

Clinical Retrospective Analysis of Critically Severe Necrotizing Fasciitis

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Abstract

Background

To explore the clinical diagnosis and treatment of fatal necrotizing fasciitis.

Methods

Retrospective analysis of simple data from January 1, 2014 to November 1, 2019, on the clinical data of the Department of Burns, Gansu Provincial People's Hospital, and the diagnosis and treatment methods were discussed.

Results

The usual causes of necrosis and fasciitis are as follows. 1. Small trauma such as mosquito bites, pressure sores, and local trauma; 2. Patients suffering from minor trauma did not receive regular treatment in time, and only went to the hospital when local redness, pain, and dysfunction occurred, and were misdiagnosed as cellulitis; 3. When a paraplegic patient has a Sacrococcygeal pressure ulcer and has whole-body fever or low-grade fever, and there is inflammation around the pressure ulcer, and redness and swelling spread to one lower limb or both lower limbs, necrotizing fasciitis should be highly suspected; 4. Patients' wounds cannot be debrided in a timely and effective manner. Generally, inexperienced doctors have incomplete incision and drainage, which causes necrosis to continue to spread along the fascia to the distal limbs.

Conclusion

1. The diagnosis of necrotizing fasciitis mainly depends on clinical manifestations, and early diagnosis is the key; 2. When the patient has local trauma with local inflammation, and fever or hypothermia throughout the body, necrotizing fasciitis should be highly suspected, and the differential diagnosis should be made with cellulitis. When it is difficult to distinguish, a diagnostic surgical incision can be performed; 3. The operation should be thorough, fully cut and drained to avoid necrosis spreading to the distal limbs along the fascial space; 4. Necrotizing fasciitis should be systemic comprehensive treatment, rational use of antibiotics, correction of water and electrolyte disorders, early active and thorough debridement, and effective sealing of the wound.

1. Background

Necrotizing fasciitis is a rapidly developing and deadly soft-tissue infection. It is characterized by subcutaneous tissue and deep fascial necrosis, and even the necrotic tissue reaches the muscle space. Therefore, patients often have sepsis, septic shock, Organ failure, early lack of specific clinical manifestations of the disease, so it is difficult to distinguish it from other soft-tissue infections such as cellulitis and gas gangrene. Treatment was delayed due to difficulties in preliminary diagnosis, and most patients had extensive complications such as fascial necrosis, electrolyte disturbance, anemia,

hypoproteinemia, and multiple organ failure when the diagnosis was clear. Therefore, it is important to retrospectively analyze the early disease characteristics of necrotizing meningitis to reduce the misdiagnosis and missed diagnosis of the disease.

1.1 Clinical data

A retrospective analysis of 35 cases of necrotizing fasciitis treated in the Department of Burns of Gansu Provincial People's Hospital from January 1, 2014 to December 31, 2017 (see Figure 1-4), including 15 female cases and 20 male cases. The time from onset to admission ranged from 15 days to 30 days, aged 28 to 55 years, 13 of whom had a history of paraplegia.

All patients were transferred to our hospital from primary hospitals, and the medical records of first hospitals were diagnosed as skin infections, and symptomatic treatments such as anti-infection and regular wound dressing were given. A retrospective analysis was performed, and the patients were 28 to 55 years old. Of the patients with skin ulcers, 13 of them had a history of paraplegia, of which 8 had ulcers in the Sacrococcygeal; 2 had ulcers in the greater trochanter; 1 had ulcers in the ischia, and 1 had a mosquito bite on the left side of the chest. Among them, four people were injured in their calves during farm work. The remaining patients were caused by minor trauma to their lower limbs and abdomen.

1.2 clinical manifestation

Most patients were admitted late, with obvious swelling of the limbs, but the wounds showed inconsistent performance. Some of them continued to expand in a certain segment of the limbs, while others developed a leap along the long axis and formed multiple wounds. According to our clinical observation, the skin appearance between necrotic fasciitis wounds is basically intact. Wounds often do not have obvious purulent secretions, mainly fascial necrosis, and even necrotic fascia can be seen in the muscle space. Patients are often accompanied by septic shock, sepsis, hypoalbuminemia, severe anemia, and electrolyte disturbances, but some patients' temperature is not high or even lower than normal.

1.3 Microbiological detection

Patients were cultured more than twice during admission, including blood culture and wound culture. The bacteria detected generally included common gram-positive and gram-negative bacteria such as MRSA, *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, *Enterobacter cloacae*, *Enterococcus Faecium*, etc., and timely adjust antibiotics based on the results of bacterial culture.

2. Results

All 35 cases of necrotizing fasciitis were alive, and 21 patients were reviewed regularly after discharge. No recurrence was observed after 1 year of follow-up. 14 patients were not reviewed after discharge.

3. Discussion

Necrotizing fasciitis is a disease characterized by necrosis of the skin, subcutaneous tissue, and superficial fascia. It rarely involves muscles, generally occurs in loose tissue sites, and most of them start dangerously and spread quickly in local tissues. If not handled properly, patients often die of sepsis and septic shock, and the later stages of the disease are usually accompanied by multiple organ failures^[102]. Due to the relative backwardness of the economy in western China, most of the reasons for the onset of patients are due to the lack of attention to foreign body puncture, or the formation of bedsores due to long-term improper bed care of paraplegic patients, and they did not seek medical treatment in time after the formation of bedsores. At the same time, many patients only come to our hospital for treatment when their limbs are swollen and their systemic symptoms are obvious, and they do not improve after seeing a local hospital. Therefore, patients are often accompanied by septic shock and complications such as sepsis, hypoproteinemia, anemia, electrolyte imbalance and so on.

This shows that early diagnosis is very important to the treatment of the disease, but necrotizing fasciitis is easy to be misdiagnosed and missed in the early stage. We conducted a retrospective analysis and found that early necrotizing fasciitis has some characteristics. 1. Small trauma such as mosquito bites, pressure sores, and local trauma; 2. Patients suffering from minor trauma did not receive regular treatment in time, and only went to the hospital when local redness, pain, and dysfunction occurred, and were misdiagnosed as cellulitis; 3. When a paraplegic patient has a Sacrococcygeal pressure ulcer and has whole-body fever or low-grade fever, and there is inflammation around the pressure ulcer, and redness and swelling spread to one lower limb or both lower limbs, necrotizing fasciitis should be highly suspected; 4. Patients' wounds cannot be debrided in a timely and effective manner. Generally, inexperienced doctors have incomplete incision and drainage, which causes necrosis to continue to spread along the fascia to the distal limbs.

Early and thorough debridement after the correction of the internal environment is a key step in the treatment of necrotizing fasciitis. A retrospective analysis found that some patients had a clear diagnosis in the primary hospital, but the surgical treatment failed to fully open and drain, causing the necrosis to continue to spread along the fascial space to the distal limbs. Therefore, perioperative systemic comprehensive treatment is the key to the treatment of necrotizing fasciitis. For patients with a prolonged course of disease, it is often accompanied by severe anemia, hypoalbuminemia, and electrolyte disorders, which should be actively corrected. However, most of these patients have a long history of bedridden, so they often have poor cardiopulmonary function, which makes the treatment of patients very difficult. Patients with septic shock and hypoalbuminemia have poor cardiopulmonary conditions and need to limit fluid replacement. Thus, this group of patients corrected septic shock with Picco's effective detection of blood flow, to maximize the time for treatment. Due to the disease characteristics of necrotizing fasciitis, surgical debridement should pay attention to the breadth and depth of debridement. Limb necrotizing fasciitis rarely involves muscles, but it can reach deep fascia in depth. In general, the deep fascia of long-term and critically ill patients is often stained and needs to be removed. The breadth refers to the extent of the wound margin. Sneak creep is a characteristic of the disease. According to clinical experience, it is necessary to remove at least 1 cm of skin and subcutaneous tissue around the wound

margin, especially the edges of both sides of the long axis of the limb, until it is not seen directly necrotic tissue. Even so, it is difficult for patients with the critical or prolonged course of disease to entirely debridement at one time, and most patients need to debridement for three or more times to completely debridement and cover the wound. This also indicates that the range of necrotizing fasciitis infection or necrosis exceeds the range estimated under direct vision [3-5]. If the patient's wound still has secretions or persistent high fever after surgery, a second surgical treatment should be performed immediately under relatively stable internal conditions. And if the patient's necrotic tissue cannot be productively removed, its symptoms cannot be effectively improved. It can be seen that thorough debridement is the key to treating necrotizing fasciitis, because this can solve the problem from the source.

When patients are admitted without direct bacteriological support, treatment with broad-spectrum antibiotics based on clinical experience is an important auxiliary means. However, since the disease is often not diagnosed early, most patients have been using multiple antibiotics for a long time by the time of definite diagnosis, which increases the resistance of the bacteria. Even so, the use of broad-spectrum antibiotics in the perioperative period still has a certain effect on the prognosis of patients. In this group of patients, Imipenem is generally selected for treatment during the perioperative period. After the wound culture and blood sample culture results are obtained, sensitive and relatively narrow-spectrum antibiotics are selected. In patients with necrotizing fasciitis, when there is no obvious systemic inflammatory response, debridement should be given priority, and the use of antibiotics is only an auxiliary method. Therefore, it is worthwhile for each of our clinicians to consider whether all patients with this disease are suitable for powerful broad-spectrum antibiotics. What is the treatment effect and whether super-strong broad-spectrum antibiotics can cause the spread of necrosis?

As we all know, bacteriological examination has very important clinical significance in the treatment of infectious diseases. However, the current detection rate of anaerobic bacteria in the clinic is low, so it will greatly reduce the guiding significance for clinical treatment. Necrotizing fasciitis is usually caused by anaerobic and aerobic bacterial infections [3-5], but bacterial culture often does not help diagnose the disease. Because the bacterial culture period is long, and the detection rate of anaerobic bacteria is low. Most of the patients in this group have been treated in more than two hospitals, and more than seven or eight kinds of bacteria have been detected. Antibiotics have been given according to drug sensitivity experiments, but the effect is not good. Therefore, the disease cannot be overly dependent on the results of bacterial drug sensitivity tests during the treatment of the disease, but should be based on clinical manifestations and surgical treatment, with bacteriology testing only as a reference for treatment.

In summary, early and thorough debridement after the correction of the internal environment is the key link in the treatment of necrotizing fasciitis. And perioperative systemic comprehensive treatment is an important guarantee for the treatment of necrotizing fasciitis.

In summary, 1. The diagnosis of necrotizing fasciitis mainly depends on clinical manifestations, and early diagnosis is the key; 2. When the patient has local trauma with local inflammation, and fever or hypothermia throughout the body, necrotizing fasciitis should be highly suspected, and the differential

diagnosis should be made with cellulitis. When it is difficult to distinguish, a diagnostic surgical incision can be performed; 3. The operation should be thorough, fully cut and drained to avoid necrosis spreading to the distal limbs along the fascial space; 4. Necrotizing fasciitis should be systemic comprehensive treatment, rational use of antibiotics, correction of water and electrolyte disorders, early active and thorough debridement, and effective sealing of the wound.

Abbreviations

Fig. : figure

Declarations

Ethics approval and consent to participate

Medical Ethics Committee of Gansu Provincial Hospital gave approval for this study, And all patients gave written informed consent before participation in this study.

Consent for publication

Not Applicable.

Availability of data and material

The manuscript, including relevant data, figures and tables, has not been published before, and the manuscript has not been considered elsewhere.

Competing interests

All authors have no conflicts of interest in employment, consulting, equity, remuneration, paid expert testimony, patent application/registration, grants or other funds.

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Author contribution statement

XPY and ZG contributed to the conception and design of the study, or acquisition of data, or analysis and interpretation of data

XPY and ZG drafted the article

XPY,ZG,JL, JW and JLZ make critical revisions to important intellectual content

XIAOPING YU,ZHENG GUO,JUN LIU, JIAN WU and JUNLI ZHOU final approval of the version to be submitted

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Figures



Figure 1

Male patient, 45 years old, admitted to the hospital for 1 day with high fever for 3 days with coma. Swelling of the left lower limb with obvious inflammatory response and a small wound on the outside of the thigh upon admission. Intraoperative exploration. A large amount of necrotic tissue can be seen during surgery and fully debrided. The wound is thoroughly debrided, continuously sucked with VSD and rinsed with a large amount of normal saline. After one week, bright-red granulation tissue was visible in the wound; One week after skin grafting, the grafts survived well and no obvious inflammatory response was seen at the wound margin. Wounds at 2 weeks after surgery. Six months after operation, the operation area recovered well and functioned well.



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Figure 2

Male patient, 32 years old, with persistent fever for 1 day before admission to the hospital Seven days after the patient's left lower extremity was drained from a small incision in the outer hospital; necrotic tissue and purulent secretions were seen around the incision. Incomplete incision and drainage, and insufficient drainage, causing necrosis to spread along the fascial space to the distal limbs. Intraoperative exploration can see a large amount of necrotic tissue, edema granulation tissue, and edema synovium in the left lower limb. Fresh granulation tissue can be seen after the wound is thoroughly debrided and continuously washed with VSD negative pressure. One week after debridement and skin grafting, the graft skin survived well, and no obvious inflammatory response was seen at the skin margin.



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Figure 3

Male patient, admitted to the hospital with paraplegia for 1 year with persistent fever for 5 days. Decubitus ulcers are seen in the tail of the patient, swelling of the right lower extremity, low skin temperature and a foul odor. Intraoperative exploration, the patient's right lower extremity had a foul pus outflow. Bandaged with concentrated iodine gauze after the first operation. Ten days after the operation, fresh granulation tissue was visible on the wound surface. Cover the wound with a small, medium-thickness skin graft in the second operation. 15 days after skin grafting, the wounds basically healed.



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Figure 4

A 33-year-old female patient was admitted to the hospital because of redness and swelling in the right lower extremity with pain for 10 days, progressive worsening, and coma for 3 days. The patient was diagnosed with necrotizing fasciitis, and the right lower limb were swollen with high temperature and foul smell. Diagnostic incision of the right lower limb, the picture shows the necrotic fascia. First operation, debride the thigh and explore the necrotic tissue to the fascial space. During the second operation, there was an obvious foul pus outflow to the right lower extremity, and a large amount of necrotic tissue was seen at the knee joint and myofascial inflammation. VSD was placed after debridement. In the third operation, necrotic tissue was reduced but the necrotic fascia was visible to the knee joint. VSD was placed after debridement. In the fourth operation, necrotic tissue was found at the knee joint, and it was fully debrided. Transplant a large autologous medium-thick skin patch to the wound and place the VSD. The patients were followed up for half a year after discharge. The patients had no significant obstacles to knee movement and walking.



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