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WJCC mainly publishes articles reporting research results and findings obtained in the field of clinical medicine and covering a wide range of topics, including case control studies, retrospective cohort studies, retrospective studies, clinical trials studies, observational studies, prospective studies, randomized controlled trials, randomized clinical trials, systematic reviews, meta-analysis, and case reports.

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Retrospective Study

Observation of the effects of three methods for reducing perineal swelling in children with developmental hip dislocation

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Patients were not required to give informed consent for this study because the analysis used anonymous clinical data that were obtained after each patient agreed to treatment by written consent.

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Abstract

BACKGROUND

Developmental dysplasia of the hip is a developmental abnormality of the hip joint that results from hypoplasia during birth and continues to deteriorate after birth.

AIM

To observe the effects of magnesium sulfate wet compress, iodophor wet compress, and ice compress on reducing postoperative perineal swelling in children with developmental hip dislocation to provide effective nursing interventions in the clinic.

METHODS

A total of 120 children with hip dislocation after surgery in a third-class A hospital from January 2018 to January 2020 were randomly divided into four groups, the magnesium sulfate wet compress group, iodophor wet compress group, ice compress group and the control group. Data such as height, weight, age, duration of surgery, intraoperative blood loss, postoperative body temperature, swelling duration, pain score, and incidence of blisters were collected and analyzed.

RESULTS

There were no significant differences in height, weight, age, duration of surgery, intraoperative blood loss, and postoperative body temperature among the four groups of children. Statistical differences were observed between the intervention groups and the control group ($P < 0.05$).

CONCLUSION

All three methods significantly reduced postoperative perineal swelling in children with developmental hip dislocation, reduced the duration of postoperative perineal swelling, reduced pain, and improved the quality of care.

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Core Tip: The effects of a magnesium sulfate wet compress, iodophor wet compress, and an ice compress for reducing postoperative perineal swelling in children with developmental hip dislocation were determined in order to provide effective nursing interventions in the clinic. We selected 120 children with hip dislocation, randomly divided them into four groups and collected data for analysis. All three methods reduced the duration of postoperative perineal swelling, reduced pain, and improved the quality of care.

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INTRODUCTION

Developmental dysplasia of the hip (DDH) is a developmental abnormality of the hip joint that results from hypoplasia during birth and continues to deteriorate after birth^[1-3]. With a prevalence as high as 1.0% to 2.9%, DDH affects more girls than boys^[4] (approximately 5- to 9-fold more girls). The clinical manifestations include shortened limbs, external rotation of the nodules, and lateral bulging of the hip bone, resulting in limited mobility. Statistics show that there are more unilateral lesions and the incidence of hip delivery is higher with DDH, which may improve or become more aggravated as the child develops. Some studies have reported that 70% of children with developmental hip dislocation have a family history^[7]. Children with developmental hip dislocation will have perineal swelling after surgery, and the swelling will be more obvious at a younger age^[8]. There have been no reports on reducing the perineal swelling of children after routine care. In this study, to further examine effective nursing interventions to reduce postoperative perineal swelling in children with developmental hip dislocation, to reduce postoperative pain, and to improve the level of care, three types of nursing interventions, namely, magnesium sulfate wet compress, iodophor wet compress and ice compress, were compared. The results of this comparison are reported below.

MATERIALS AND METHODS

Patients

Following clinical observation, female patients aged 1.5 to 4 years with a high swelling rate were enrolled in this study after surgery for developmental hip dislocation in a third-class A hospital from January 2018 to January 2020. One hundred and twenty 1.5-4-year-old female patients were selected. Inclusion criteria were as follows: Children diagnosed with developmental hip dislocation and open reduction and internal fixation, hip osteotomy, and plate screw internal fixation in our hospital; female patients aged 1.5 to 4 years. Exclusion criteria: Children who did not undergo surgical treatment for various reasons; children with delayed operation time due to fever before surgery; children whose family members refused to participate in the study.

Research methods

Children in the control group were given routine care, including basic care, perineal irrigation, vital signs monitoring, and health education. The remaining three groups underwent wet compresses on the basis of routine care as follows: (1) From the 1st day

after operation, 8 layers of 3 cm × 5 cm gauze were immersed in 50% magnesium sulfate solution, preferably soaked with no drips, which was used to gently cover the perineum from top to bottom at the site of edema, the gauze was always kept moist during treatment, and the local reaction was observed. Each wet compress was applied for 30 min, twice/d; (2) In the iodophor wet compress group, from the first day after surgery, 8 layers of sterile gauze soaked in 0.3% iodophor was applied for perineal edema, the gauze was kept moist during application, which was tightly attached and the local reaction was observed. Each wet compress remained in place for 30 min, was changed twice/d, and the perineum was kept clean during treatment; and (3) A 1 cm thick sponge was made into a 2 cm × 5 cm ice pack, which was soaked in water and then frozen. From the first day after surgery, the ice pack was wrapped with sterile gauze and placed on the perineum to cover the swelling. Each ice compress was applied for 15 min, 3 times/d. During this period, the skin was regularly checked to prevent frostbite.

Grading of edema (Level IV method): (1) Class I: The perineum is slightly swollen and has dermatoglyphs; (2) Grade II: The perineum swells until the skin is shiny and the skin lines disappear; (3) Grade III: The perineum is swollen until the skin is translucent, and the surrounding labia majora is also swollen; and (4) Grade IV: Extreme swelling and blisters on the skin.

Evaluation of perineal edema: (1) Invalid: The child's symptoms did not improve, and the edema did not resolve or worsen; (2) Effective: The child's symptoms improved, and the edema symptoms resolved by 30% to 70%; (3) Significant effect: The symptoms basically disappeared, and the edema symptoms resolved by more than 70%; and (4) Healed: The child's symptoms disappeared, and the edema symptoms subsided.

Quality control: Using the randomization principle, the patients were randomly divided into four groups using the digital random method; the inclusion and exclusion criteria were strictly followed; the researchers used uniform guidance and consistent interpretation when collecting data, thereby reducing the risk of family members misunderstandings and reducing information deviation; survey content, measurement indicators, and judgment standards were clearly unified; the participants in this study were uniformly trained to ensure standard uniform data collection.

Statistical analysis

The data were processed using the SPSS 13.0 statistical software package. The measurement data were expressed as ($x \pm s$) and the *F* test was used. The count data were expressed as a percentage, using the χ^2 test. $P < 0.05$ indicated that the difference was statistically significant.

RESULTS

The four groups were compared in terms of age, height, weight, duration of surgery, blood loss, and postoperative body temperature, and analysis showed that all values were not statistically different ($P > 0.05$), but were comparable (Table 1).

The baseline data of the four groups including age, height, and weight were not statistically different ($P > 0.05$), indicating that the data in the four groups were comparable; the duration of surgery and the amount of intraoperative bleeding were not statistically different ($P > 0.05$), indicating that surgical trauma was similar in all groups, and the results were not biased due to differences in these factors; postoperative body temperature was comparable in the four groups of patients ($P > 0.05$), indicating that the degree of swelling did affect body temperature, and was not the reason for swelling.

The pain duration and pain score of perineal swelling in the four groups of patients were compared. The pain duration in the three treatment groups was significantly lower than that in the control group ($P < 0.05$).

The data on swelling elimination in the three groups were compared with the data in the control group, and a statistically significant difference ($P < 0.05$) was observed (Table 2). Swelling elimination was faster in the magnesium sulfate wet compress group, followed by the ice compress group, and the iodophor wet compress group. However, swelling duration in the three groups was shorter than that in the control group, indicating that the interventions in the three groups all had significant effects. The pain score in the three treatment groups were compared with that in the control group and it was found that the ice compress group resulted in the lowest pain score

Table 1 Comparison of general data of four groups of children

	Magnesium sulfate wet pack group	Iodophor wet compress group	Ice pack group	Control group	P value
Age (mo)	32.40 ± 8.89 ^a	31.03 ± 8.72 ^a	30.03 ± 9.08 ^a	31.33 ± 9.13	0.759
Height (cm)	95.90 ± 7.02 ^a	95.40 ± 6.03 ^a	94.20 ± 5.40 ^a	94.83 ± 6.77	0.941
Weight (kg)	14.50 ± 1.66 ^a	14.25 ± 1.53 ^a	13.91 ± 1.40 ^a	14.15 ± 1.60	0.781
Operation duration (h)	3.53 ± 0.39 ^a	3.55 ± 0.38 ^a	3.38 ± 0.36 ^a	3.46 ± 0.41	0.599
Intraoperative bleeding (mL)	90.20 ± 4.99 ^a	86.63 ± 6.37 ^a	88.33 ± 4.18 ^a	89.70 ± 6.11	0.211
Temperature (°C)	2.03 ± 0.61 ^a	2.07 ± 0.69 ^a	1.80 ± 0.61 ^a	3.53 ± 0.57	0.132

^a*P* < 0.05 vs controls. Body temperature in the table (0: < 37.5°C; 1: 37.5–38°C; 2: 38.1–38.5°C; 3: 38.5–39°C; 4: > 39°C).

Table 2 Time to regression of perineum swelling and the pain score in the four groups

	Magnesium sulfate wet pack group	Iodophor wet compress group	Ice pack group	Control group	P value
Swelling to subside (d)	2.98 ± 0.33 ^a	3.90 ± 0.33 ^a	3.11 ± 0.41 ^a	5.91 ± 0.63	0.001
Pain score	4.07 ± 0.98 ^a	4.00 ± 1.05 ^a	3.93 ± 0.11 ^a	6.53 ± 1.28	0.025

^a*P* < 0.05 vs controls.

followed by the iodophor wet compress group and the magnesium sulfate wet compress group, indicating that these interventions relieved postoperative pain to a certain extent.

The incidence of blisters around the swelling of the perineum in the four groups of patients was compared. The χ^2 test was used to compare the data which are shown in Table 3. Five cases of blisters were observed in the control group, and none were noted in the other three groups, indicating the obvious effects of these three interventions, which had a positive effect on clinical work and greatly reduced the children's blisters. The pain and risk of infection due to blister rupture also reduced staff workload in terms of difficult nursing procedures.

DISCUSSION

At present, there are not many interventions in clinical practice for swelling of the perineum after developmental hip dislocation surgery. Essentially, swelling resolves spontaneously and keeping the perineum clean and dry to prevent stool from polluting the incision is emphasized and studies do not mention how to reduce the swelling of the perineum in children. There are many methods to reduce swelling of the perineum in adults. Infrared irradiation combined with a magnesium sulfate wet heat compress has a significant effect on removing postpartum hemorrhoids and edema. We believe that an ice compress applied to the perineum postpartum will achieve good results. Ethanol has a very good effect on swelling, but is volatile, and should not be used in allergic patients. 10% sodium chloride solution applied externally reduces swelling and has an analgesic effect. Metronidazole can eliminate perineal edema and a 654-2 wet compress has a significant effect on eliminating perineal edema. It takes a long time for swelling to resolve spontaneously, which greatly aggravates postoperative pain in children. Patients with severe swelling will also develop tension blisters^[9]. If the blisters rupture, this will increase the risk of infection. Therefore, determining how to reduce perineal swelling in children after surgery is imperative.

The scientific basis for choosing a magnesium sulfate wet compress, an iodophor wet compress or an ice compress is discussed below.

Mg²⁺ and SO₄²⁻ are polar substances that can absorb water, mainly through the entry of magnesium ions, which changes the pressure difference between tissues and tissue gaps and leads to the absorption of extravasated water. The main mechanisms of action of these ions involve a reduction in the generation of oxygen free radicals, protecting vascular tissue, inhibiting vascular inflammation, reducing vascular injury,

Table 3 Comparison of the incidence of perineum blisters in the four groups

	Total number of cases	Number of cases of blistering	Percentage	P value
Magnesium sulfate wet pack group	30	0	0%	0.021
Iodophor wet compress group	30	0	0%	
Ice pack group	30	0	0%	
Control group	30	5	16.67%	

dilation of blood vessels, and restoring blood vessel elasticity. After dissolution of magnesium sulfate powder, the penetration of magnesium ions can improve the tissue gap and intracellular osmotic pressure, which can promote the absorption of exudate from local swollen tissue to promote the reduction of local tissue edema, thereby achieving anti-inflammatory, analgesic, and anti-swelling effects^[10-12].

Iodophor, also known as strong iodine and povidone iodine, is a compound consisting of polyvinylpyrrolidone and iodine. The stock solution is dark brown and tends to foam. Iodophor mainly denatures bacteria by releasing elemental iodine and binding the amino acids of bacterial proteins while oxidizing the active groups of bacterial protoplasmic proteins, leading to the death of microorganisms and the rapid and lasting sterilization of various bacteria, viruses, fungi and spores. Iodophor is a commonly used disinfectant in surgery^[13-15]. It has the functions of sterilization, anti-swelling, convergence, anti-infection, protection of wounds, and promotion of healing. It is used in the clinic for postpartum perineal edema. An iodophor wet compress can kill bacteria, dehydrate local tissues, and reduce tissue edema and incisional bleeding.

Ice compress therapy is a type of physical therapy. It is widely used in clinical practice to reduce swelling and relieve pain caused by local tissue swelling resulting from various physical and chemical causes^[16-19]. Its mechanism of action lies in the application of physical factors, such as a temperature that is lower than that of the human body, to stimulate local rapid cooling and promote local tissue vasoconstriction, reduce tissue metabolism, and inhibit inflammatory exudation and bleeding of blood vessels, all in order to achieve a reduction in swelling. Furthermore, by reducing peripheral nerve sensitivity, this therapy had an analgesic effect^[20].

The experimental results are clear; the three treatment methods are safe, reliable, and effective, without any complications and discomfort. The magnesium sulfate wet compress was more effective than the other methods in eliminating swelling, and pain relief was greater than that with the other two methods. The ice compress was more effective than the other therapies in terms of pain relief, but special attention should be paid to preventing frostbite during use. The effect of the iodophor wet compress had an intermediate effect compared with the other two therapies, although this method was gentler. As a result, postoperative nursing staff can choose appropriate nursing measures according to the different conditions and needs of the child, reduce the duration of perineal swelling in the child, reduce the child's pain to a certain extent, and ease the tension and anxiety of the parents, thereby improving the quality of care. These findings provide a reference for clinical use^[21].

CONCLUSION

Postoperative perineal swelling in children with developmental hip dislocation can be reduced using a magnesium sulfate wet compress, iodophor wet compress, and an ice compress. These findings will broaden the application of magnesium sulfate wet compress, iodophor wet compress and ice compress in the treatment of perineum swelling after surgery for developmental dislocation of the hip joint in children. Postoperative nursing staff can choose appropriate nursing measures according to the different conditions and needs of the child, reduce the duration of perineal swelling, reduce the child's pain to a certain extent, and ease the tension and anxiety of the parents, thereby improving the quality of care. These findings provide a reference for clinical use.

ARTICLE HIGHLIGHTS

Research background

Developmental dysplasia of the hip (DDH) is a developmental abnormality of the hip joint that results from hypoplasia during birth and continues to deteriorate after birth. With a prevalence as high as 1.0% to 2.9%, DDH affects more girls than boys. The clinical manifestations include shortened limbs, external rotation of the nodules, and lateral bulging of the hip bone, resulting in limited mobility. There have been no reports on the reduction of perineal swelling in children after routine care.

Research motivation

In this study, to further explore effective nursing interventions to reduce postoperative perineal swelling in children with developmental hip dislocation, to reduce postoperative pain of these children, and to improve the level of care, three types of nursing interventions, namely, magnesium sulfate wet compress, iodophor wet compress and ice compress, were compared.

Research objectives

This study aimed to observe the effect of reducing postoperative perineal swelling in children with developmental hip dislocation using magnesium sulfate wet compress, iodophor wet compress, and ice compress to provide effective nursing interventions in the clinic.

Research methods

A total of 120 children with surgical hip dislocation after surgery in a third-class A hospital were randomly divided into four groups, the magnesium sulfate wet compress group, iodophor wet compress group, ice compress group and the control group, and data such as height, weight, age, duration of surgery, intraoperative blood loss, postoperative body temperature, swelling duration, pain score, and incidence of blisters were collected and analyzed.

Research results

There were no significant differences in height, weight, age, duration of surgery, intraoperative blood loss, and postoperative body temperature among the four groups of children.

Research conclusions

Postoperative perineal swelling in children with developmental hip dislocation was reduced using magnesium sulfate wet compress, iodophor wet compress, and ice compress. These findings provide a reference for clinical use.

Research perspectives

The ice compress was more effective than the others in terms of pain relief, but special attention should be paid to the prevention of frostbite during use. The clinical application of magnesium sulfate wet compress, iodophor wet compress and ice compress in the treatment of perineum swelling after surgery for developmental dislocation of hip joint in children should be investigated further.

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