

New combined therapy for multiple organ failure in abdominal surgery

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Abstract

AIM: To report 15 cases of abdominal-surgical multiple organ failure (MOF) treated successfully by a new combined therapy using four high doses in large volume and one nutritional support (FHDOS), consisting of one short period high dose of anisodaminum in a large volume, followed by one short period high dose of dexamethasone in a large volume, one high dose of disinfectant antibiotics in a large volume and one high dose washing liquor in a large volume to the abdominal cavity, and finally by applying support of nutrition metabolism.

METHODS: The study group consisted of 15 patients (10 women and 5 men; average age: 42.7) who were hospitalized in our hospital. All patients were given FHDOS as follows. First, a short period of high doses of anisodaminum in large volume delivered *via* intravenous injection of 40 mg once and with an optional 40 mg added 30 min later according to condition; the total amount may reach 120-240 mg a day, or intravenous injection of 40 mg every 15 min until the condition comes under control. Second, a short period of high doses of dexamethasone in large volume delivered *via* intravenous injection of 100-200 mg once; this remedy could be continued for 1-3 d and the amount could be decreased according to condition. Third, high doses of disinfectant antibiotics in large volume with select use of antibiotics according to clinical condition of Gram staining status; it was necessary to repeatedly culture the bacteria and make adjustments according to the result and status of drug-resistance to prevent dual infections from occurring. Fourth, high doses of washing liquor (normal saline at 6000-8000 mL to wash the abdominal cavity) in large volume. Finally, one full support of nutrition metabolism.

RESULTS: All the patients treated by FHDOS survived after the rescue treatment without any complication.

CONCLUSION: MOF should be prevented, if possible, by stopping

or controlling the injury, removing as much necrotic tissue as possible, improving blood flow and oxygen consumption, supporting metabolism, and preventing infection or by initiating treatment early and adequately. FHDOS is a combined therapy and plays a key role in treating MOF.

Key words: Abdomen/surgery; Multiple organ failure/therapy; Combined modality therapy

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INTRODUCTION

The syndrome of multiple organ failure (MOF) is the final common pathway for a number of clinical problems, including severe multiple system trauma, complications following surgery, infections such as peritonitis, inflammatory processes such as pancreatitis, and severe illness with limitations in organ function or cardiac output secondary to aging, arteriosclerosis or chronic diseases^[1]. MOF has widely attracted clinicians' attention, and has emerged as a hot research focus of international medical circles. However, no MOF treatment has yet to provide satisfactory results. The average mortality of the cases suffering from failure of two organs is 69%, of three organs is 85%, and of four organs is 100%^[2].

Therefore, countries all over the world are carrying out tremendous research on issues concerning MOF. We report here our experience with 15 patients with abdominal-surgical MOF and who were treated with a new combined therapy.

MATERIALS AND METHODS

Materials

The study group consisted of 15 patients (10 women and 5 men; average age: 43.7 years, age range: 11-93 years) who were hospitalized in our hospital. All the cases were diagnosed as MOF according to the diagnostic standards proposed by Baue^[2], Eisman^[3], Knaus *et al*^[4], Chen^[5] and Yue^[6]. Among this group, 9 cases suffered from failure of two organs, 5 from failure of three organs and 1 from failure of four organs. Underlying diseases included serious compound wound caused by a collapse accident ($n = 1$; which had resulted in injury and massive hemorrhaging (total: 4400 mL) from the liver, spleen, kidney and lungs, and various fractures), car accident ($n = 1$; which had resulted in serious compound wound and subsequent colon fistula, perineal-rec-

tal diaphragm abscess, golden staphylococcal septicemia), acute large and small intestine twist-induced necrosis with delayed diagnosis ($n = 1$), acute cholangitis ($n = 4$; which had resulted from gallstones and overflowing peritonitis; abscesses in the thoracic and abdominal cavities along with septicemia ($n = 1$; which had resulted from dystocia and cesarean operation), colon perforation and overflowing peritonitis coupled with delayed diagnosis for 5 d ($n = 1$), liver and abdominal cavity abscesses and septicemia ($n = 1$; which had resulted from local hormone injection), acute hemorrhagic-necrotic pancreatitis complicated by ARDS and intestinal failure ($n = 1$), and compound wound caused by traffic accident or falling from high buildings ($n = 4$). The clinical course for all 15 cases had very clear initiating factors that resulted in MOF; among them were serious compound wound ($n = 6$), serious infection ($n = 8$), and acute large-range (2.8 meters) small intestine necrosis coupled with delayed diagnosis ($n = 1$).

Methods

All patients underwent surgery to resolve the initiating factor and then were given "four high doses in large volume and one support" (FHDOS), a new combined therapy that consisted of the following. First, a short period high dose of anisodaminum in large volume delivered by intravenous injection of 40 mg once, with an optional 40 mg added 30 min later according to the patient's condition; the total amount could reach 120-240 mg per day or intravenous injection of 40 mg every 15 min until the condition came under control. Second, a short period of high dose of dexamethasone in large volume delivered by intravenous injection of 100-200 mg once; this step could be continued for 1-3 d and the amount could be decreased according to the patient's condition. Third, high dose of antibiotics in large volume using select antibiotics according to the patient's clinical condition and findings from Gram staining test; this step required repeated culturing of bacteria to make adjustments in the procedure according to the culture results and development of drug-resistant strains in order to prevent opportunistic infections. Fourth, high dose abdominal cavity washing liquor with large volume; this step consisted of normal saline applied to wash the abdominal cavity with 6000-8000 mL. Finally, support of full nutrition metabolism [parenteral (TPN) and enteral (TEN) nutrition] was applied.

RESULTS

All the patients survived after the rescue treatment without any complication. Follow-up revealed that 8 patients returned to work normally, 4 retired but were able to perform normal housework activities, and 2 continued their schooling; the oldest patient died of cancer at the age of 93, 5 mo after study participation.

DISCUSSION

All the patients in this study, having been in dangerous conditions following surgery, survived due to the combined treatment measures mentioned above and management in the Intensive Care Unit. In cases of infection, once the lethal pathogen was removed the condition reversed and the patients were cured. In general, the clinical observation of these patients showed that abdominal-surgical MOF has distinctive clinical characteristics. First, abdominal-surgical MOF does not show any special early clinical symptoms. Second, there are obvious initiating factors resulting in MOF. Third, when MOF is consequential to another condition, the patient's status worsens very quickly. Fourth, if the initiating factors are not removed, death will result. Fifth, oftentimes effective surgery is required to thoroughly resolve the lethal factors, such as ruptured abdominal organs and massive hemorrhaging, abscesses in the abdominal cavity, acute obstructive and festering cholangitis caused by gallbladder stones, acute hemorrhage-necrosis pancreatitis, and wide-range abdominal-internal organs necrosis. Sixth, the cases often represent very difficult technical challenges and surgeons should try to concentrate their energies

towards treating the most serious disease, so that the patient's condition will stabilize and they can then carry out the operative treatment. Seventh, only under the close monitoring provided in the Intensive Care Unit and along with the strong supportive measures can the operation be performed safely. Eighth, the patients with abdominal-surgical MOF have hypermetabolism and need metabolic support. Ninth, once the lethal factors are resolved, the conditions will reverse and the patient may finally be cured.

The three main causes of death of abdominal-surgical patients with MOF are microcirculation failure, uncontrolled severe infection, and hypermetabolism. Our clinical observation indicated that anisodaminum has much better anti-shock effects and in improvement of microcirculation than achieved with dopaminum, which can expand the blood vessels of visceral organs. During the operations, there were no occurrences of low blood pressure and bleeding, and the recovery from cases of septic shock was relatively smooth. The underlying functional mechanism involves the combination of cardiac vascular effects, energy metabolism protection, calcium ion effect and anti-oxygen free radical effect. The short period and high dose of dexamethasone in large volume delivered by intravenous injection saves on the amount of infusion given, gains precious time for blood transfusion and the operation, lessens complications of organ edema, stabilizes the cells to avoid damage induced by free radicals due to occurrence of septic shock, and prevents or slows down the further development of organ failure. The use of high doses of disinfectant antibiotics in large volume and abdominal cavity washing with high doses of washing liquor in large volume are helpful in preventing and treating infection. The final step of full nutritional and metabolic support can correct damage involving the cell biochemistry damage, and ensure supplies of nutrition for organ metabolism through TPN and TEN methods.

The clinical application showed that the various steps of the "FHDOS" therapy work in coordination and complement each other. For example, infection predisposition, which may occur after intravenous injection of high-dose dexamethasone in large volume, can be prevented by the delivery of high-dose disinfectant antibiotics in large volume. Abdominal-surgical MOF has no specific clinical manifestation at the early stage, when surgeons are concentrating on treating sepsis or other serious disease. It may be too late to cure MOF after it becomes obvious. The "FHDOS" therapy described herein involves the author's experience with its application as a rescue method and involved adoption of combined and extraordinary doses in order to safely operate on the patients due to its resolution of lethal pathogenic infections and rescue of patients who were critically ill.

Most of the patients in this study had normally functioning organs before their diseases occurred. It is recommended that clinicians pay great attention to the clinical manifestation of MOF, so as to diagnose MOF early and try to slow or halt its development. Ultimately, however, MOF should be prevented because of its particularly high mortality rate. Thus, prevention of MOF and prevention or early treatment of infection are both paramount to clinical care. Nutritional support to prevent complications is also necessary. If TPN is necessary, special solutions are available for the liver, kidneys or lungs. Stopping or controlling any organ injuries, including removing as much necrotic tissue as possible, improving the blood flow and oxygen consumption, supporting metabolism, and preventing infection or treating it early and adequately is necessary. The FHDOS approach is practical and effective; when MOF develops, it plays a key role as treatment.

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