on vaseline oil cloth for parts susceptible to pressure. And if possible, the body position could be changed, namely, medicine should be applied in time when the medicine ran off. In some cases, occlusive dressing could be used with MEBO for burns on extremities. The frequency for dressing change would be determined by concrete situations. The necrotic tissues and purulent secretion on infected wounds should be removed with all efforts; and appropriate debridement could be conducted to expose the new tissues. During exudation stage of deep type wounds of deep second-degree burns and superficial third-degree burn wounds, it was better to use ploughing and blading therapy.\(^1\) Small amount of MEBO should be applied on the newly healed wounds to prevent injury by dryness and avoid the injury and pigmentation caused by ultraviolet radiation. In the later phase, MEBO scar lotion could be used according to situation.

1.3 Other Measures

Set up effective venous channels rapidly, and strengthening heart and protecting kidney; when necessary, tracheotomy can be conducted to ensure good pulmonary ventilation function; correct water-electrolyte acid-base balance; control infection; perform nutritional support therapy and prevent and treat complications etc.

1.4 Results

64 cases were cured and 5 died in this group. The duration of hospitalization was 8~90 days. The causes of death were respectively severe head injury (1 case), acute laryngeal edema asphyxia (1 case), function failure of multi organs after burns
(1 case), diabetic ketoacidosis (1 case), massive haemorrhage of alimentary tract by stress ulcer (1 case), and 4 cases with third-degree wounds were given skin grafting.

2. Discussion

1. Coal-mine gas explosion burns caused many patients, complex state of illness, long duration and great amount of work. The preconditions for successful treatment lies in the timely establishment of treatment and cure system, correct organization and leadership, and reasonable arrangement and distribution of the medical resources, which allows the orderly and fast treatment and cure. The medical staff should be reasonably grouped according to the state of illness of the patients to allow a reasonable distribution of patients. Collaboration between groups should be conducted, and the collaboration between sections also shall be carried out to ensure timely and effective diagnosis and treatment. Except for the effect of MEBT, the combination of MEBO and MEBT will result in good curative effect, and the major functions are as follows: 1) Allow the variation of pathogens and reduce virulence. 2) Relieve pain effectively by protecting nerve endings, reducing algesthesia, relaxing arrectores pilorum. 3) Bring anti-inflammatory action into play through the effect of $\beta$-Sitosterol etc contained in MEBO. 4) As MEBO is composed of nutriment, it has the function of protecting cells, in addition to improving the tension of thin envelope. And it can convert the nearly necrotic cells to normal cells with vitality. 5) As physiological moist environment on wounds was created with the cooperation of MEBT, it would benefit for the regeneration and repairing of tissue structure in normal state, thus producing the effect of reducing of scar healing and enhancing the function of auto therapy of wounds and regenerating new skin of remained epithelial tissues, vascular plexus and fibrous tissues in adipose tissues. Strictly following the operating procedures of MEBT/MEBO in the early phase for mass burns patients and adhering to 7 treatment principles and the integrated therapeutic programs in medium and late phase can increase the success rate of treatment and cure for mass burns patients.

2. Early decision of the state of illness, and timely wound management. Early and fast wound management not only can relieve the patients’ pain in wounds in acute phase, but also ensures the comparative skin integrity forming after the application of MEBO and the reduction of exudation. Further more, it would benefit for the adsorption of local attaching substances, which reduces the occurrence of unfavorable circumstances to the patients caused by debridement. In addition, gas explosion always occurs suddenly and usually there will be comparatively few medical staff to conduct treatment and cure, which brings difficulties to treatment. Fast wound management provides sufficient time for treatment, allowing the effective and timely treatment of patients in severe conditions, thus increasing healing rate. Treatment of the mass gas explosion burns with MEBT/MEBO is practical and feasible.

3. Several issues to be noticed: (1) After getting gas explosion burns, the early and effective anti-shock treatment and reduction of injury by hypoxia and ischemia
can reduce the occurrence of complications. (2) The early manifestations showing after gas explosion burns are mainly progressive dyspnea, cyanosis, wet rale of both lungs, wheezing, etc. The expectant treatment should be carried out for patients with light state of illness, and for the patients with state of illness above the medium state. The early tracheotomy is recommended. And when necessary, the early preventive tracheotomy could be carried out \(^4\). (3) Enhance anti-infectious and nutrition support therapy and improve the resistance of organism. At the same time, pay attention to the prevention and care of complications and reduce the death rate.

4. When gas explosion occurs in a coalmine, the field staff should know necessary self-saving knowledge, which will alleviate injury greatly. When accidents occur, persons there should lay down quickly with face downward, chest contacting the ground surface to protect face, which will reduce the injury caused by shock wave and avoid inhalation injury and lung explosive injury.

References


Brief Introduction to the Authors
Liu Fuqing (1967-), male (Han nationality), Zibo, Shandong Province, graduated from Department of Medicine of Ningxia Medical College, a doctor-in-charge.
Ju Guangya (1968-), male (Han nationality), Cao County, Shandong Province, graduated from Department of Medicine of Ningxia Medical College, a doctor-in-charge.
Li Zhaolong (1968-), male (Han nationality), Shizuishan City, Ningxia Hui Autonomous Region, graduated from Department of Medicine of Ningxia Medical College, a doctor-in-charge.