

Evaluation of the Effect of Comprehensive Nursing on Patients with Acute Appendicitis Undergoing Laparoscopic Appendectomy After CT Diagnosis

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Abstract: *Objective:* To analyze the nursing effect of comprehensive nursing on patients with acute appendicitis (AA) undergoing laparoscopic appendectomy (LA) diagnosed by CT three-dimensional reconstruction technology (3DSCT). *Methods:* A total of 88 AA patients admitted to the hospital from August 2023 to August 2025 for 3DSCT diagnosis and LA treatment were selected and equally divided using a random number table. The experimental group received comprehensive nursing, while the reference group received conventional nursing. Rehabilitation indicators, postoperative pain scores, complication rates, nursing comfort levels, and satisfaction were compared between the two groups. *Results:* The experimental group demonstrated superior rehabilitation indicators, lower postoperative pain scores, lower postoperative complication rates, higher nursing comfort scores, and higher nursing satisfaction scores compared to the reference group ($p < 0.05$). *Conclusion:* Implementing comprehensive nursing during LA treatment under 3DSCT diagnosis can shorten the postoperative recovery time of AA patients, alleviate their postoperative pain, prevent postoperative complications, enhance nursing comfort, and achieve high patient satisfaction.

Keywords: Acute appendicitis; CT diagnosis; Laparoscopic appendectomy; Comprehensive nursing

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1. Introduction

AA is an acute abdominal condition primarily characterized by pain in the lower right abdomen, accompanied by symptoms such as nausea, fever, and vomiting. Delayed treatment may lead to complications such as sepsis, thereby increasing disease risk. Surgery is the fundamental treatment for this condition, enabling complete removal of the appendix, and the key to successful surgery lies in preoperative accurate diagnosis. 3DSCT is a high-resolution diagnostic method that allows clear visualization of the size and location

of the appendix, as well as assessment of its anatomical relationship with surrounding organs, thereby guiding the rational formulation of surgical plans ^[1]. LA is a relatively novel treatment approach for AA patients, enabling precise removal of appendix tissue under laparoscopic guidance, with advantages such as minimal invasiveness, safety, and definitive efficacy. However, LA is an invasive procedure that may lead to postoperative complications. Therefore, comprehensive postoperative nursing is necessary to comprehensively explain postoperative care points and precautions, improve patient treatment compliance, and ultimately ensure surgical efficacy. Based on this, this study selected 88 AA patients treated with LA under 3DSCT diagnosis to evaluate the intervention effect of comprehensive nursing.

2. Materials and methods

2.1. General information

A total of 88 AA patients admitted to the hospital from August 2023 to August 2025 for 3DSCT examination were selected and equally divided using a random number table. The experimental group consisted of 44 patients, including 27 males and 17 females, aged between 26 and 67 years, with a mean age of (41.58 ± 4.37) years, and a disease duration ranging from 3 to 17 hours, with a mean duration of (10.05 ± 1.49) hours. The reference group consisted of 44 patients, including 28 males and 16 females, aged between 24 and 65 years, with a mean age of (41.71 ± 4.43) years, and a disease duration ranging from 4 to 16 hours, with a mean duration of (10.12 ± 1.60) hours. No significant differences were observed between the two groups ($p > 0.05$).

2.1.1. Inclusion criteria

Confirmed AA diagnosis after 3DSCT examination; age < 70 years; meeting the diagnostic indications for 3DSCT; meeting the surgical indications for LA; acute onset; normal communication ability; able to clearly describe symptoms and highly cooperative with examinations; informed consent for the study.

2.1.2. Exclusion criteria

Coma or concurrent sepsis; abnormal heart, liver, or kidney function; presence of surgical contraindications; inability to tolerate 3DSCT examination; presence of immune system or blood system diseases; withdrawal from the study midway.

2.2. Methods

Both groups of patients underwent 3DSCT examination to confirm AA diagnosis. CT images showed obvious swelling of the mucosal layer of the vessel wall with relatively clear structural boundaries. Significant fluid accumulation was observed within the appendix, accompanied by cystic changes, presenting uneven echoes, and appendiceal enlargement. Periappendiceal gas and fluid accumulation were visible, along with honeycomb inflammatory lesions, as shown in **Figure 1** and **2**.

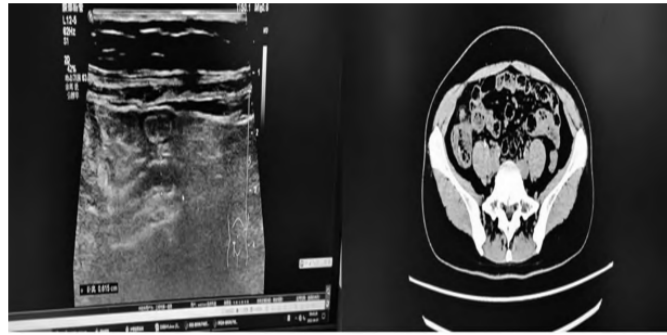


Figure 1. Acute gangrenous appendicitis.

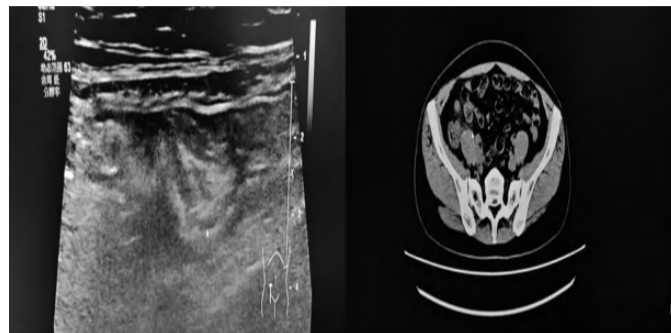


Figure 2. Acute suppurative appendicitis.

The reference group received conventional nursing care after LA surgery, which included distributing health manuals, providing detailed explanations of the self-care process and key nursing points after LA surgery, popularizing the positive role of proper nursing in postoperative recovery, and encouraging patients to actively participate in postoperative nursing practices. Patients were instructed on scientific dietary habits, requiring strict fasting before anal flatus, starting with small amounts of liquid food after flatus, and gradually increasing food intake until transitioning to a regular diet. Moderate exercise was recommended after surgery to promote recovery.

The experimental group received comprehensive nursing care after LA surgery:

(1) Condition observation

Patients were kept in a supine position without a pillow after surgery to prevent aspiration of secretions. Once their vital signs stabilized, they could assume a semi-recumbent position. Continuous monitoring of vital signs was conducted to observe for signs such as pallor and abdominal discomfort, with immediate action taken if abnormalities were detected. Antibiotic therapy was administered for 3 days postoperatively to ensure clean and dry skin at the incision site, checking for bleeding or swelling at the incision. The drainage tube was regularly squeezed to assess its patency, and the volume and color of the drainage fluid were monitored, with any bright red or excessive drainage reported to the doctor.

(2) Knowledge education

Educational materials in the form of brochures or videos were distributed to explain postoperative care procedures, self-care essentials, and cooperation requirements to patients, with a focus on popularizing potential postoperative complications and guiding patients on how to correctly identify and respond to them, thereby alleviating their anxiety. Patients' knowledge gaps were patiently inquired about and

individually addressed in easy-to-understand language. Their anxious or fearful emotions were listened to, and psychological states were improved through verbal counseling, deep breathing exercises, and emotional diversion techniques.

(3) Diet and exercise care

Patients were required to consume liquid food in small, frequent amounts before anal flatus, with personalized meal plans developed based on their dietary preferences, advising them to avoid gas-producing foods and adhere to a high-protein, high-fiber, and high-vitamin diet. Patients were guided to get out of bed early, starting with small-amplitude exercises such as sitting up with bed support once their vital signs stabilized, followed by standing and walking with bed support, gradually increasing exercise intensity.

(4) Pain care

The degree, location, and nature of patients' pain were assessed. For mild pain, distractions such as listening to music, watching TV programs, and reading were utilized to alleviate discomfort. For severe pain, pain medication was administered as prescribed, supplemented by physical methods such as ice packs and massage.

2.3. Observation indicators

(1) Rehabilitation indicators

Observation of indicators such as the recovery time of bowel sounds, anal flatus/defecation time, time to first food intake, and hospital stay.

(2) Postoperative pain score

Assessment using the Visual Analog Scale from postoperative days 1 to 7, with scores ranging from 0 to 10, where higher scores indicate greater pain intensity.

(3) Complication rate

Observation of the incidence of complications such as abdominal abscess, intestinal obstruction, postoperative fever, and incision dehiscence.

(4) Nursing comfort level

The Simplified Comfort Status Scale was used, encompassing four domains: environment, society, physiology, and psychology/spirit, each scored from 1 to 4, with higher scores indicating greater comfort.

(5) Nursing satisfaction

A self-made nursing satisfaction evaluation form was used, covering aspects such as nursing assessment, individual education, service attitude, nursing skills, communication frequency, and specialized guidance, each scored out of 100, with higher scores indicating greater satisfaction.

2.4. Statistical analysis

Data were processed using SPSS 28.0 software. Continuous variables were compared using *t*-tests, while categorical variables were compared using chi-square tests. Statistical significance was considered as $p < 0.05$.

3. Results

3.1. Comparison of rehabilitation indicators between the two groups

After nursing care, the rehabilitation indicators of the experimental group were superior to those of the reference group ($p < 0.05$). See **Table 1**.

Table 1. Comparison of rehabilitation indicators between the two groups [$\bar{x} \pm s$]

Group	Number of cases	Bowel sound recovery time (h)	Anal exhaustion time (h)	Anal defecation time (h)	First feeding time (h)	Hospital stay (d)
Experimental group	44	12.75 $\pm$ 2.64	17.54 $\pm$ 3.45	41.56 $\pm$ 5.74	18.35 $\pm$ 2.41	5.61 $\pm$ 1.76
Reference group	44	20.81 $\pm$ 2.77	25.37 $\pm$ 3.68	50.64 $\pm$ 5.91	22.17 $\pm$ 2.50	7.52 $\pm$ 1.88
<i>t</i>	-	13.972	10.296	7.311	7.297	4.920
<i>p</i>	-	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

3.2. Comparison of postoperative pain scores between the two groups

The postoperative pain score in the experimental group was lower than that in the reference group ($p < 0.05$). See **Table 2**.

Table 2. Comparison of postoperative pain scores between the two groups [$\bar{x} \pm s$, points]

Group	Number of cases	Postoperative day 1	Postoperative day 3	Postoperative day 7
Experimental group	44	3.15 $\pm$ 0.94	2.10 $\pm$ 0.85	1.09 $\pm$ 0.28
Reference group	44	4.51 $\pm$ 1.03	3.19 $\pm$ 0.94	2.01 $\pm$ 0.47
<i>t</i>	-	6.469	5.705	11.155
<i>p</i>	-	< 0.001	< 0.001	< 0.001

3.3. Comparison of complication rates between the two groups

The complication rate in the experimental group was lower than that in the reference group ($p < 0.05$). See **Table 3**.

Table 3. Comparison of complication rates between the two groups [n/%]

Group	Number of cases	Abdominal abscess	Intestinal obstruction	Postoperative fever	Wound dehiscence	Incidence rate
Experimental group	44	1 (2.27)	0	0	0 ()	2.27% (1/44)
Reference group	44	2 (4.55)	1 (2.27)	2 (4.55)	1 (2.27)	13.64% (6/44)
χ^2	-	-	-	-	-	3.880
<i>p</i>	-	-	-	-	-	0.049

3.4. Comparison of nursing comfort levels between the two groups

Before the examination, there was no significant difference in nursing comfort scores between the two groups ($p > 0.05$). After the examination, the nursing comfort score in the experimental group was higher than that in the reference group ($p < 0.05$). See **Table 4**.

Table 4. Comparison of nursing comfort levels between the two groups [$\bar{x} \pm s$, points]

Group	Number of cases	Environment		Social		Physiological		Psychological/Spiritual	
		Before exam	After exam	Before exam	After exam	Before exam	After exam	Before exam	After exam
Experimental group	44	2.43 $\pm$ 0.62	3.47 $\pm$ 0.38	2.38 $\pm$ 0.67	3.41 $\pm$ 0.42	2.31 $\pm$ 0.64	3.36 $\pm$ 0.44	2.28 $\pm$ 0.61	3.32 $\pm$ 0.46
Control group	44	2.46 $\pm$ 0.64	3.02 $\pm$ 0.49	2.41 $\pm$ 0.68	2.96 $\pm$ 0.51	2.34 $\pm$ 0.66	2.91 $\pm$ 0.53	2.31 $\pm$ 0.63	2.88 $\pm$ 0.54
<i>t</i>	-	0.223	4.814	0.208	4.518	0.216	4.333	0.227	4.114
<i>p</i>	-	0.824	< 0.001	0.835	< 0.001	0.829	< 0.001	0.821	< 0.001

3.5. Comparison of nursing satisfaction between the two groups

The nursing satisfaction score of the experimental group was higher than that of the reference group ($p < 0.05$). See **Table 5**.

Table 5. Comparison of nursing satisfaction between the two groups [$\bar{x} \pm s$, points]

Group	Number of cases	Nursing assessment	Individual education	Service attitude	Nursing procedures	Communication frequency	Specialized guidance
Experimental group	44	92.50 $\pm$ 3.21	91.85 $\pm$ 4.07	94.20 $\pm$ 2.65	93.10 $\pm$ 3.58	89.75 $\pm$ 5.12	90.30 $\pm$ 4.33
Reference group	44	84.60 $\pm$ 5.22	82.35 $\pm$ 6.41	86.90 $\pm$ 4.80	83.75 $\pm$ 5.70	81.20 $\pm$ 6.35	82.90 $\pm$ 5.84
<i>t</i>	-	8.551	8.299	8.832	9.214	6.953	6.752
<i>p</i>	-	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

4. Discussion

AA is an infectious disease caused by bacterial invasion of the appendiceal lumen and luminal stenosis. Its main symptoms include paroxysmal pain in the lower right abdomen, diarrhea or constipation, nausea, and vomiting. Early symptomatic diagnosis and treatment are necessary to prevent serious complications such as peritonitis ^[2]. 3D spiral computed tomography (3DSCT) is a commonly used diagnostic technique for this disease. It can clearly obtain images of appendiceal tissue, reveal the location of appendicitis, assess the spatial relationship between the lesion and adjacent organs, and facilitate the scientific formulation of surgical approaches. The examination procedure of 3DSCT is relatively simple, with a short examination time and rapid result issuance, demonstrating high diagnostic efficacy. Following a 3DSCT diagnosis, laparoscopic appendectomy (LA) treatment can completely resect the appendix, with a short operative time and simple steps, offering high surgical feasibility ^[3]. To maximize the overall efficacy of LA, postoperative nursing interventions can be implemented to scientifically guide patients' self-care behaviors, thereby enhancing the quality of recovery.

Conventional nursing emphasizes knowledge education and daily life care, which can disseminate postoperative care knowledge to patients, eliminate their cognitive blind spots, and subsequently improve their compliance. However, conventional nursing measures are relatively singular, lacking detailed care throughout the nursing process, resulting in suboptimal overall nursing effects ^[4]. Comprehensive nursing

focuses on individual differences among patients and provides comprehensive and meticulous nursing services based on the disease condition, 3DSCT diagnostic results, and LA surgical procedures, thereby meeting patients' nursing needs at both physiological and psychological levels and ensuring the smooth progress of surgery ^[5].

The results showed that after nursing, the recovery indicators of the experimental group were superior to those of the reference group ($p < 0.05$). The reason for this analysis is that comprehensive nursing can observe changes in patients' vital signs early after surgery, reasonably guide their body positions, identify abnormal manifestations early, and then provide targeted treatment to eliminate risk factors for postoperative recovery. Knowledge education can stimulate patients' self-care awareness, enabling them to actively participate in the postoperative care process, alleviate their psychological burden, and thereby reduce physiological discomfort caused by negative emotions, facilitating postoperative recovery ^[6]. The postoperative pain score of the experimental group was lower than that of the reference group ($p < 0.05$). The reason for this analysis is that comprehensive nursing includes pain nursing measures, which can dynamically assess patients' pain levels and provide personalized pain care, thereby improving patients' pain tolerance and minimizing pain symptoms ^[7]. The complication rate of the experimental group was lower than that of the reference group ($p < 0.05$). The reason for this analysis is that comprehensive nursing can guide patients in early exercise and formulate dietary plans based on their dietary habits, which can enhance patients' physical fitness and improve their postoperative disease resistance. Additionally, disease observation can identify signs of complications early and provide predictive nursing, resulting in fewer complications in patients ^[5]. The nursing comfort and nursing satisfaction scores of the experimental group were higher than those of the reference group ($p < 0.05$). The reason for this analysis is that comprehensive nursing dynamically assesses patients' personal situations, understands changes in their nursing needs in real-time, demonstrates humanistic care in nursing details, provides recognition and encouragement to patients, and effectively improves patients' nursing comfort and satisfaction. Under these circumstances, patients remain emotionally stable, actively maintain a fixed body position, and easily cooperate with the examination process, resulting in high nursing recognition.

5. Conclusion

In conclusion, comprehensive nursing during LA treatment after 3DSCT diagnosis can alleviate postoperative pain symptoms in AA patients, promote their postoperative recovery, prevent various complications, and improve their nursing comfort, demonstrating high nursing value.

Disclosure statement

The authors declare no conflict of interest.

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