Observation of Therapeutic Effect of Hirudoid Ointment on Infantile Phlebitis Caused by Intravenous Indwelling Needle

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To observe the therapeutic effect of hirudoid ointment on infantile phlebitis caused by intravenous indwelling needle is the objective of study. 180 children with phlebitis caused by intravenous indwelling needles were enrolled as research objects in this study. They were randomly divided into research group and control group, each containing 90 patients. Children in the control group were treated with continuous wet application of 50 % magnesium sulfate at the venous site, while children in the research group were treated with hirudoid ointment externally applied at the phlebitis site. After that, the therapeutic effects of two groups were comparatively analyzed. The overall treatment effective rate of control group was 83.33 %, while that of the research group was 95.56 %, which was significantly higher, $p<0.05$. The regression time, area regression rate, pain relief time and cure time of the two groups were compared. Results showed that the research group had significant advantages over the control group, $p<0.05$. The application of hirudoid ointment in the treatment of infantile phlebitis caused by intravenous indwelling needle can actively improve the state of the disease and improve the overall treatment effective rate, which is an effective measure, worthy of promotion and application.

Key words: Hirudoid ointment, intravenous indwelling needle, intravenous infusion, infantile phlebitis

Intravenous infusion is one of the key measures in clinical rescue and treatment of children, and one of the common complications during treatment in phlebitis. Once the problem of phlebitis occurs, physical and metal discomfort will occur in children, leading to an increase in the workload of nursing[1]. At the same time, phlebitis will hinder the smooth treatment of children, increase economic losses and reduce the compliance of children with treatment. Although there are many methods for the treatment of phlebitis, some of them will increase the intensity of clinical nursing due to the relatively complicated operation steps and some patients cannot accept them well, showing poor compliance. Intravenous indwelling needle has many advantages, including flexible outer trocar, not affecting children's activity, little stimulation to blood vessels, capable of staying in the blood vessels for a long time. It has been widely used in clinical treatment. During the application period, it can significantly reduce the pain of venipuncture in children and reduce the workload of nurses, and at the same time, it allows to administrate drug or rehydration *via* indwelling needle at any time. However, phlebitis as shown in fig. 1 can still be caused by various factors and it is urgent to effectively deal with phlebitis in children caused by intravenous indwelling needles[2,3]. Currently, the application of hirudoid ointment in the treatment of phlebitis has achieved good results. In this study, comparative analysis was adopted to observe and explore the efficacy of hirudoid ointment in the treatment of infantile phlebitis caused by intravenous indwelling needles. In this study, 180 children who had been treated for phlebitis caused by intravenous indwelling needle treatment in our hospital from August 2016 to May 2019 were enrolled as research objects. The venous imaging of 1 patient is shown in fig. 2. The phlebitis sites normally include scalp, back of the hand or the forearm, with clinical manifestations such as local tissue redness, burning, swelling and pain. Some children may suffer from scleroma or red wire along the vein. The grading standard of phlebitis can be described as follow[4,5]. Grade 1 phlebitis shows symptoms including local redness, swelling, tenderness, no cordage, no vein cordage, which occurs within the

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length of the catheter; Grade 2 phlebitis is characterized by redness, swelling, edema, heat and pain, with visible cords and no vein cords to be touched, occurring beyond the length of the catheter; Grade 3 phlebitis is locally characterized by pain, heat, redness, abscesses and sometimes visible bands, which occurs beyond the length of the catheter. All the families in this study had the right to know and signed the formal informed consent. The selected children were divided into research group and control group, each containing 90 children. There were 56 male and 34 female children in the study group, with an average age of (4.9±0.2) y. In the reference group, there were 60 male children and 30 female children, with an average age of (3.5±0.5) y. There was no significant difference in general data between two groups before treatment, $p>0.05$. The control group was treated with 50 % magnesium sulfate continuous wet compress, while the research group was treated with hirudoid ointment. For phlebitis location, take the besmear outside hirudoid cream, then gently massage and let it dry. After that, compress the phlebitis site with 2 % lidocaine soaked gauze (no water drop as the standard), within the range beyond 2 cm of phlebitis and wrap it with plastic wrap. At the same time, fix it tightly with adhesive tape to keep the gauze moist. The whole process above was conducted twice a day. Before hydropathic compress, the nursing staff should introduce and guide the families of the sick children, answer questions and solve difficulties, eliminate their tension and anxiety, let them sign the informed consent, and cooperate with parents of patients. Before formal administration, the puncture site must be kept in a sterile state and the skin of the affected area should be thoroughly cleaned. After appropriate preparations, hirudoid ointment should be applied to avoid reducing the drug's osmotic absorption capacity. Completely soak the gauze with 2 % lidocaine and then cover it with plastic wrap to prevent evaporation of the solution. Nursing staff should maintain comfortable indoor temperature and humidity to create a warm treatment environment for children in order to avoid crying or reduced treatment compliance of children. Hirudoid ointment (also called Mucopolysaccharide Polysulfate (MPS) cream) is anti-inflammatory drug, which can promote edema and hematoma absorption, inhibit thrombosis and growth, promote local blood circulation, stimulate the regeneration of damaged tissue, quickly relieve pain and pressure, reduce edema and hematoma, make the leg heaviness disappear quickly. Its main component is MPS. MPS is composed of a disaccharide unit consisting of sulfonated d-glucuronic acid and n-acetyl-d-galactosamine[6].The molecular weight of MPS is between 5000 and 15 000 Dalton. Observation indexes are described here. The overall therapeutic effective rates of the two groups were compared and three criteria were involved, including significant effectiveness, effectiveness and ineffectiveness. Significant effectiveness is defined upon significant improvement of local redness, swelling, heat and pain[7], disappearance or removal of cordular vein and scleroma softens. Effectiveness is defined upon alleviation of redness, swelling, heat and pain, improvement of scleroma and cable-like vein after treatment. Ineffectiveness is defined upon no difference before and after treatment. In addition, the regression time of redness and swelling, the regression rate of redness and swelling area, the time of pain relief and the cure were recorded. Statistical analysis software, Statistical Package for the Social Sciences (SPSS) 21.0 was used to process data. The measurement data were expressed by mean±average ($\bar{x}\pm s$), with t test conducted for intergroup comparison. Enumeration data were expressed by Natural (n) and Percentage (%), with Chi-square (χ^2) used for intergroup comparison. The intergroup difference is of statistical value when $p<0.05$. The overall therapeutic effective rate between two groups was compared. As shown in Table 1, after the implementation of different treatment modes, the treatment effective rate of research group was significantly higher than that of control group, $p<0.05$. The disease improvement between the two groups was compared. As shown in Table 2 below, the research group were significantly lower than the control group in terms of the regression time of redness and swelling, the regression rate of redness and swelling area, the time of pain relief and the cure time, $p<0.05$. Phlebitis is a common complication of clinical intravenous infusion. Due to intensive application of intravenous indwelling needles, the increase of indwelling time and the passive bearing of certain hypertonic solutions, the incidence of phlebitis has also been increased. If not treated in time or improperly, it will cause redness, swelling and even necrosis of local skin tissue, increase the pain of children and affect the smooth treatment and rehabilitation process[8]. Therefore, it is necessary to timely find local skin or vascular abnormalities in children and evaluate them scientifically, so as to intervene as soon as possible. The traditional treatment for phlebitis is the wet application of 50 % magnesium sulfate solution. However, such treatment has poor effect, requires timely infiltration and is limited by inconvenient operation. The main ingredient of hirudoid

ointment is MPS, which is extracted from animal organs. MPS plays a role in blood coagulation and fibrinolysis system, exerting anti-thrombotic effect, promoting absorption of exudate, avoiding local inflammation development, promoting hematoma absorption, normal connective tissue regeneration, restoring tissue as soon as possible and achieving anti-inflammatory and analgesic effects. After external application of hirudoid ointment, a gentle local massage can activate blood circulation, remove blood stasis, relax meridians and promote local blood circulation. At the same time, drugs penetrate deeper into the subcutaneous tissue, which can improve the toxic stimulation of drugs on blood vessels, reduce vascular endothelial injury and pain, and promote healing. The results of this study showed that the therapeutic effect of external application of hirudoid ointment in the treatment of phlebitis was significantly better than that of the control group and the recovery time was faster, which is consistent with the results of related studies[9,10]. In summary, hirudoid ointment has important advantages in the treatment of phlebitis. It is mild in nature, highly permeable, non-irritating and easy to use, which can be accepted by most children with phlebitis. It is an effective and cheap medicine for treating infantile phlebitis caused by intravenous indwelling needle. In addition, a scientific nursing model should be implemented during the treatment period to provide comfortable treatment experience for the children, so as to avoid reduced compliance or feeling of tension or anxiety. Hirudoid ointment is a safe and reliable treatment mode, which can be widely used in clinical practice.

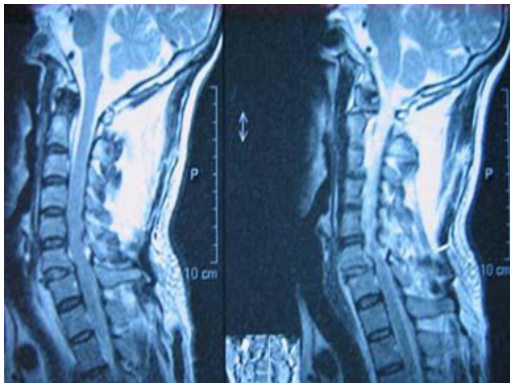

Fig. 1: Medical examination of phlebitis

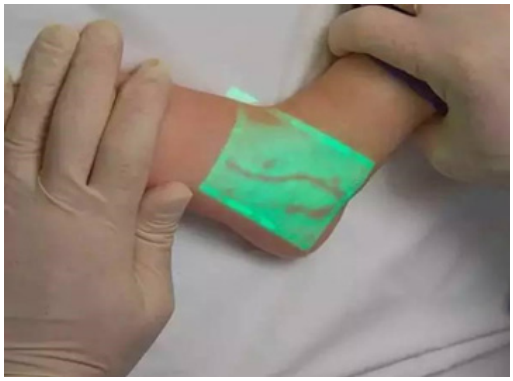

Fig. 2: Venography of a child patient

TABLE 1: COMPARISON OF THE OVERALL THERAPEUTIC EFFECTIVE RATE BETWEEN TWO GROUPS [n (%)]

Group	Number of cases	Significantly effective	Effective	Ineffective	Overall treatment effective rate
Research group	90	60	26	4	86 (95.56)
Control group	90	40	35	15	75 (83.33)
χ^2					10.20
p					<0.05

TABLE 2: COMPARISON OF DISEASE IMPROVEMENT BETWEEN THE TWO GROUPS ($\bar{x}$±s)

Group	Regression time of redness and swelling (h)	Time of pain relief (h)	Regression rate of redness and swelling area (%)	Cure time (d)
Research group (n=90)	24.30±1.28	15.48±3.21	97.80±0.29	2.17±0.95
Control group (n=90)	40.25±1.46	28.90±2.85	88.95±0.74	4.2±0.88
t	9.03	12.37	7.46	8.33
p	<0.05	<0.05	<0.05	<0.05

Conflict of interests:

The authors declared no conflict of interest.

REFERENCES

1. Tian B, Liu Y, Wang Z. Effect of 75 % alcohol and Bezoar detoxification tablets combined with hirudoid in the treatment of phlebitis. Chin J Geriatr Care 2015;13(06):117-8.
2. Gong YL, Li JL, Su XX, Jiang LH, Zhou MX, Zhang X. Effect of compound aescinate sodium gel and hirudoid ointment in the treatment of pipe-induced phlebitis in PICC. Chin J New Clin Med 2016;9(6):532-4.
3. Gao H, Fang XL. Efficacy of hirudoid in the treatment of phlebitis in patients with breast cancer after accepting peripherally implanted central venous catheter chemotherapy. J Baotou Med 2015;39(2):83-5.
4. Meng L, Nguyen CM, Patel S, Mlynash M, Caulfield AF. Association between continuous peripheral IV infusion of 3 % sodium chloride injection and phlebitis in adults. Am J Health Syst Pharm 2018;75(5):284-91.
5. Shi S, Zheng S, Li XF, Yang LL, Liu ZD, Yuan W. Comparison of a stand-alone anchored spacer versus plate-cage construct in the treatment of two noncontiguous levels of cervical spondylosis: A preliminary investigation. World Neurosurg 2016;89:285-92.
6. Huang AL, Zhu LY, Qiu HZ. Comparison of clinical efficacy in the treatment of phlebitis correlation with peripherally inserted central catheter (PICC) between Shuangbai powder and hirudoid cream. Guangzhou Med J 2017;48(1):42-4.
7. Zhu Y, Shi CL, He LL. Application of external application of hirudoid combined with wet lidocaine in children with phlebitis. J Gannan Med Coll 2017;37(2):258-9.
8. Molokoane-Mokgoro K, Goldstein LN, Wells M. Ultrasound evaluation of the respiratory changes of the inferior vena cava and auxiliary vein diameter at rest and during positive pressure ventilation in spontaneously breathing healthy volunteers. Emerg Med J 2018;35(5):297-302.
9. Venkata SS, Arimappamagan A, Lafazanos S, Pruthi N. Syringomyelia secondary to cervical spondylosis: Case report and review of literature. J Neurosci Rural Pract 2014;5(1):78-82.
10. Moustafa IM, Diab AA, Hegazy FA, Harrison DE. Does rehabilitation of cervical lordosis influence sagittal cervical spine flexion extension kinematics in cervical spondylotic radiculopathy subjects? J Back Musculoskelet Rehabil 2017;30(4):937-41.

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