Int J Clin Exp Med 2019;12(11):12920-12927
www.ijcem.com /ISSN:1940-5901/IJCEM0099801

Original Article

The alleviation of pain and the reduction of the incidence of complications in pediatric supracondylar humerus fractures through the clinical nursing pathway

Hua Zhao[1], Yanling Wang[2], Yu An[3]

[1]The First Department of Bone in Baoji Central Hospital, Baoji, Shanxi, China; [2]The Affiliated Hospital of Yan'an University, Yan'an, Shanxi, China; [3]Department of Pediatrics, Baoji Central Hospital, Baoji, Shanxi, China

Received July 17, 2019; Accepted September 10, 2019; Epub November 15, 2019; Published November 30, 2019

Abstract: Objective: To explore the application of the clinical nursing pathway (CNP) in the operation of pediatric supracondylar humerus fractures. Methods: 92 children with supracondylar humerus fractures who underwent internal fixation in our hospital were randomly divided into group A (N=46) and group B (N=46). The visual analogue scale (VAS) and modified objective pain score (MOPS) were used to assess the children's pain before and after nursing. The Mayo elbow function score was used to evaluate the recovery of elbow function in children. The incidences of complications, treatment compliance, and nursing satisfaction were observed during treatment. Results: The VAS and MOPS scores of group A and group B were lower than they were before nursing (P<0.001). The scores of VAS and MOPS in group A were lower than those in group B after nursing (P<0.01). The stability of the elbow joints, pain, daily activities, motor function scores and Mayo scores in group A and group B were higher than those before nursing and group A showed higher scores than group B (P<0.001). The incidence of complications in group A was lower than it was in group B (P<0.01). The scores of group A in compliance with medical drugs, a reasonable diet, combined exercise, and regular follow-up were much higher than those in group B (P<0.001). A higher satisfaction was recorded in group A than in group B (P<0.05). Conclusion: CNP intervention can alleviate the pain of pediatric supracondylar humerus fractures, promote the rehabilitation of elbow joint function, reduce the incidence of postoperative complications, and improve treatment compliance and nursing satisfaction.

Keywords: Supracondylar humerus fractures, pediatric, clinical nursing pathway, pain, complications

Introduction

Supracondylar humerus fracture is a fracture of the distal humerus just above the elbow joint. It accounts for about 16% of all pediatric fractures and usually requires surgery [1]. The peak age of the supracondylar humerus fractures is 6-7 years old. In this age, the upper sacral area is undergoing reconstruction, and the cortex is thin, making the area vulnerable to fracture [2]. At present, internal fixation surgery is mainly used for the treatment of supracondylar humerus fractures. However, children often suffer different degrees of pain after surgery. The increased psychological stress makes children unwilling to cooperate with treatment and has a huge impact on their rehabilitation [3]. The location of the humeral condyle is relatively special, and it is easy to cause a series of complications after surgery, such as Volkmann ischemic contracture, elbow varus, etc. [4]. Different degrees of pain and complications often occur after fracture surgery [5]. It is important to study how to reduce the postoperative pain and complication rate in children with supracondylar humerus fractures and promote the recovery of postoperative elbow joint function.

Appropriate clinical nursing interventions are necessary for the surgical treatment of children with fractures [5]. The clinical nursing pathway (CNP) is a kind of effective nursing management method based on diseases, surgery, etc. According to the clinical path table, a standard nursing plan is drawn up for the patient in advance, and the nursing intervention is implemented from the patient's admission to the discharge [6]. When the patient is admitted to the

hospital, the treatment and nursing plan is formulated into the nursing path based on the patient's personal information, medical history, etc. An individual, scientific nursing intervention model combined with clinical signs and symptoms is provided to the patients [7]. Many studies have explored the clinical applications of CNP. Loeb et al. [8] used CNP intervention in patients with pneumonia and other lower respiratory tract infections, which improved their clinical treatment and reduced medical care costs. In a study by Johnson et al. [9], the use of CNP intervention in inpatients with asthma reduced hospital stays and beta-agonist applications. Meanwhile, no adverse consequences occurred within 2 weeks after discharge. However, little is known about the application of CNP in pediatric supracondylar humerus fractures.

In this study, the application of CNP intervention mode was explored in pediatric supracondylar humerus fractures, aiming to provide a feasible clinical nursing model for children with supracondylar humerus fractures.

Material and methods

General information

92 children with supracondylar humerus fractures were enrolled in our hospital, and we randomly divided them into group A and group B, with 46 cases in each group.

The study was approved by the ethics committee of the Baoji Central Hospital. The patients and their guardians signed a written informed consent.

Inclusion and exclusion criteria

Inclusion criteria: Patients, from 3-12 years old, who were diagnosed with supracondylar humerus fractures using CT and MRI [10], patients who were conscious and received internal fixation, and patients whose clinical information was complete.

Exclusion criteria: Patients who could not be matched with medical care providers; patients with severe muscle atrophy, patients who also had severe heart and liver dysfunction, patients with congenital elbow valgus deformity, congenital bone metabolic disease, important vascular nerve injury, severe mental system disease, hematological malignancy; malignant tumors, or old humeral supracondylar fractures were excluded.

Nursing method

The patients in group B received routine nursing intervention. Specific measures: the vital signs of the children, their body temperature and the recovery of the children's wounds were closely monitored. Relevant precautions, diet and rehabilitation guidance were provided through gentle communication with the children and their families. The wards were kept clean, tidy and ventilated.

CNP intervention was implemented in group A, including psychological care, intravenous indwelling needle care, pain care, diet care, functional exercise, and discharge guidance. Specific measures: A CNP research group was formulated, which consisted of a head nurse and a responsible nurse. After the children were admitted to the hospital, the patients' conditions, clinical indications, and family environment were objectively evaluated. The information and the physicians' charts were reviewed to develop an individualized CNP nursing approach for the supracondylar humerus fractures.

The patients were young and were afraid of hospitals. They had a poor psychological condition [11]. Psychological care for group A: A gentle tone was used by preoperative caregivers to relax the patients' mood. A smile was used during the communication process, so as to eliminate the tension and help the children to reduce the fear of surgery. After the operation, the psychological conditions of the children were observed constantly. Methods of diverting attention, like watching TV shows or chatting were applied to reduce the children's pain.

Intravenous indwelling needle care: a venous indwelling needle of suitable size, high safety performance and easy puncture was selected. After puncture point skin was disinfected with 0.5% iodophor and 75% alcohol, the nursing staff inserted the needle 2 mm into the blood vessel slowly at an appropriate angle of 30° and fixed the hose and the outer casing after pulling the needle. The implementation pro-

cess was gentle to reduce the pain that the intravenous infusion brings.

Pain care: The nature of the pain was assessed based on the psychological characteristics of the children. The braking method was adopted when compressive pain was caused by inappropriate posture. The fixing device was adjusted and placed again if it was too tight. Physical analgesia was performed on the incision wound, and the cold pack was used to relieve the pain. The affected limb was raised and massaged appropriately.

Dietary care: Based on the situation of the children, vitamins, good nutrition, and digestible foods were increased in the diet. The children with partial eclipse were guided to change the habit and maintain a balanced diet.

Functional exercise: the children were guided to exercise their fingers, fists, and to perform grasping and wrist flexion and extension. Wrist joint exercises included back extension, left and right lateral flexion and flexion. One week after the operation, the shoulders were actively exercised, and the elbow joint exercise was performed 3 weeks after the operation, including the elbow joint pronation, elbow flexion and extension, and elbow joint rotation.

Discharge guidance: Regular follow-up was requested, and a discharge instruction manual was issued. It included dietary guidance, functional exercise and daily precautions, etc. Telephone follow-up was performed weekly, and family follow-up was performed every one month to observe the recovery status of the children. The follow-up time was half a year.

Observation index

The visual analogue scale (VAS) [5] and the modified objective pain score (MOPS) [5] were used to assess the pain of children before and after 2 days of nursing. VAS score: A 10 mm VAS evaluation ruler was used, and the number 10 indicated severe pain, and the number 0 indicated no pain. The children slid the marker needle to the position of the pain number, which represented the pain intensity. MOPS score: 5 items, including crying, mood, activity, posture, and verbal expression were observed. Each item was divided into 3 levels and scored 0-2. The higher the MOPS score was, the more severe pain was suffered.

The Mayo elbow function score [12] was used to evaluate the recovery of elbow function 6 weeks after the operation. The score included 10 points of elbow stability, 45 points of pain, 25 points of daily activities, 20 points of motor function, for a total score of 100 points. A high Mayo score indicates good the elbow joint function.

The incidence of complications at 4 months after surgery was observed, including joint stiffness, elbow varus, Volkmann ischemic contracture, and neurological impairment.

After nursing, the hospital's self-made treatment compliance scale was used to evaluate each patient's treatment compliance [13]. Compliance with medical drugs, a reasonable diet, exercise, and regular follow-up were scored. Non-compliance was 0 points, partial compliance was 2 points, and complete compliance was 4 points. A high score suggested good treatment compliance. The nursing satisfaction degree of the family members was evaluated using the self-made nursing satisfaction scale, including the ward environment, service quality, nursing skills and communication skills. The total score was 100 points, ≥90 points expressed satisfaction, 70-89 points indicated basic satisfaction, <60 points or less was not satisfied. (satisfaction + basic satisfaction)/ total number of groups × 100% = satisfaction.

Statistical analysis

The statistical analysis was performed using SPSS 22.0 (Easybio Technology Co., Ltd.). The measurement data were expressed as the mean ± standard deviation ($\bar{x} \pm s$). An independent sample *t* test was adopted. The paired *t* test was used for intra group comparison. The enumeration data were represented with a [n (%)]. χ^2 test applied in a comparison among the groups. When the theoretical frequency in the χ^2 test was less than 5, a continuous calibration χ^2 test was used. $P<0.05$ implied a significant difference.

Results

Comparison of baseline information

There were 31 males and 15 females in group A, aged 5-12 years, with an average age of (7.9 ± 1.5) years. 24 cases had a right side fracture and 22 cases had a left side fracture. The frac-

Table 1. Baseline data for Groups A and B [n (%)]/($\bar{x} \pm sd$)

Category	Group A (n=46)	Group B (n=46)	t/χ^2 value	*P* value
Gender			0.192	0.662
Male	31 (67.39)	29 (63.04)		
Female	15 (32.61)	17 (36.96)		
Age	7.9 ± 1.5	8.2 ± 1.3	1.025	0.308
Course of disease (d)	11.3 ± 3.2	10.9 ± 2.6	0.658	0.512
Weight (kg)	15.9 ± 1.8	16.3 ± 1.7	1.096	0.276
Cause of fracture			1.246	0.536
Traffic accident	17 (36.96)	13 (28.26)		
Falling from a height	24 (52.17)	25 (54.35)		
Fall	5 (10.87)	8 (17.39)		
Fracture site			0.708	0.400
Right	24 (52.17)	28 (60.87)		
Left side	22 (47.83)	18 (39.13)		
Fracture type			0.548	0.459
Buckling type	5 (10.87)	3 (6.52)		
Straight type	41 (89.13)	43 (93.48)		
Gartland classification			0.174	0.676
Type II	21 (45.65)	23 (50.00)		
Type III	25 (54.35)	23 (50.00)		
Swelling of the skin			0.187	0.666
Yes	18 (39.13)	16 (34.78)		
No	28 (60.87)	30 (65.22)		
Traumatic nerve injury			0.123	0.726
Yes	5 (10.87)	4 (8.70)		
No	41 (89.13)	42 (91.30)		
Ulnar nerve injury			1.108	0.292
Yes	6 (13.04)	3 (6.52)		
No	40 (86.96)	43 (93.48)		
Osteophyte injury			0.697	0.404
Yes	24 (52.17)	20 (43.48)		
No	22 (47.83)	26 (56.52)		
Place of residence			0.049	0.825
City	30 (65.22)	31 (67.39)		
Rural	16 (34.78)	15 (32.61)		

ture type of 5 cases was flexion, and 41 cases were the straight type. 29 males and 17 females were in group B, aged 5-11 years, with an average age of (8.2 ± 1.3) years. 28 cases had a right side fracture, and 18 cases had a left side fracture. 3 cases were a flexion fracture and 43 cases were a straight fracture. No statistical difference was observed between group A and group B in the baseline data. The gender, age, duration of disease, weight, cause of fracture, fracture site, type of fracture, Gartland classification, skin swelling, radial nerve injury, ulnar nerve injury, osteophyte injury, and place of residence were compared (**Table 1**).

Comparison of VAS, MOPS scores

There was no difference in the VAS and MOPS scores between group A and group B before nursing (P>0.05). After nursing, the VAS and MOPS scores of group A and group B dropped significantly (P<0.001). The VAS and MOPS scores of group A were much lower than the scores in group B (P<0.01) (**Table 2**; **Figure 1**).

Comparison of Mayo elbow function scores

There was no significant difference in the stability, pain, daily activities, motor function scores and Mayo scores between group A and group B before nursing (P>0.05). All of the referred scores in nursing group A and group B were higher than those before nursing (P<0.001), and the scores of group A were significantly lower than those of group B (P<0.001) (**Figure 2**).

Comparison of the incidence of complications

1 case (2.17%) of joint stiffness, 2 cases (4.35%) of cubitus varus, and 1 case (2.17%) of neurological impairment occurred in group A. The complication rate was 8.70%. There were 4 cases of joint stiffness (8.70%), 7 cases (15.22%) of cubitus varus, 3 cases (6.52%) of Volkmann ischemic contracture, and 3 cases of neurological impairment (6.52%) in group B. The complication rate was 36.96%. Group A showed a lower incidence of complications than group B (P<0.01) (**Table 3**).

Comparison of treatment adherence scores

The scores of group A in accordance with medical drugs, a reasonable diet, combined exer-

Table 2. Comparison of VAS and MOPS scores after care in group A and group B ($\bar{x}$ ± sd)

Group	n	VAS score		t value	*P* value	MOPS score		t value	*P* value
		Before treatment	After nursing			Before treatment	After nursing		
Group A	46	7.5 ± 0.8	4.7 ± 0.4	21.230	<0.001	8.1 ± 0.7	4.5 ± 0.3	32.060	<0.001
Group B	46	7.7 ± 0.6	4.9 ± 0.3	28.310	<0.001	7.9 ± 0.6	5.1 ± 0.6	22.380	<0.001
t value	-	1.356	2.713	-	-	1.471	6.066	-	-
P value	-	0.178	0.008	-	-	0.145	<0.001	-	-

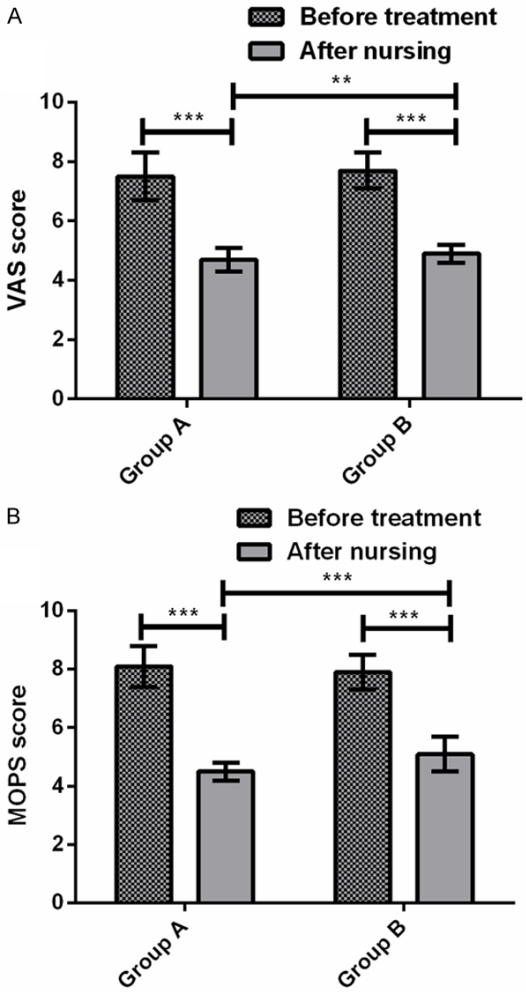

Figure 1. Comparison of VAS and MOPS scores before and after nursing in group A and group B. Comparison of VAS scores before and after nursing in group A and group B (A); comparison of MOPS scores before and after nursing in group A and group B (B). Note: **P<0.01; ***P<0.001.

cise, and regular follow-up were higher than those in group B (P<0.001) (**Table 4**).

Comparison of nursing satisfaction

After nursing, 24 cases were satisfied (52.17%), 20 cases were basically satisfied (43.48%), and 2 cases were not satisfied (4.35%) in group A. The satisfaction of nursing was 95.65%. 17 cases (36.96%) were satisfied, 21 cases (45.65%) were basically satisfied, and 8 cases (17.39%) were dissatisfied in group B. The satisfaction of nursing was 82.61%. The satisfaction level of group A was higher than the level of group B (P<0.05) (**Table 5**).

Discussion

The form of routine nursing methods for fracture patients is relatively simple, it is not systematic, and it lacks relevance. It is difficult to meet the needs of most patients [5]. CNP is a relatively new type of nursing method in clinical practice, and the application for the patient is more programmed and standardized, which can promote the rehabilitation of the patient [14]. Many studies have reported the application of CNP in clinical practice. For example, in Li et al.' s study [15], the application of CNP in patients with acute cerebral hemorrhage improved clinical efficacy and nursing satisfaction and reduced adverse reactions. Wilson et al. [5] have reported that the use of CNP in children with bronchiolitis reduced the excessive use of antibiotics. Thus, the clinical application of CNP has significant benefits for patients.

The children with supracondylar humerus fractures generally have poor psychological conditions. They are scared of the hospital and have a low tolerance to surgical pain [16]. Pain cannot be ignored in the course of surgical treatment. It can cause discomfort to the children and affect the therapeutic effect [17]. Therefore, psychological care and encouraging language can alleviate the patients' fear and enhance their self-confidence and improve treatment compliance [5]. The results of this study showed that the VAS and MOPS scores of group A and group B were significantly lower than those before nursing; the VAS and MOPS scores of group A were lower than those of group B after nursing, indicating that CNP inter-

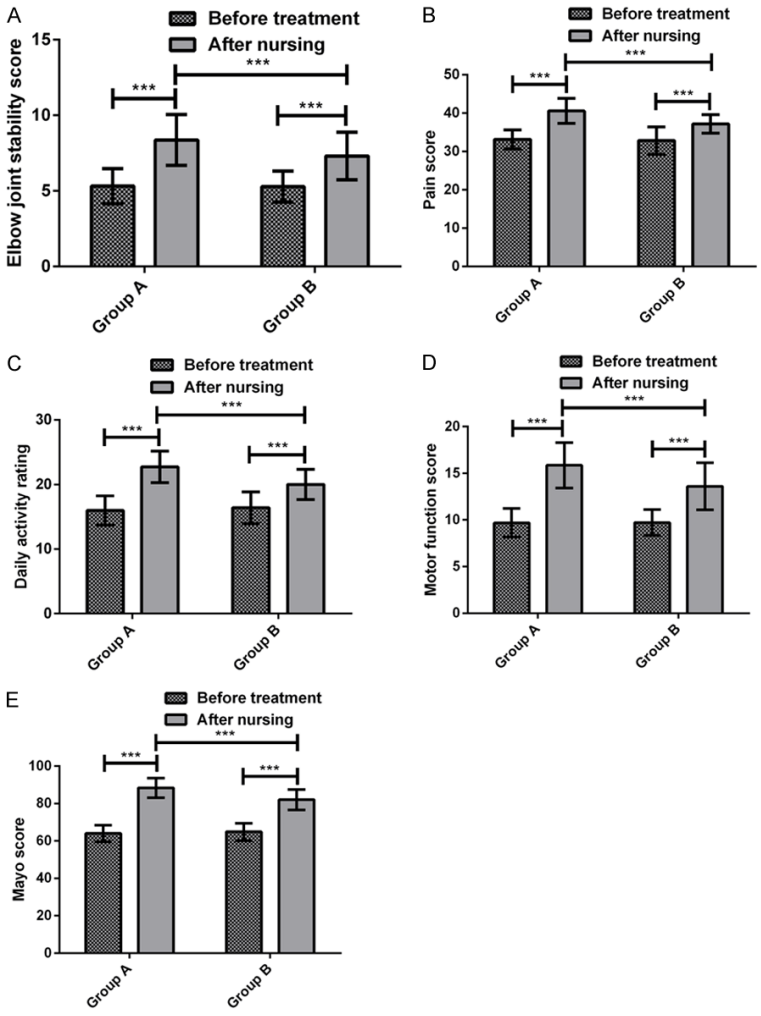

Figure 2. Comparison of Mayo elbow joint function scores before and after nursing in group A and group B. Comparison of the stability scores of the elbow joint before and after nursing in group A and group B (A); comparison of pain scores before and after nursing in group A and group B (B); comparison of daily activity scores before and after nursing in group A and group B (C); Comparison of motor function scores before and after nursing in group A and group B (D); comparison of Mayo scores before and after nursing in group A and group B (E). Note: ***P<0.001.

vention can alleviate postoperative pain in children. Powers et al. [18] reported that psychological intervention was helpful in controlling pain associated with surgery. Thus, CNP intervention was used to minimize postoperative pain in pediatric supracondylar humerus fractures. A reasonable diet plan for the children is helpful to improve the prognosis of their fractures [19]. Further functional exercises like flexion, flexing, clenching, and so on were taught to them to prevent joint stiffness [20]. After their conditions stabilized, appropriate joint exercises were performed to improve the blood supply of the affected limb, promote healing [5], and reduce the occurrence of complications. It contributed to the postoperative recovery of the children. Finally, the discharge guidance was given, and the recovery status of the children was observed in time. Finding problems and solving problems in a timely manner means the children can achieve a better recovery [21]. In this study's results, the stability, pain, daily activities, motor function, and Mayo scores of the elbow joints in group A and group B were higher than those before nursing, and the scores of group A were higher than those of group B. The incidence of complications in group A was lower than it was in group B, and the scores of group A were in accordance with medical drugs, a reasonable diet, and combined exercise, and regular follow-ups were much higher than those in group B. It is suggested that CNP intervention improved the treatment compliance of children with pediatric supracondylar humerus fractures, promoted the rehabilitation of elbow joint function, and reduced the incidence of complications. In the study by Zhang et al. [22], CNP combined with TCM dialectical nursing significantly improved the clinical manifestations, self-care awareness and clinical nursing satisfaction of patients with knee osteoarthritis, which is similar to this study's findings. In our analysis, CNP is a kind of pre-established clinical nursing model [5]. Psychological intervention, a nutritious diet, and functional exercise in children can reduce children's fear, and make them actively cooperate with treatment. In the study by Olsson et al. [23], the implementation of a comprehensive care pathway for hip fracture patients shortened hospital stays and improved the quality of care. Comprehensive care path-

Table 3. Comparison of complication rates in group A and group B [n (%)]

Group	n	Joint stiffness	Elbow inversion	Volkmann ischemic contracture	Neurological impairment	Total incidence (%)
Group A	46	1 (2.17)	2 (4.35)	0 (0.00)	1 (2.17)	8.70
Group B	46	4 (8.70)	7 (15.22)	3 (6.52)	3 (6.52)	36.96
χ^2 value	-	0.846	1.971	1.378	0.261	10.430
P value	-	0.358	0.160	0.240	0.609	0.001

Table 4. Comparison of treatment adherence scores between groups A and B ($\bar{x} \pm sd$)

Group	n	Compliance with medical drugs	Reasonable diet	Cooperate with exercise	Regular follow-up
Group A	46	2.79 ± 0.72	2.63 ± 0.51	2.74 ± 0.58	2.81 ± 0.54
Group B	46	2.23 ± 0.57	1.94 ± 0.43	2.16 ± 0.38	2.36 ± 0.47
t value	-	4.136	7.015	5.673	4.263
P value	-	<0.001	<0.001	<0.001	<0.001

Table 5. Comparison of nursing satisfaction results between groups A and B ($\bar{x} \pm sd$)

Group	n	Satisfaction	Basic satisfaction	Not satisfied	Satisfaction (%)
Group A	46	24 (52.17)	20 (43.48)	2 (4.35)	95.65
Group B	46	17 (36.96)	21 (45.65)	8 (17.39)	82.61
χ^2 value	-	-	-	-	4.039
P value	-	-	-	-	0.044

ways and CNP are well-planned for patients in advance [5], except that the comprehensive care pathway program covers all the key factors of care and rehabilitation, which was not well investigated in this study. After nursing, the satisfaction survey of the children's family showed that the satisfaction of group A was higher than that of group B, which provided a feasible basis for the application of CNP in the treatment of pediatric humeral fractures.

This study confirmed the significant benefits of CNP in pediatric supracondylar humerus fractures, but some shortcomings still exist in the study. First, the pain at different time points was not evaluated after surgery. Secondly, no investigation was conducted on the quality of life of the children after surgery. These shortcomings need to be supplemented in future research, in order to support the results of this study.

In summary, CNP intervention alleviated the pain of pediatric supracondylar humerus fractures, promoted the rehabilitation of elbow joint function, and reduced the incidence of postoperative complications. It also improved treatment compliance and nursing satisfaction.

Disclosure of conflict of interest

None.

Address correspondence to: Yu An, Department of Pediatrics, Baoji Central Hospital, No. 8 Jiangtan Road, Weibin, Baoji 721008, Shanxi, China. Tel: +86-13992788606; E-mail: yuan190718@163.com

References

[1] von Laer L, Brunner R and Lampert C. Lateral condylar fractures of humerus in children following varus malunion of supracondylar fracture. Orthopade 1991; 20: 331-40.

[2] Anjum R, Sharma V, Jindal R, Singh TP and Rathee N. Epidemiologic pattern of paediatric supracondylar fractures of humerus in a teaching hospital of rural India: a prospective study of 263 cases. Chin J Traumatol 2017; 20: 158-160.

[3] Kumar V and Singh A. Fracture supracondylar humerus: a review. J Clin Diagn Res 2016; 10: RE01-RE06.

[4] Bloom T, Seigerman DA, Zhao C and Sabharwal S. Do additional full-length radiographs of the humerus and forearm improve the decision making in children with supracondylar humerus fractures? J Pediatr Orthop B 2016; 25: 417-23.

[5] Tsuda Y, Yasunaga H, Horiguchi H, Ogawa S, Kawano H and Tanaka S. Association between dementia and postoperative complications after hip fracture surgery in the elderly: analysis of 87,654 patients using a national administrative database. Arch Orthop Trauma Surg 2015; 135: 1511-7.
[6] Yang Y, Hu X, Zhang Q, Cao H, Li J, Wang J, Shao Y and Xin S. Effect of clinical nursing pathway for endoscopic thyroidectomy in Chinese patients: a meta-analysis. Int J Nurs Pract 2016; 22: 224-231.
[7] Li M and Liu H. Implementation of a clinical nursing pathway for percutaneous coronary intervention: a prospective study. Geriatr Nurs 2018; 39: 593-596.
[8] Loeb M, Carusone SC, Goeree R, Walter SD, Brazil K, Krueger P, Simor A, Moss L and Marrie T. Effect of a clinical pathway to reduce hospitalizations in nursing home residents with pneumonia: a randomized controlled trial. JAMA 2006; 295: 2503-2510.
[9] Johnson KB, Blaisdell CJ, Walker A and Eggleston P. Effectiveness of a clinical pathway for inpatient asthma management. Pediatrics 2000; 106: 1006-1012.
[10] Madjar-Simic I, Talic-Tanovic A, Hadziahmetovic Z and Sarac-Hadzihalilovic A. Radiographic assessment in the treatment of supracondylar humerus fractures in children. Acta Informatica Medica 2012; 20: 154-159.
[11] Hammond WA, Kay RM and Skaggs DL. Supracondylar humerus fractures in children. AORN J 1998; 68: 186-199.
[12] von Recum J, Matschke S, Jupiter JB, Ring D, Souer JS, Huber M and Audigé L. Characteristics of two different locking compression plates in the volar fixation of complex articular distal radius fractures. Bone Joint Res 2012; 1: 111-7.
[13] Siris ES, Selby PL, Saag KG, Borgström F, Herings RM and Silverman SL. Impact of osteoporosis treatment adherence on fracture rates in north America and europe. Am J Med 2009; 122 Suppl: S3-13.
[14] Bradshaw MJ. Clinical pathways: a tool to evaluate clinical learning. J Soc Pediatr Nurs 1999; 4: 37-40.
[15] Li W, Gao J, Wei S and Wang D. Application values of clinical nursing pathway in patients with acute cerebral hemorrhage. Exp Ther Med 2016; 11: 490-494.
[16] Keppler P, Salem K, Schwarting B and Kinzl L. The effectiveness of physiotherapy after operative treatment of supracondylar humeral fractures in children. J Pediatr Orthop 2005; 25: 314-6.
[17] Kao HK, Chen MC, Lee WC, Yang WE and Chang CH. A prospective comparative study of pin site infection in pediatric supracondylar humeral fractures: daily pin care vs. no pin care. Arch Orthop Trauma Surg 2014; 134: 919-923.
[18] Powers SW. Empirically supported treatments in pediatric psychology: procedure-related pain. J Pediatr Psychol 1999; 24: 131-145.
[19] Xin L, Xu H, Ling L, Huang LL and Liu Z. Influence of continuous nursing on the psychological state and coping style of patients undergoing pacemaker implantation. Iran J Public Health 2015; 44: 953-61.
[20] Yoon JY, King B, Pecanac K, Brown R, Mahoney J and Kuo F. Comparison of time-and-motion observations and self-reports to capture mobility-related nursing care activities for hospitalized older adults. Res Gerontol Nurs 2015; 8: 110-117.
[21] Hamar GB, Coberley C, Pope JE, Cottrill A, Verrall S, Larkin S and Rula EY. The effect of post-discharge telephone intervention on rehabilitation following total hip replacement surgery. Aust Health Rev 2018; 42: 241-247.
[22] Zhang C and Sun C. Role of clinical nursing path combined with traditional Chinese dialectical nursing in the treatment of knee osteoarthritis. Int J Clin Exp Med 2015; 8: 6171-6178.
[23] Olsson LE, Karlsson J and Ekman I. The integrated care pathway reduced the number of hospital days by half: a prospective comparative study of patients with acute hip fracture. J Orthop Surg Res 2006; 1: 3.