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original Articles

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Comparison of Dronedarone and Amiodarone in Maintaining Sinus Rhythm of Paroxysmal Atrial Fibrillation

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Abstract: Objective: To compare the Dronedarone and the Amiodarone in maintaining the sinus rhythm of paroxysmal atrial fibrillation. Method 80 cases of paroxysmal atrial fibrillation patients were randomly divided into the dronedarone group and the amiodarone group. All patients were monitored for ambulatory electrocardiogram, liver and kidney function, thyroid function and other adverse reactions after 1 month and 3 months. Results: After 1 month, there was no statistical difference in arrhythmias recurrence, thyroid dysfunction, liver and kidney dysfunction, other adverse reactions(P>0.05). After 3 months, the amiodarone group was superior to the downturn in control arrhythmias recurrence, while the traders' group were better than the amiodarone group in the thyroid dysfunction (P<0.05). Conclusion: Compared with amiodarone, the advantage of drawdown is that it has fewer side effects, especially thyroid dysfunction.

Keywords: Dronedarone; Amiodarone; Paroxysmal Atrial Fibrillation

Introduction

Atrial fibrillation is one of the most common arrhythmias. The treatment of the atrial fibrillation is the translator radiofrequency ablation and the drug therapy. The medicine includes rhythm control and rate control. Amiodarone is the effective drug in controlling the rhythm of the atrial fibrillation at the present, while it also has many side effects, such as thyroid disease, pulmonary interstitial fibrosis, hepatotoxicity, which need to be monitored [1].

Dronedarone is a deionized benzofuran derivative. The electrophysiological characteristics of amiodarone multichannel block were retained by removing iodide group and introducing methylsulfonamide group [2]. Therefore, dronedarone eliminate the toxic effects of amiodarone on the thyroid and lung [3]. We plan to compare the efficacy of dronedarone and amiodarone in maintaining the sinus rhythm of Paroxysmal Atrial Fibrillation.

1. Method

80 cases of paroxysmal atrial fibrillation patients divided into two groups： the dronedarone group and the amiodarone group. Exclusion criteria: thyroid disease, liver and kidney disfunction, pregnancy, NYHAIII-IV, ejection fraction<35%, sick sinus syndrome, atrioventricular block, QT interval>500ms, pulmonary interstitial fibrosis, allergic to research drugs. The dosage of dronedarone was 400mg Bid; the amiodarone was 200mg Tid,200mg Bid a week later, then 200mg qd after 2 weeks. The schedule of the clinical follow up was one month, three months. All patients received ambulatory electrocardiogram, liver and kidney function, thyroid function and other adverse reaction was recorded.

2. Statistical Analysis

SPSS 26.0 statistical software Processed the data. Categorical data were analyzed by $\chi 2$ test or the Fisher exact test. $P<0.05$ were considered statistically significant.

Result:

In control the recurrence of arrhythmias, the superiority of amiodarone appears. In our study, we found that there were statistically significant in amiodarone group at the 3 month($P<0.05$), however, at 1 month the result was no statistical

significance (P>0.05).There were no statically diffidence in liver and kidney dysfunction, other adverse reaction between the two groups(P>0.05).By contrast the dronedarone group take an absolute advantage in the thyroid dysfunction on 3 month(P<0.05).

Table 1 the comparison of the two groups in treatment of paroxysmal atrial fibrillation

Group	Case Number	Atrial Fibrillation Atrial tachycardia		Thyroid Dysfunction		Liver Kidney Dysfunction		Other Adverse Reaction	
		1M	3M	1M	3M	1M	3M	1M	3M
Amiodarone	40	3(7.5%)	5(12.5%)	3(7.5%)	9(22.5%)	3(7.5%)	5(12.5%)	9(22.5%)	10（25%）
Dronedarone	40	5(12.5%)	14(32.5%)	0(0%)	0(0%)	2(5%)	4(10%)	6（15%）	8（20%）
X2		-	5.591	-	-	-	-	0.738	0.287
P		0.712	0.034	0.241	0.002	1.0	1.0	0.568	0.790

3. Discussion

The dronedarone is the Class III antiarrhythmic agent, can inhibit the sodium, potassium, calcium channels and β receptor blockers. The dronedarone act on the atrial acetylcholine-dependent potassium channels, so more effect on atria than ventricles. It inhibited the inward current and outward current, alleviated the dispersion of repolarization, reduce the risk of arrhythmias [4,5]. In our study we found that amiodarone is better than dronedarone in control arrhythmias recurrence at 3 months, however at 1 month there were no difference. This was due to the follow-up time too short. Previous study found that the median time of dronedarone group to recurrence of atrial fibrillation was 96 day [6]. Therefore, dronedarone is effective in maintaining sinus rhythm.

Amiodarone contains 37% iodine, the rate of deiodination is 10% in vivo. Amiodarone is commonly administered at 200mg per day, at this dose about 7mg of iodine can be ingested, cause a 40-fold increase in iodine level, urine iodine concentration is up to 15000ug/d [7,8]. At the result, patients with iodine overdose lead to thyroid dysfunction. Dronedarone is a deionized benzofuran derivative. In the essential drug structure of amiodarone, remove the iodide and introduce the methyl sulfonamide. Therefore, in the thyroid disease, dronedarone is better than amiodarone. Same result was found in our research(P<0.05）.

The liver, kidney side effect of dronedarone and amiodarone in our research show that they were no statically (P>0.05).Elevated liver enzymes induced by dronedarone can be recovered after drug withdrawal[9].Other side effects such as gastrointestinal reaction, nervous system response they were no significant difference in the two groups.

Connolly et al explore the effect of dronedarone on end-point events in high-risk patients with permanent atrial fibrillation, inclusion criteria were defined as 65 years of age with at least one of the following risk factors, coronary artery disease, stroke or transient ischemic, symptomatic heart failure (NYHA II-IV heart failure), and left ventricular ejection fraction <40%.The primary concomitant endpoint was stroke, myocardial infarction, embolism, or death .The result suggested that dronedarone should not be used in patients with permanent atrial fibrillation with high-risk factors [10]. Therefore, dronedarone is not recommended to the patients with the NYHA III-IV heat failure, acute decompensated heart

failure.

Compared with amiodarone, the advantage of dronedarone is that it has fewer side effects. However, in maintaining sinus rhythm, amiodarone is superiorities. Dronedarone as a substitute for amiodarone can provide new options for patients affected by amiodarone side effect.

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A Retrospective Study on the Timing of Perioperative Antimicrobial Interventions in Class I Incisions

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Abstract: This retrospective case-control study was conducted to provide reference for the timing of antimicrobial drug use for clinical prevention. Cases of patients with type I incision surgery of 2019 at a 3A hospital were selected for statistical analysis, and 336 cases each with surgical duration ≥3h and equivalent surgical duration <3h of the same type were selected as the case and control groups, respectively. The focus was on the type of surgery, length of surgery, timing of medication, days of medication, and the occurrence or not of surgical site infection (SSI)in patients. There was a significant difference in the incidence of SSI between the case and control groups (18.15% Vs. 6.15%, P<0.001). The number of cases of intraoperative additional antimicrobial drugs for surgical duration ≥3h was 155 (57.83%), of which the number of cases with SSI was 40 and the number of cases with SSI without additional 113 was 21 (25.81% Vs. 18.58%, P=0.145). Additional intraoperative antimicrobial drugs for surgery ≥3 h were not effective in reducing the incidence of SSI, but significantly reduced the number of days patients were hospitalized. The occurrence of SSI is related to many factors and should not be overly dependent on the use of antimicrobial drugs.

Keywords: Class I Incision; Perioperative Period; Antimicrobial Prophylaxis; Surgical Site Infection

Introduction

The main purpose of perioperative prophylaxis with antimicrobial drugs is to prevent surgical site infection (SSI). SSI is the most common postoperative complication [1], accounting for 15% of hospital-acquired infections. The rate of infection in Class I surgical incisions is only about 1% according to Cruse[2]. The first core strategy for the prevention of SSI is surgical prophylaxis, in which the timing of antimicrobial use in surgical prophylaxis is important. The half-life of cephalosporins in the general prophylaxis category is relatively short, and the effective concentration may not be maintained beyond 3h. NNIS confirmed that the duration of surgery is one of the risk factors for the occurrence of surgical site infection, and the duration of surgery beyond 2h is already a high risk factor for postoperative infection [3]. However, it is worth noting that no significant difference in the incidence of hospital-acquired infections has also been reported for perioperative prophylaxis with antibiotics for class I incisions. It is also true that there are clinical examples of patients who grew older than 3 hours during surgery and did not develop infections without additional intraoperative antimicrobial drugs. It is worthwhile to consider whether the timing of antimicrobial intervention, especially the addition of intraoperative drugs at three hours, has any effect on the incidence of postoperative SSI.

1. Materials and Methods

1.1 Sources of information

Using EMR and HIS, "incision type" was used as search terms to extract the cases of category I incision surgery, and 336 cases as the experimental group. Then an equal number of cases with the same type of type I incision were randomly

selected from the cases with less than 3h as the control group.

1.2 General method

The general information of patients (ID number, gender, age, department, discharge time); information of surgery (main diagnosis, name of surgery, date of surgery, duration, incision healing, hospitalization days); information of antimicrobial drug application (name of drug, dosage, route of drug, timing of drug, duration of drug, combination of drug) and incision infection were counted according to the extracted case record information. The information is entered and summarized according to the extracted case records.

1.3 SSI judgment basis

Any incision with localized redness, swelling, heat, pain, purulent exudate above the fascial tissue, or localized pus exudation after stitch removal, regardless of whether there is bacteriological evidence, is an incisional infection.

1.4 Statistical methods

Statistics and analysis were performed using SPSS 19.0 computer software. The data were expressed as mean ± SD, and t Test and Chi-Square Test were used for comparison between groups, and logistic regression method was applied for multi-factor analysis. $P < 0.05$ was considered as significant difference.

2. Results

A total of 336 patients meeting the ≥3h inclusion criteria were selected from 2019, while 336 cases in the <3h control group were randomly selected, for a total of 672 cases. Among them, 280 cases (41.67%) were male. The youngest of the patients was 2 years old and the oldest was 90 years old with a mean age of 51.46 ± 14.19 years.

2.1 SSI situation

Of the 672 patients included in the survey, 88 were infected. The overall incidence of SSI was 13.09%, and the infection rate in the case group was 18.15% (61/336) significantly higher than that in the control group, which was 8.04% (27/336) (χ^2=15.116, P<0.001). Surgical infections were mainly concentrated in surgical times longer than 2h-5h. The mean number of hospital days in the case group was 17.57±11.04 days, which was higher than the mean number of hospital days in the control group, which was 12.99±6.70 days, and the difference in the number of hospital days between the two groups was statistically significant (P<0.001).

2.2 Problems related to the timing of antimicrobial drug use

Antimicrobial drugs were used in 481 of 672 cases of type I incision surgery, with a utilization rate of 71.58% and 191 cases without antimicrobial drugs, with a non-utilization rate of 28.42%. The types of surgery without prophylactic use of antimicrobial drugs were mostly thyroid adenoma, mastectomy, and inguinal hernia repair. The use of antimicrobial drugs was mostly first and second generation cephalosporins, accounting for 77.33% of prophylactic use, and only 8 cases of other types; 31 cases of combined use accounted for 6.45%.

The duration of surgery was longer than 3h in 336 cases. Among them, perioperative medication was used in 268 cases. Intraoperative additional antibiotics were applied in 155 cases, accounting for 57.83% of the medications used and 46.13% of the overall cases. The analysis showed that there was no significant difference in the rate of infection with or without additional intraoperative antibiotics for surgery longer than 3 h (P=0.145). In cases where the duration of surgery was ≥3h, the mean number of days in hospital was 16.12±5.48 for patients on medication was significantly less than 19.75±11.816 for patients operated on without medication *(*P=0.037).

3. Discussion

3.1 Procedure length and SSI

The current study focused on the effect of operative length on the incidence of SSI and found that the incidence of postoperative SSI tended to increase with longer operative time, increasing the mean length of stay of patients, and all of them were significantly increased (P<0.001). The incidence of SSI in the present study was 18.15% significantly greater than the incidence of SSI in surgery longer than 3h (P<0.001) than 6.25% (P<0.001), which is generally consistent with the literature. Analysis of this may be due to the fact that prolonged duration of surgery may increase the time of straining at the surgical site, bleeding, and increase the time of tissue exposure, which aggravates tissue ischemia and hypoxia at the incision site and tissue damage, and also the sensitivity of antimicrobial drugs may decrease after 3h, and the effective concentration of drugs decreases, increasing the likelihood of infection.

3.2 Timing of antimicrobial prophylaxis use and SSI

In surgical procedures, it is important to use antimicrobial drugs for reasonable perioperative prophylaxis, and many scholars point out that the timing of antimicrobial drug use is the key. Exactly why antimicrobial drugs in the intraoperative additional to choose 3h this intervention time, analyzed part of the literature found that, first of all, the timing of 3h use is based on pharmacological theory, generally used for prophylaxis of cephalosporin antibiotics are short half-life, generally 30-40min, there are data to support that the sensitivity of antibacterial drugs will also change with the increase of time [1], in order to ensure the effectiveness of drugs, clinical generally use 3h to go additional antibacterial drugs. Further related to the contamination colonization of bacteria, the critical period for effective preventive medication is within 4 h of the germ invasion into the wound, and it is difficult to achieve the desired effect with medication after the bacterial colonization time [4], which reflects the importance of antimicrobial drug use before bacterial colonization. Whereas after two hours is a risk factor for the occurrence of SSI, between 2-4h, 3h may be a more appropriate time.

In this study, we observed the use of additional intraoperative antimicrobial drugs at the time of surgery older than 3h. We found no significant difference between the use of additional intraoperative drugs and the occurrence of postoperative SSI (P=0.145). However, it was also found that the number of days of hospitalization was significantly less in patients who were administered medication after 3h than in those who were not, indicating that the use of antimicrobial drugs was significant to some extent.

3.3 Other factors of SSI

Relevant literature related to surgical factors have pointed out that age, impaired immune system, diabetes mellitus, infection in non-operative areas, wound classification, malnutrition, smoking, obesity, excessive preoperative hospital days and hormones, and prolonged operative time, skin preparation, surgical hand washing, operating room environment, and surgical technique are factors associated with postoperative SSI. In this study, the proportion of cases with intraoperative implantation of artificial joints, prostheses, and internal fixation materials was large, and the concentration of surgical susceptibility factors was high, which to a certain extent also led to a high rate of prophylaxis. Deep surgical incisions, mostly complex surgeries, long exposure time of incisions, more severe strains and tissue damage, and mostly having built-in materials are all factors associated with SSI. Therefore, the importance of the use of antimicrobial drugs in reducing the occurrence of SSI is not significant under the influence of the combined condition factors. Even if additional intraoperative antimicrobial drugs are used, they are not effective in reducing the incidence of postoperative SSI.

In summary, although the additional use of antimicrobial drugs effectively shortened the number of days of hospitalization, the correlation with surgical site infection was not significant and was not an independent influencing factor in reducing the incidence of postoperative SSI. The incidence of SSI should not rely solely on the use of antimicrobial drugs to prevent and treat SSI.

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Application of Improved Packing Method in the Repair of Infectious Wounds in Special Body Parts

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Abstract: Objective: To investigate the effect of improved packing method in the repair of infectious wounds in special parts. Methods: From December 2017 to December 2020, 68cases of infectious wounds in special body parts were treated with improved packing and dressing method (including 28 cases of hip abscess, 16 cases of sacrococcygeal pressure ulcer, 12 cases of buttock pressure ulcer, 8 cases of perineal necrotizing fasciitis and 4 cases of hip pressure ulcer). After active anti infection, abscess incision and drainage, and debridement of necrotic tissue, the wound inflammation subsided, necrotic tissue was removed, and granulation tissue grew. The wound edge was fully dissociated, and the wound was directly closed and sutured or transferred to the adjacent skin flap to repair the wound. The drainage tube was prevented according to the condition of the wound. Meilan marked the area of the basal cavity of the wound, and the packing suture was placed outside the edge of the cavity to fix the wound. Result: Of the 68 patients, 58 had primary wound healing; 8 cases of partial wound dehiscence after removal of packing and bandage were treated with secondary suture combined with improved packing and bandage method; Two patient's wound was uncooperative due to the poor consciousness of the patient. The bandage was completely loose and the wound split again. Conclusion It has the advantages of simple operation, easy nursing and less hospitalization cost.

Keywords: Improved Packing Method; Special Body Parts; Wound Healing

Introduction

Perineal abscess, hip pressure sore and other wounds which are difficult to heal as special parts often have the characteristics of large subcutaneous soft tissue necrosis area, heavy wound pollution, and difficulty in fixing the wound due to body position change. At present, the application of negative pressure sealing drainage technology for this kind of wounds can often play an ideal therapeutic effect [1]. However, negative pressure depends on the coverage of medical film. Because of hair growth and being too close to urethra or anus, and the influence of humid environment, negative pressure film is difficult to be firmly fixed. From December, 2017 to December, 2020, 34 cases of infectious wounds in special parts were treated by improved packing and bandaging, and the effect was good, which is now introduced as follows.

1. Materials and methods

1.1 Clinical data

There are 68 patients in this group, including 38 males and 30 females. The age is 23-81 years old, and the average age is 57 years old. Among them, there were 28 cases of buttock abscess, 16 cases of sacrococcygeal pressure sore, 1 case of buttock pressure sore, 8 cases of perineal necrotizing fasciitis and 4 cases of hip pressure sore.

1.2 The operation method

Active anti-inflammatory and blood sugar control before operation, active nutritional support to correct anemia, hypoproteinemia and maintain internal environment stability, etc., and bacterial culture on wound surface.

1.2.1 Wound debridement treatment

Incision of abscess as soon as possible, thorough removal of necrotic tissue and unobstructed drainage; Stage III-IV pressure ulcers were cleared of necrotic skin, muscle and fascia once or in several stages.

Patients with perineal necrotizing fasciitis should be debrided as soon as possible, and suspicious necrotic tissues should be removed together to reduce the possibility of infection spreading to abdominal wall and other parts of the body. Some patients need multiple operations to control infection.

1.2.2 Wound repair

After the infection is controlled and the necrotic tissue is completely removed, the wound can be repaired only when the granulation tissue grows in the wound cavity.

After satisfactory anesthesia, the skin around the wound was routinely disinfected, the wound was repeatedly washed with hydrogen peroxide and normal saline for 3 times, and the edema granulation of the wound was scraped off. After trimming the wound margin, stop bleeding completely. Meilan marks the necrotic cavity on the body surface, leaving the packing line with 3-0 mousse suture 2cm outside the marking line and around the wound edge, and the packing line interval is about 3cm. Evaluate the size of skin defect. For patients with abscess and partial necrotizing fasciitis, there are not many skin defects. Give sufficient free skin silk thread intermittent suture and place drainage tube. For some patients with pressure ulcers or wounds with large skin defects after debridement, which are difficult to be sutured directly, skin grafting or adjacent skin flap transfer should be given to cover the wounds, and drainage tubes should be placed if necessary. Mesh gauze covers the wound surface. After the iodophor gauze is shaken off, evenly fill the wound surface, especially in the scrotum, pay attention to fill the space around the scrotum and pack it appropriately.

2. Result

All 68 patients were unpacked and bandaged 5-7 days after operation. There were 58 cases of primary wound healing; In 8 cases, after the wound was removed and bandaged, part of the wound was split, and the wound was sutured twice and the improved wrapping method was used again for secondary healing. Two cases of wounds did not cooperate due to the poor consciousness of patients, and the wound was completely loose and peeled off, and the wound split again. No skin flap or skin margin necrosis was found in 68 cases of wounds.

3. Typical case

The first case, a 22-year-old female, suffered from hip pressure sores after carbon monoxide poisoning for more than 2 months. After the treatment of wound debridement and dressing change, the granulation tissue at the base of the wound grew. There was a subcutaneous cavity of about 5cm in the upper part of the wound towards the midline of the buttocks, and the subcutaneous cavity of about 4cm in the lateral direction towards the anterior superior iliac spine. Therefore, the wound debridement and flushing were arranged under general anesthesia, and the relaxation of skin tissue around the wound was evaluated during operation, and after trimming the skin margin, direct suture could be given. Mark the range of necrotic

cavity on the body surface with methylene blue, give 3-0 mousse thread at an interval of 3cm, and give indwelling packing thread; 3-0 absorbable sutures were given to the wound edge after trimming, and subcutaneous tension-reducing suture was given. After the iodophor gauze is shaken off, evenly fill the wound surface, properly pack and bandage the wound, and leave the catheter after operation, and instruct the patient to limit hip flexion. Seven days after operation, when the wound was opened, most of the wounds were well anastomosed, and the wound about 2-3cm inside was split. Two weeks after the operation, the wound was sutured at the wound dehiscence under local anesthesia, and the wound was treated with improved packing method again. After one week, the wound basically healed. See figure;

Figure (1) Preoperative

Figure (2) 7 days after operation

Figure(3) 14 days after operation

Figure(4) 2 months after operation

The second case, a 72-year-old male, have diabetes for more than 30 years and perineal necrotizing fasciitis for more than one month. After active anti-inflammatory, hypoglycemic and repeated debridement of necrotic tissue, the infection was

gradually controlled, and the necrotic area from the pubic mound to the perineum, testis and epididymis were preserved, and the surface granulation tissue grew. Therefore, wound debridement and irrigation were arranged under moderate and low epidural anesthesia, skin and soft tissue defects were evaluated during operation, and the skin margin could be directly sutured after trimming. Meilan marks the range of necrotic cavity on the body surface, which is consistent with the range of necrosis. The 3-0 mousse thread is given the indwelling packing line at an interval of 3cm; After trimming the wound margin, 3-0 absorbable sutures were given to subcutaneous tension suture, and 8# drainage tube was placed in the lower part of scrotum near perineum. After the iodophor gauze is shaken off, it is evenly packed around the scrotum, properly packed and bandaged, indwelling catheter after operation, and cleaning and disinfecting the perineum around the wound every day. No obvious drainage fluid was given to remove the drainage tube 3 days after operation, and the wound was closed well 5 days after opening the wound, and there was no obvious purulent effusion after extrusion, etc., and the suture was removed 10 days after operation. See figure;

Figure (1) Preoperative

Figure (2)10 days after operation

4. Discussion

Skin and soft tissue infections in perineum, buttocks and other special parts are often extensive. After incision and drainage or debridement, the wound is not easy to bind and fix, and the wound oozes more. The wound in this area is difficult to heal, and the reasons are as follows: 1. Hip movement will lead to delayed healing; 2. The wound is close to urethra and anus, which easily leads to contact pollution; 3. The untimely care leads to skin and urine impregnation [2]. In recent years, the application of negative pressure sealing drainage technology in infected wounds at special sites has gradually increased. Continuous negative pressure suction can timely drain exudate and promote the growth of granulation tissue [3]. In clinical application, we found that after VSD was used, the adhesive film was easy to fall off and excrement polluted the wound. Some wounds with many subcutaneous necrotic cavities are difficult to achieve thorough unobstructed drainage. In addition, Czymek et al [4] found that the hospital stay and clinical prognosis of patients with perineal necrotizing fasciitis using negative pressure were not better than those of traditional antibacterial dressings.

In free skin grafting, we often use the method of pressure dressing in order to make the skin get the support of the root and establish the blood supply. In the flat parts such as trunk and limbs, we can use ordinary bandages or elastic bandages to

compress moderately, while the parts such as head, face, neck and buttocks perineum often adopt the traditional packing method. This fixation method is generally firm, and it is not easy to loosen during proper physical activity, which avoids the skin flap shifting, is beneficial to the establishment of blood supply and reduces the generation of effusion [5]. Based on the same principle, in order to establish a reliable blood supply between the skin flap and the wound base and avoid the generation of effusion, we use the improved packing method when repairing infectious wounds such as perineum and buttocks, that is, the scope of packing is slightly larger than the size of the wound, and at the same time, we can also use the zoning packing method for larger wounds. Advantages of the improved packing method: 1. It doesn't rely on any instruments, reducing the burden of patients' expenses; 2. For wounds with high tension, the purpose of external tension reduction is achieved, and the probability of early wound dehiscence caused by joint activity is reduced; 3. It is convenient for turning over and nursing.

Matters needing attention: 1. The scope of the retained packing line is larger than that of the necrotic cavity, and it is best to mark it with methylene blue before suturing; 2. Avoid the pain and discomfort caused by the packing line pulling the skin, the pressure necrosis of the transfer flap or the packing line pulling. 3. In the groin area or the subcutaneous tissue of scrotum where it is not easy to fit, gauze should be evenly packed; 4. It is best to pack and bandage for 5-7 days, and premature removal may lead to insecure subcutaneous adhesion and wound dehiscence at the active site; 5. Disinfect the skin every day and try to keep the dressing clean and dry.

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Evaluation of the Anti-Inflammatory Effects of Glucocorticoids

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Abstract: The purpose of this article is to study the pros and cons of glucocorticoids in anti-inflammatory effects and to evaluate them. Because inflammation can play a positive role in removing pathogens and recovering the body on the one hand, it can also bring about adverse reactions such as redness, swelling, heat, and pain. Therefore, understanding the pros and cons of glucocorticoids in anti-inflammatory effects has the guiding significance in the clinical drug use.

Based on the complexity of the clinical effects of glucocorticoids on the patient's body, this article first analyzes the specific symptoms of inflammation, which are mainly manifested as redness, swelling, heat, pain, and dysfunction, and then analyzes the mechanism of inflammation, which is mainly due to body fluid leakage and the role of cytokines.

Then, based on the symptoms and mechanism of inflammatory episodes, the inflammatory episodes are divided into fatal and non-fatal attacks, and three dosage regimens are designed. On this basis, the three dosage regimens were evaluated in the treatment of fatal and non-fatal seizures from four indicators of safety, effectiveness, stability, and uniformity, and the following evaluation results were obtained.

In the treatment of fatal diseases, the evaluation weight of the A program is 0.587384, the evaluation weight of the B program is 0.202727, and the evaluation weight of the C program is 0.209809. In the treatment of non-fatal diseases, the evaluation weight of the A plan is 0.5462, the B plan is 0.261573, and the C plan is 0.192148.

Analyze the three programs in the fatal disease situation and the non-fatal disease situation respectively, and draw the experimental conclusion that the comprehensive evaluation result of the A program is better than the B and C programs whether it is to treat fatal or non-fatal diseases. In the treatment of fatal diseases, the C program is slightly better than the B program, and in the treatment of non-fatal diseases, the B program is better than the C program.

Keywords: Anti-Inflammatory Effect; Glucocorticoid; Analytic Hierarchy Process; Judgment Matrix

1. Introduction

1.1 The background of the topic and its significance

Inflammation is a physical sign that the body shows when it is stimulated by damage factors. On the one hand, the inflammatory reaction is the body's elimination of damage factors in the body to restore the body to normal, and on the other hand, it will cause redness, swelling, heat, pain, dysfunction and other adverse reactions.

Inflammation has a variety of pathogenic factors, such as bacteria, viruses, strong acids and bases. Mild inflammation is generally treated by directly eliminating the cause and relying on the patient's own immunity, such as local scalds and cuts. Severe inflammation generally requires the combination of anti-inflammatory drugs while eliminating the cause to reduce the damage to the body by inflammation. For example, in the treatment of acute bacterial infections, it is necessary to use antibiotics together with glucocorticoid anti-inflammatory drugs. However, for acute inflammatory episodes caused by viruses without antiviral drugs, due to the lack of effective treatment drugs for the cause, anti-inflammatory drugs are generally used for symptomatic treatment to relieve symptoms, such as the SARS virus in 2003 and the recent new coronavirus.

Therefore, in the treatment of such viral infections, on the one hand, it is necessary to prevent excessive use of anti-inflammatory drugs, thereby overly inhibiting the body's self-repair function, on the other hand, it is necessary to prevent

insufficient use of anti-inflammatory drugs, which may cause serious adverse inflammatory reactions to the body's organs. damage. In this case, the dosage of anti-inflammatory drugs is particularly important.

1.2. Research methods and ideas

Before evaluating the anti-inflammatory effects of glucocorticoids, it is necessary to understand the specific pathogenesis of inflammation and the effects of glucocorticoids involved in it. On this basis, the analytic hierarchy process is used to evaluate the anti-inflammatory effects of glucocorticoids from four perspectives: safety, effectiveness, compliance, and economy.

2. Mechanism of inflammation

First of all, when pathogens or other stimuli appear in the body, the body's first response is to produce an immune response against the pathogen. On the one hand, the immune system eliminates the pathogen, and on the other hand, it will cause red, swelling, heat, pain, and dysfunction. Immune response can be divided into innate immunity and specific immunity, and specific immunity can be divided into cellular immunity and humoral immunity. This article mainly analyzes the influence of the two factors of body fluid exudation and cytokines on the immune function in the process of inflammation.

2.1 Fluid exudation

On the one hand, the exudation of body fluids can promote the elimination of pathogens, and on the other hand, it can cause a series of adverse reactions. The therapeutic effect is embodied in three aspects: the role of body fluid itself, the exudation of white blood cells, and the auxiliary effect of cytokines. The adverse reactions are embodied in redness, swelling, heat, pain, and dysfunction.[1]

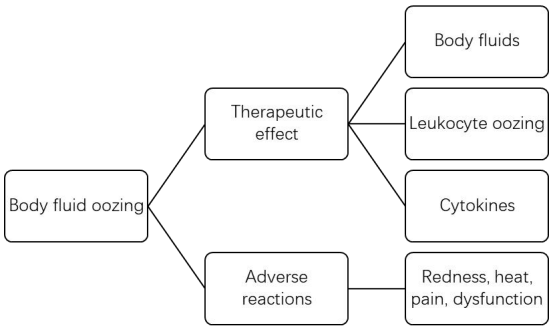

Figure 1 Humoral exudation

Because cytokines are substances that are released by lymphocytes and other cells that can regulate other inflammatory cells, inflammatory cells need to exudate with body fluids to the site of inflammation in order to have an effective anti-pathogen effect. It can be said that body fluids exudation is indispensable in the process of cytokine function.

2.2 The role of cytokines

Cytokines are substances secreted by immune cells that can enhance immune function. There are many types of cytokines. This article mainly introduces the role of interleukin (IL), tumor necrosis factor (TNF) and interferon (IFN) in inflammation.

The role of cytokines can be divided into direct action and indirect action. The direct action is to achieve the elimination of pathogens by increasing immunity, such as promoting the proliferation of immune cells, or by stimulating the immune cells themselves to enhance their ability to fight pathogens. It is functionally Enhance immune function. The indirect effect is to affect the elimination of pathogens through non-immune influencing factors, such as promoting hematopoiesis, and laying a good environment for immune function.[4]

Interleukin was originally thought to be secreted by white blood cells, but now it is a type of cytokine secreted by other cells. The direct role of interleukin is to promote the proliferation and differentiation of immune cells and enhance innate immunity and adaptive immunity. The indirect effect is that white blood cells can also promote hematopoiesis. The actual effect is the same as the exudation of body fluids, laying the environment for the immune system to function.

The role of tumor necrosis factor is mainly direct action, which can eliminate pathogens by enhancing innate immunity and directly killing tumor cells.

The effect of interferon is also a direct effect, which can eliminate pathogens through direct anti-virus and enhancement of innate immunity

In the course of clinical use, glucocorticoids mainly inhibit the effects of cytokines.

2.3 Analytic Hierarchy Process Evaluation

2.3.1 The establishment of plans and indicators

The interaction between glucocorticoids and inflammatory diseases is more complicated. The evaluation of the clinical use of glucocorticoids here mainly considers the anti-inflammatory and anti-immune effects of glucocorticoids, which are important for safety, effectiveness, economy, and the four indicators of compliance are weighted separately and then evaluated. There are three main evaluation schemes:

Plan A: Use glucocorticoids plus effective drugs

Plan B: No drugs are used

Plan C: Use only glucocorticoids

Table 1 Judgment matrix of each index weight

	Safe	Effective	Compliance	Economic
Safe	1	1	2	6
Effective	1	1	2	6
Compliance	1/2	1/2	1	3
Economic	1/6	1/6	1/3	1

Through calculation, the weight of each indicator is obtained

Table 2 The weight of each indicator

	Safe	Effective	Compliance	Economic
Weights	0.3960	0.3960	0.1476	0.0603

2.3.2. Judgment matrix for different indicators

(1) Safety evaluation

On the one hand, A program can control the damage of symptoms to the body, on the other hand, it can eliminate pathogens by using antibacterial drugs in the process of suppressing immunity to prevent further deterioration of the disease, so it is safer than B and C programs.

Plan B and Plan C need to be analyzed in different situations in terms of safety. It is necessary to consider whether inflammatory symptoms are fatal. When the inflammatory symptoms do not induce fatal diseases, because plan B does not suppress the immune system, the disease can be controlled more quickly. It can prevent further deterioration of the condition and is safer. But if inflammatory symptoms can induce fatal diseases, then the C program will be much safer.

Table 3 Safety evaluation for the treatment of non-fatal diseases

	Plan A	Plan B	Plan C
Safety evaluation	0.6232	0.2395	0.1373

Table 4 Safety evaluation for the treatment of fatal diseases

	Plan A	Plan B	Plan C
Safety evaluation	0.7272	0.0909	0.1819

(2) Effectiveness evaluation

The evaluation of effectiveness, compliance, and economics has no obvious relationship with whether it will cause fatal diseases, so it is no need to classify.

It is believed that the therapeutic drugs used are better than the own immune system in terms of effectiveness. Plan C uses only glucocorticoids, which will suppress immunity, so it is not as effective as Plan A and Plan B.

Table 5 Evaluation of the effectiveness of treatment of diseases

	Plan A	Plan B	Plan C
Effectiveness evaluation	0.5714	0.2857	0.1429

(3) Compliance evaluation

Compliance is mainly analyzed from the patient's own treatment experience during the entire treatment process. Since both plan A and plan C use glucocorticoids and are symptomatic treatments, both treatments are better than plan B.

Table 6 Evaluation of the Compliance of treatment of diseases

	Plan A	Plan B	Plan C
Compliance evaluation	0.4286	0.1429	0.4286

(4) Economic evaluation

The economy is mainly considered from the price of drugs. Glucocorticoids and antibacterial drugs are under the protection of medical insurance, and the clinical use price is relatively low, and the economics are comparable.

Table 7 Evaluation of the economy of treatment of diseases

	Plan A	Plan B	Plan C
Economic evaluation	0.4286	0.1429	0.4286

Summarize the weight of each index evaluation, and get the following two tables

Table 8 Evaluation of indicators for treatment of fatal diseases

	Weights	Plan A	Plan B	Plan C
Safe	0.3960	0.7272	0.0909	0.1819
Effective	0.3960	0.5714	0.2857	0.1429
Compliance	0.1476	0.4286	0.1429	0.4286
Economic	0.0603	0.1638	0.5390	0.2973

Table 9 Evaluation of indicators for treatment of non-fatal diseases

	Weights	Plan A	Plan B	Plan C
Safe	0.3960	0.6232	0.2395	0.1373
Effective	0.3960	0.5714	0.2857	0.1429
Compliance	0.1476	0.4286	0.1429	0.4286
Economic	0.0603	0.1638	0.5390	0.2973

3. Evaluation results of anti-inflammatory effects of glucocorticoids

Calculate Table 8 to get the final evaluation results of each program

Table 10 Evaluation results of various programs for the treatment of fatal diseases

	Plan A	Plan B	Plan C
Evaluation results	0.587384	0.202727	0.209809

Table 10 Evaluation results of various programs for the treatment of non-fatal diseases

	Plan A	Plan B	Plan C
Evaluation results	0.5462	0.261573	0.192148

It is concluded from the experiment that whether program A is to treat fatal or non-fatal diseases, the comprehensive evaluation results are better than those of program B and C. In the treatment of fatal diseases, program C is slightly better than program B. For non-fatal diseases, plan B is better than plan C.

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Some Thoughts on Bioethics Turning to Body Ethics

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Abstract: Medicine and philosophy are important impetus for the development of bioethics. The development of modern medicine makes bioethics turn to the ethical concern of "body", and the body revival in body philosophy and humanities and social sciences should become an important theoretical support for the ethical thinking of body. Body ethics studies the moral problems of human life from the perspective of the body. With the help of the research results of body philosophy and related disciplines, it can promote the medical science to fully understand the body of disease and the "patient" of human beings, which has important research significance.

Keywords*:* Medicine; Bioethics; Body Ethics; Body Philosophy; Embodied

1. Why did bioethics turn to body ethics?

1.1 The enzymatic effect of medical development makes bioethics turn to body ethics

In 1971, The American biologist Porter put forward the term of bioethics for the first time in his book Bioethics: A Bridge to the Future, which is "a science combining biomedical science with other rich humanistic knowledge to provide the best medical and environmental system for the survival of human species" [1]. Bioethics mainly uses philosophical thoughts and ethical theories to solve the ethical problems related to the development of medicine, life science and human existence through multidisciplinary research methods. From the perspective of disciplinary characteristics, philosophy is the theoretical source of bioethics and medicine is the field of application of bioethics. Medicine and philosophy are the important impetus to promote the development of bioethics.

There is no intervention of techniques and other complicated factors on ancient medicine. Doctor-patient relationship is very harmonious. Doctors have noble virtue and show high respect to the life and actively fulfill their obligations to patients, which shows a high degree of consistency between old Chinese medicine and Western medicine. The medical ethics words can see in the Hippocratic oath, and “On the Absolute Sincerity of Great Physicians” by Sun Simiao. Since the 16th century, mainstream medicine has achieved a qualitative leap from traditional empirical medicine to modern experimental medicine as the achievements of modern scientific development have been applied to the medical field. This leap led to two trends in the development of medicine: the first is reductionism and mechanism. Medicine seems to know more and more about the human body, but the patient's mind and body are separate and the patient is a living body/dead corpse. The human body is like a machine, and all the organs are the parts of the machine, and everything that goes wrong is fixed. The second trend is the materialization of medicine as a result of technological intervention. When medical science and technology are not developed, doctors are full of sympathy and care for patients, but once complicated factors such as technology are involved between doctors and patients. Doctor feelings for patients will dissipate in some intermediate links. Medical scientism makes people become the bearer of diseases, and turns patients from "sick people" to "human diseases".

Clinical treatment of body of patients’ somatization makes medicine emphasize the truth of objective facts or objective laws, but it ignores the feeling and significance of people happiness, and cannot treat patients well. The development of

medical science was accompanied by patient rights movement, unfair distribution of medical resources, abortion, religion, death, population and environmental issues, which were closely related to individual physical experience, moral cognition and body culture, religion and social significance. Then there are the growing biomedical technologies that can manipulate genes, embryos, even the human brain and human behavior. The development of medicine makes bioethics turn to the ethical concern of "body".

1.2 Rational subject philosophy has limitations on the analysis of bioethics

Since the 16th century, the medical application of science and technology has led to the materialization trend of medicine. After world War II, the Nuremberg Code and the Declaration of Helsinki emphasized that medical research should place the protection of the subject above all other interests. No matter clinical treatment or scientific research, medicine is for people's happy life and long-term survival of mankind. So, what exactly is a person? What is the most striking mark that distinguishes man from other living things? Thinking about these questions is an important subject of philosophy. In the 17th century, philosopher Descartes put forward the famous assertion "I think, therefore I am", which marked the awakening of man's subject consciousness. Man placed himself as the subject at the center of the world, and regarded all other beings and bodies with physical attributes as objects, forming the thinking mode of subject and object dichotomy. As the subject, man has various features, functions and attributes, which is the expression of man's subjectivity. "Subjectivity" is a very complex concept, mind/body, rationality/irrationality (intuition, will, emotion) can be the elements of human subjectivity. But obviously, rational thinking is the fundamental sign that human beings are different from animals and an important feature of human beings as subjects. Therefore, Descartes always placed rationality in the core position, so the metaphysics of subjectivity in Descartes is embodied as the metaphysics of rational subject [2]. After that, Kant's "absolute imperative" and Hegel's logical reason are the substantial advance of rational subject philosophy.

Since the 16th century, the thought of mind-body dualism led by western rational subject philosophy has exerted an important influence on medicine. Medicine divides health and disease, life and death, quality and function. Medical protection of patients and subjects is mainly manifested in respect of rational autonomy. Rational autonomy refers to the ability of every adult to judge and reason rationally so as to exercise certain propositions and decisions in the judgment of affairs. Medical informed consent is a practical philosophical activity of patient or subject's autonomous right and free will. Informed consent is based on the premise that every sane adult has the right to decide what to do with his or her own body. It is generally believed that rational subjects should reasonably constrain, control and dispose of their own bodies, that is, a person's metaphysical dignity mainly comes from his rationality and autonomy. But they do not realize that when suffering from pain and suffering caused by diseases. The body will also become a source of metaphysical dignity [3]. Obviously, bioethics should not only respect individual rational choice, but also pay attention to the body phenomenon of pain when discussing pain and other related issues. Body philosophy and the humanities and social sciences of body resuscitate can become an important theoretical source for the ethical thinking of body.

2. Bioethics turns to the philosophical exploration of body ethics

2.1 The beginning of Nietzsche's body Rebellion

Obviously, the rational subjectivity is important, but it cannot represent a whole person. Nietzsche questioned the traditional rational subject philosophy. Nietzsche opposed the huge speculative system of western philosophy which centered on rationality and established by pure rational logical reasoning. He attached great importance to the power inspired by the ceaseless flowing desire in the perceptual body and attributed the will to power to "body", becoming the beginning figure of body philosophy. Nietzsche criticized being as the constant to explain the existence of human life activities, and believed that they should become to highlight the significance of life. Compared with the single and inevitable reason, generation represents difference, contingency and sensibility. Nietzsche said: "The body is not an object, an object that merely accompanies us. Most of what we know from the natural sciences of the body and the way it exists are assertions that the

body has been misinterpreted in advance as a mere natural object [4]. Biomedicine treats the body as a simple natural object, and the body is the objective carrier of disease. Medical knowledge is the objective expression of disease, which has nothing to do with the subjective state of doctors and patients. In fact, patients do not just "own a body", but "exist" in the body. Doctors are not only acting on a sick body, but should pay attention to the perceptual, different, accidental physical characteristics of patients.

2.2 Development of Body philosophy after Nietzsche

Since Nietzsche, the body has occupied an important position in philosophy and become an important topic in post-modern philosophy. Postmodern philosophy is opposed to the characteristics of western traditional culture, which advocates rationality, emphasizes center and maintains structure. The research thoughts are gradually oriented to the concern of non-rationality, edge and deconstruction. Hermeneutics, post-structuralism and feminism are all important theoretical achievements of postmodern philosophy, which also inspires the research of body ethics.

Foucault, inspired by Nietzsche's genealogy, used the history written on the body as a carrier. In Madness and Civilization and Discipline and Punishment, he took mental patients and prisoners as objects and considered that difference would produce the realm of speech in the body. His seemingly natural things are actually specific products under certain social and historical conditions, highlighting the restraint of power on the body. Like Nietzsche, Deleuze regarded the body as the energy of force, transformed Nietzsche's will to power into a desire machine, and proposed a "body without organs", which is a body free from organization, and only this laissez-faire body can escape from various mechanisms, authorities and dictatorship [5]. Baudrillard, Le Breton and others explored the body from the perspectives of sociology, culturology and anthropology. Feminist ethics also believes that traditional ethics overemphasize absolutized subject and rational authority, and the principle of universality can play an important role in moral judgment. But in specific situations, they tend to give consideration to one side and lose the other. In the analysis of specific moral situation, we should distinguish the various relations that affect individual essence and pay attention to the subject's self-change when different experiences occur. When solving complex moral problems, we should construct "autonomy in relation" through the conversation and dialogue between different subjects in specific situations. The ethical study of the body is not to provide definitive answers to moral dilemmas, but to create an imaginary and fluid space in which to think about human ontology and epistemology.

2.3 Research on body phenomenology and body ethics

The phenomenological research in the second half of the 20th century has always regarded the body as an important content, which has changed the derogatory tendency of the subject philosophy to the body since Descartes. It is the most important theoretical resource for the study of body ethics. Husserl, the originator of phenomenology, turned his attention to time, body, intersubjectivity and the living world in his late phenomenology [6]. He proposed to analyze the relationship between the functional and subjective body and the experienced object body. On the basis of Husserl's late philosophical thoughts, Mello Ponty further analyzed the phenomenon of body perception, and believed that "the world is not something for me to think about. I am open to the world, and I undeniably establish contact with the world. But I do not own the world, and the world is inexhaustible [7]. Marx Scheele questioned Kant's rational-based formalism ethics, and combined with the research method of phenomenology, deeply criticized the rational ethics, and created his unique phenomenology of emotion and value ethics of matter. Scheler believes that "body nature" shows a special nature of material being given, and distinguishes between "body" and "body", pointing out that the body of a simple body and the body and mind with identity and internal consciousness are a unified whole for the body [8]. Sartre designed a three-dimensional ontology of the body. I make my body exist: this is the first dimension of the existence of the body. My body is used and known by others, and this is its second dimension. I exist for myself as something known to others as a body, which is the third ontological dimension of my body. Complete the research on the existence of the body in the relationship between "me and others" [9]. Hermann Schmitz, a new phenomenologist, proposed body dynamics and made different analyses of physical and emotional tremor states and atmospheric situations. In his book Body and Emotion, he collected papers on body and emotion by the most important body philosophy researchers in the history of contemporary philosophy. The concept of "philosophical therapy"

was proposed by exploring human beings themselves, human history, and the relationship between human beings and surrounding groups [10]. Body phenomenology also focuses on the study of the relationship between mind and body, which is also the focus of contemporary philosophy of mind.

2.4 Embodiment and body ethics

Driven by body philosophy, the research on "body" has covered cognitive science, neuroethics, body psychology, body sociology, body aesthetics, body literature and body politics, all of which can become the foundation of interdisciplinary research on body ethics. Embodiment is a very important concept for the study of the body, although not only. In contrast to the traditional view that cognition is abstract, embodied cognition believes that cognition requires the participation of the body and the world. Perceptual ability of people, such as the breadth, threshold and limit of perception, is determined by the physical attributes of the body. Subjective feeling of people body and body experience in the outside world can provide certain cognitive content for language and thought. Embodied emphasizes that the body is embedded in the environment. Body is a medium existing in the world. To have a body is to intervene in a certain environment, participate in some plans and stay in it [11]. Emotions are also closely related to the body and the environment. For example, emotional excitement is in a situation that people cannot cope with but cannot leave. Therefore, being embodied is not about seeing a body as a tool, or simply having a body. The body is the condition for the continuous realization of self-existence. When different experiences occur in the body, the self will also change and form a new connection. In the development of medicine, the uncertainty of individual body is becoming more and more obvious. The new body and identity will produce new cognition, emotion and interaction with the environment, which affects the performance of individual subjectivity in the new interaction association. For example, brain transplantation carries the memory, consciousness and identity of an individual. If the identity and memory representing the individual are transplanted to another individual, then what basis should we use to rejudge the identity and subjectivity of a person? After a brain transplant, the DNA of the recipient's offspring is in confusion, and how to define the identity of the recipient's offspring? Modern medicine is developing towards the direction of precision medicine, and humans have a clearer and clearer understanding of their own biology. But people tend to overlook the emotional, social, cultural and multi-layered implications. Body philosophy can better assist medical and life sciences in the analysis of biological, psychological and social dimensions to achieve a holistic understanding of human beings.

3. It is of great significance for bioethics to turn to body ethics

From the research situation at home and abroad, it is inevitable that bioethics should turn to body ethics. Contemporary bioethics is a study of the overall state of human existence. The research contents and fields of concern are very broad, and it is always open. Bioethics has not yet formed a mature and unified theoretical system, and the thinking and research perspective of body ethics is also multi-dimensional, covering philosophy, ethics, sociology, anthropology and forming cross-study. The term "body ethics" was first proposed abroad in Body Ethics compiled by Australian scholar Shildrick in 2005. In the collected papers of post-traditional Challenge, HIV infection and treatment, drug addiction, narrative of cancer patients and other issues are discussed in the paper, and body ethics is considered as a post-traditional challenge of bioethics and a real study of body ethics [12].Sun Muyi, a famous bioethicist in China, summarized the research content of body ethics into seven aspects: the moral philosophy of the body and the ethical significance of the body; The degree to which each body allows, protects, and desires overindulgence; How best to treat a sick body; Prudent and rational use of narcotics and psychotropic substances; Ethical issues of body augmentation; The sexual identity and role of the body and the ethical issues of the body, organs and biological resources of the body [13].

Now take a look at Bioethics, Bioethics is closer to the meaning of Biomedical ethics due to its Biomedical background. Contemporary Bioethics research has expanded from Biomedical to population, pollution, poverty, politics, peace and other fields related to human survival. "Ethics of life" is more consistent with the ethical connotation of contemporary bioethics after entering the development stage of population health care. From "Ethics of life" to "Ethics of body", body ethics can be regarded as a variant thinking of bioethics [13]: The body is the materialized carrier of medicine, the body structure determines the human feeling, consciousness, will and spiritual form. Measures of moral evaluation of physical and spiritual orientation

must be taken through physical indicators in some sense, including clinical, natural, social, life, culture, philosophy and human life. Compared with bioethics, the study of body ethics strengthens the dignity and value of the body, as well as the moral value in social, economic and especially cultural implications. The study of the ethical aspects of the body of the subject as a whole. It values the unity of body and mind, believing that the combination of soul and body is not guaranteed as a random decision between two external factors, one of which is the object and the other is the subject. The combination of soul and body is realized in the movement of existence every moment. No part of the human body and soul is separate; they are part of each other and part of the whole. It is of great significance to study the moral problems of human life from the perspective of body, which can promote medical science to fully understand the body of disease and the "patient" of human being.

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The Strategy of Medical Rescue for Mass Casualty Incidents

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Abstract: Mass casualty incidents refer to the medical resources required in the rescue of casualties, which obviously exceed existing local medical resources in a relatively short period. In recent years, mass casualty incidents caused by various reasons happen frequently in China, which results in the serious situation of emergency medical rescue. Troops have always been an important force in the rescue of mass casualty accidents. This paper introduces the latest development of the method of triage and its principles of implementation in the on-site rescue of mass casualty incidents in foreign armies. According to *National Emergency Plan for Medical and Health Rescue in Public Emergencies*, the paper puts forward strategies and skills that should be adopted in the on-site rescue of mass casualty accidents, and analyzes the significance of mass casualty drills at the same time.

Keywords: Mass Casualty Incidents; Medical Rescue; On-Site Rescue

Introduction

China has planned to improve its capability of emergency medical rescue on the spot effectively during the 13th Five-Year Plan, including effectively improving the speed of emergency response of local rescue teams at all levels, reaching the spot fast, and handling effectively. Around the world, troops have always been an important force in the rescue of mass casualty accidents, and most countries have formed the medical rescue system of mass casualty incidents based on civil-military association. This paper introduces the experience and practice of North Atlantic Treaty Organization and other countries in the medical rescue of mass casualty accidents, and put forward measures and suggestions to improve China's capability in the rescue of those accidents on the spot, in order to provide reference for on-site first aid.

1. The On-site First Aid of Foreign Mass Casualty Accidents

Given the characteristics of mass casualty accidents, US army and North Atlantic Treaty Organization attach great importance to the management, communication and evacuation of construction site, providing that the site must be assessed continuously and repeatedly. The main content includes understanding the overall situation of the site, and clarifying what resources are needed, what assistance should be provided, recent and current risks, casualties, where to get a number of rescue and return relief, the assistance of other companies in transport, medical and non-medical evacuation resources, and possible landing point destroyed or not polluted by the environment. They pay attention to the site above all else organizationally, and highly value on-site provision of diagnostic and non-rescue resources and designated medical institution.

The most outstanding feature of many on-site rescues of mass casualty accidents is triage, and casualties are rescued based on priority. There are 2 types: one is the patients that cannot be brought back through rescue, and the other is the patients that need more time and complex process to rescue and have narrow chance for survival. However, the exhausted resources can be used to rescue other patients with light injuries. As to the two types, they mainly adopt supportive and palliative therapies until the mass casualty accident is controlled. As to the emergency degree of four types of casualties and

patients, the standard of US army is that the emergency rescue team needs to save life, amputation, or visual impairment in 2 hours, or salvage in 4 hours. The delayed treatment team can cure survivable causalities and patients in 24 hours. The lowest treatment team disposes the wounds of causalities, and cannot affect the casualties that continue to fight [4].

2. The Measures and Technologies for the On-site First Aid of Mass Casualty Accidents

According to the requirements of China's current National Emergency Plan for Medical and Health Rescue in Public Emergencies, the medical rescue team should transfer causalities to a safety zone as soon as possible after arriving the spot, adheres to the standard of "saving people first and then saving and curing causalities with light injuries", and mainly controls external hemorrhage and triage analysis: (1) as to serious patients with active internal haemorrhage, patients with side haemorrhage should be treated firstly in a relative safe spot, putting a tourniquet on the abnormal pelvic girdle. If you suspect a patient with nephridium bleeding, make zone planning and recover. (2) According to the national uniform standard, the condition of injuries can be divided into light, serious, grave, and death, in order to help distinguish for treatment and adopt effective measures later.

Mass causality caused by on-site rescue measures of mass casualty accidents influences not only casualties but also a number of institutions. If the required response ability exceeds local diagnostic and service security resources, causality caused in a short time can be announced as a mass casualty accident.

Medical rescue solutions of mass causality incidents changes based on the standard from that meets the demands of every patient to that meets the maximum requirements. In the process of conventional diagnosis and treatment, the chosen team is usually trained to a highly cooperative emergency rescue team [1].

After rescuing and treating causalities, technological medical professionals should take the following measures to rescue them: (1) set up diagnostic rescue area such as the spot of triage for casualties and timely arrival area of rescue, designate specific staff to undertake and conduct triage, and provide enough supply of labor and relief. (2) Evaluate the level of pollution to the environment, the change of requirements in diagnostic emergency resources, and medical resources that have got and need to be added and medical evacuation plan. In the situation that the natural environment is unsafe, we should ensure the rescue cannot cause too great damage to other survivors or rescuers. We should care about the balance between the number and condition of survivors and applicable rescue resources. If the condition of a survivor cannot be verified, we should adopt emergency diagnostic treatment; if the condition has been grasped, we should describe the injury of the survivor in detail in order to decide medical demands such as stretcher, oxygen, blood, revival liquid, and so on. (3) The method of triage analysis. When coming across several casualties, making the priority of rescue clear is the premise to perform rescue. (4) On-site rescue. (5) Plan and distribute the reports of situation about sending survivors to temporary or last safe place. On the spot of mass casualty accidents, rescuers often encounter many injuries, while the contradiction between the requirements of rescue and emergency materials is obvious at this moment, so we need to avoid unhelpful and ineffective interventions of rescue, which not only occupy precious rescue resources and cause that other casualties cannot be rescued, but also form risks to rescuers (such as infectious disease, nuclear biochemical environmental pollution, etc.). In normal environment, those interventions that are understood to be less than 1% in survival rate can also cause futile efforts against professional ethics. In this time, we should adopt the measures of "not open CPR and "stop CPR". During this period, medical rescuers need to observe and record features. For example, in the condition of arteria carotis communis or cardiovascular apex without pulse in 60s, we can use monitor, because although it has opened, the bronchus don't conduct respiratory movement in 60s (which can be determined by auscultation); if no response to painful stimuli such as kneading scapula, and no tendon reflection; no pupil reflector (that is, the pupil does not respond to light, and keep fixed and spread), and no corneal reflection; lack of more drugs is direct evidence of non-response. If a casualty is not apparently dead, we can conduct cardiopulmonary resuscitation until he has vital signs or until the doctor confirms his death.

The purpose of technologies for the on-site first aid of mass casualty accidents is to make casualties keep in a stable state and sent to hospital safely. As to any casualty with functional impairment in life, limbs, sight, and organs, and timely conducted triage, recovery, stability, preliminary disposal and treatment after evacuation: (1) Triage. In most cases, it can be divided into 4 types, similar to NATO. The sign for the expectation of medical treatment in China is black, while that of NATO is milk white. With effective first aid in time, casualties with serious injuries assigned to the first aid team can turn to secondary group. If the massive haemorrhage of limbs can be controlled by tourniquets, casualties with injuries later can be turned from the first aid team to the delayed treatment team. (2) We should start to handle the work of survivors as soon as possible, in order to make serious casualties safe. We should pay attention to the management of trachea, the control of bleeding, the alleviation of stress caused by pneumothorax, recovery through intravenous drip, and heat preservation. General principles should be followed are: the first thing is the management of respiratory tract and the maintenance of cervical spondylosis, including thyrocricocentesis and the application of oropharynx breather; secondly, maintain normal respiration, including CPR with hands, intrathoracic puncture to relieve stress or closed drainage, and chest wound dressing; thirdly, maintain the function of circulatory system function, including the control of external hemorrhage, recovery through intravenous drip, and pelvifixation. In addition, it also includes the assessment of neurological condition, pain relief, and the application of antibiotics.

The capability of medical rescue for mass casualty incidents mainly demonstrates on the treatment outside hospital, including extrahospital first aid and medical evacuation; the second is treatment in the hospital, including the capability of hospital outpatient clinics to organize and implement treatment. In mass casualty incidents, rescue in and outside hospital is the basis of its outpatient clinics. The on-site working competence is from the emergency plan and drills, and all participators have to understand the emergency plan, triage, and on-site emergency technology, and participate in drills of mass casualty incidents; This activity includes: (1) evaluate the working capability of the safety management of level 1 diagnosis and treatment and the medical evacuation by air in a war zone; (2) find out mutual enforceable problems influencing different areas (or China); (3) balance low-value and consumable medical supplies, such as blood and gases for diagnosis and treatment; (4) clarify whether emergency medical resources are enough; (5) test the situation of communication [5].

Conclusion

Expect the above first aid strategies and technologies for mass casualty accidents, disposal plans and repeated drills can reduce causalities and losses caused by those accidents. In addition, according to the spot and type of a specific mass security accident, to complete adjustment and effective solution through level and area divisions can reduce chaos caused by the accident, which can provide orientation and time for its effective disposal.

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