



Reply to the commentary on ‘Safety and efficacy of enhanced recovery after surgery among patients undergoing percutaneous nephrolithotomy: a systematic review and meta-analysis’

Liang Liu, MM^{a,b,*}, Yong Suo, BSM^c, Yu Xiao, MM^{d,e}, Lin An, MM^f, Xiao Yue, BSM^{a,b}, Ji Zheng, PhD^{g,h,*}, Qiang Wang, PhD^{a,b,*}

Dear Editor,

We have read the comments comprehensively and carefully to our paper^[1] (Liu L., Xiao Y., Yue X., *et al.* Safety and efficacy of enhanced recovery after surgery among patients undergoing percutaneous nephrolithotomy: a systematic review and meta-analysis. International Journal of Surgery. 2024. doi:10.1097/JS9.0000000000001158) by Huang *et al.*^[2]. We appreciate the authors' concern for our article. At the same time, as a result of their insightful suggestions, we are grateful to the editors, reviewers, and Huang *et al.* who contributed to this process. These insightful suggestions will greatly improve the authenticity and credibility of our study, and minimize the bias and limitations of our research. And we know how important it is to clarifying these questions in detail.

Enhanced recovery after surgery program aimed to promote rapid recovery from surgery by using perioperative management

to block or reduce the body's stress response after surgery. An improved enhanced recovery after surgery protocol was introduced in colorectal surgery in the 1990s for the purpose of reducing the perioperative burden and speeding up recovery for patients. Today, enhanced recovery after surgery is being applied to a range of complex laparoscopic surgical procedures and specialties, including liver resections and gynecologic oncology, and the benefits of the procedure have been well established^[3]. In clinical practice, percutaneous nephrolithotomy is the most common treatment for large renal calculi, however, the clinical application of the enhanced recovery after surgery program in this setting has not been effectively evaluated. As a result, we conducted a systematic review and meta-analysis of the efficacy and safety of the enhanced recovery after surgery program in percutaneous nephrolithotomy to provide evidence for clinical practice. Enhanced recovery after surgery ensures the safety and efficiency in percutaneous nephrolithotomy while also promoting postoperative rehabilitation of patients such as postoperative hospital time, postoperative indwelling nephrostomy tube time, and lower complication rate.

First, the present study has some limitations, as do all research studies. As you said ‘the meta-analysis only included studies conducted in China. The specific implementation of the Enhanced Recovery After Surgery (ERAS) protocols can vary due to hospital policies and geographical locations, and different cultural beliefs and social factors in various regions may also affect

^aDepartment of Urology, Baoding No.1 Central Hospital, Baoding, Hebei, China,

^bProstate & Andrology Key Laboratory of Baoding, Baoding, Hebei, China,

^cDepartment of Urology, Affiliated Hospital of Hebei University, Baoding, Hebei, China, ^dPsychosomatic Medical Center, The Fourth People's Hospital of Chengdu, Chengdu, Sichuan, China, ^ePsychosomatic Medical Center, The Clinical Hospital of Chengdu Brain Science Institute, MOE Key Lab for Neuroinformation, University of Electronic Science and Technology of China, Chengdu, Sichuan, China, ^fDepartment of Medical Oncology, Affiliated Hospital of Hebei University, Hebei Key Laboratory of Cancer Radiotherapy and Chemotherapy, Baoding, Hebei, China, ^gDepartment of Urology, Urologic Surgery Center, Xinqiao Hospital, Army Medical University, Chongqing, China and ^hState Key Laboratory of Trauma and Chemical Poisoning, Third Military Medical University (Army Medical University), Chongqing, China

Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

*Corresponding author. Address: Department of Urology, Prostate and Andrology Key Laboratory of Baoding, Baoding No.1 Central Hospital, Changcheng North Street and Number 320, Baoding 071000, People's Republic of China. Tel.: +312 597 5015. E-mail: mnwkl@163.com (L. Liu), and E-mail: 18031296066@163.com (Q. Wang); Department of Urology, Urologic Surgery Center, Xinqiao Hospital, Army Medical University, Chongqing 400037, People's Republic of China. Tel.: +86 023 687 658 46. E-mail: jizheng023@aliyun.com (J. Zheng).

Copyright © 2024 The Author(s). Published by Wolters Kluwer Health, Inc. This is an open access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

International Journal of Surgery (2024) 110:6038–6042

Received 21 May 2024; Accepted 27 May 2024

Published online 10 June 2024

<http://dx.doi.org/10.1097/JS9.0000000000001771>

Table 1

Cochrane library search strategy

Search number	Search detail
#1	enhanced recovery after surgery (ti,ab,kw)
#2	enhanced postsurgical recovery (ti,ab,kw)
#3	postsurgical recoveries, enhanced (ti,ab,kw)
#4	postsurgical recovery, enhanced (ti,ab,kw)
#5	recovery, enhanced postsurgical (ti,ab,kw)
#6	ERAS (ti,ab,kw)
#7	FTS (ti,ab,kw)
#8	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7
#9	nephrolithotomy, percutaneous (ti,ab,kw)
#10	nephrolithotomies, percutaneous (ti,ab,kw)
#11	percutaneous nephrolithotomies (ti,ab,kw)
#12	percutaneous nephrolithotomy (ti,ab,kw)
#13	PCNL (ti,ab,kw)
#14	#9 OR #10 OR #11 OR #12 OR #13
#15	#8 AND #14

Table 2
Number of ERAS items adopted in preoperative interventions in the included RCTs.

References	Patient education/ counseling	Shortened fasting	Optimized diets	Prophylactic antibiotics
Zhang <i>et al.</i> ^[4]	✓	✓		
Yang <i>et al.</i> ^[5]	✓	✓	✓	
Ou <i>et al.</i> ^[6]	✓	✓	✓	
Chen <i>et al.</i> ^[7]	✓			
Li <i>et al.</i> ^[8]	✓	✓	✓	
Shen <i>et al.</i> ^[9]	✓	✓	✓	✓
Cai <i>et al.</i> ^[10]	✓	✓	✓	
Li <i>et al.</i> ^[11]	✓	✓	✓	✓
Zhang <i>et al.</i> ^[12]	✓	✓	✓	
Tan ^[13]		✓	✓	✓
Li ^[14]	✓	✓	✓	
Luo <i>et al.</i> ^[15]	✓	✓	✓	
Ma <i>et al.</i> ^[16]	✓	✓	✓	
Hou <i>et al.</i> ^[17]	✓	✓		
Zhuang <i>et al.</i> ^[18]	✓	✓	✓	
Zhou <i>et al.</i> ^[19]	✓	✓	✓	
Wei ^[20]	✓	✓	✓	
Mao <i>et al.</i> ^[21]	✓	✓		✓
Li <i>et al.</i> ^[22]	✓			
Yang ^[23]	✓	✓		
Lin <i>et al.</i> ^[24]				
Ma <i>et al.</i> ^[25]	✓			
Dong <i>et al.</i> ^[26]	✓		✓	✓
Chen <i>et al.</i> ^[27]	✓	✓		✓
Qiao <i>et al.</i> ^[28]	✓	✓		

patients’ compliance with ERAS recommendations’. First, in order to control biases generated by study retrieval and data extraction, we developed extensive search strategies in advance to yield as much information as possible. As well as a search of the English databases, we also searched the Chinese databases for our meta-analysis, including four English databases (Wan Fang database, Chinese Biomedical Literature Service System, Chinese National Knowledge Infrastructure, Chinese Science and Technology Journal Full Text Database) and four Chinese databases (PubMed, Embase, Cochrane Library, and Web of Science). In parallel, we also conducted comprehensive literature searches by hand-searching of grey literature. As we described in Literature search and inclusion criteria, we searched for relevant literature using subject terms and free words, and manual search in order to gather as much information as possible. The Cochrane Library search strategy is presented in Table 1. Second, to ensure the quality of the included studies and the reliability of the results, we determined and implemented strict inclusion and exclusion criteria. Finally, 25 studies^[4–28] from China were included in the final analysis after searching for well articles and screenings.

Secondly, Huang *et al.*^[2] indicated that random effects models should be used for analyses when significant heterogeneity was present, which is a robust method. However, there may also be residual confounding from unmeasured or incompletely measured covariates. Across different clinical trials, methodological designs vary, especially in subsequent patient care for our article, which may affect the outcome. To solve this doubt, each study’s management measures of enhanced recovery after surgery in the perioperative period has been documented and evaluated in detail. Sixteen items were included, and if the item was less than 6

Table 3
Number of ERAS items adopted in intraoperative interventions in the included RCTs.

References	Prophylactic antibiotics	Minimally invasive	Epidural anesthesia/ nonsteroidal analgesic painkillers	Intravenous fluid restriction	Prevention of hypothermia	Use of drainage tubes
Zhang <i>et al.</i> ^[4]		✓			✓	✓
Yang <i>et al.</i> ^[5]		✓				
Ou <i>et al.</i> ^[6]		✓		✓	✓	✓
Chen <i>et al.</i> ^[7]	✓	✓		✓	✓	✓
Li <i>et al.</i> ^[8]		✓		✓	✓	
Shen <i>et al.</i> ^[9]		✓				
Cai <i>et al.</i> ^[10]		✓				
Li <i>et al.</i> ^[11]	✓	✓	✓		✓	✓
Zhang <i>et al.</i> ^[12]		✓	✓	✓	✓	✓
Tan ^[13]		✓				✓
Li ^[14]	✓	✓				
Luo <i>et al.</i> ^[15]		✓			✓	✓
Ma <i>et al.</i> ^[16]		✓				✓
Hou <i>et al.</i> ^[17]		✓		✓	✓	✓
Zhuang <i>et al.</i> ^[18]	✓	✓	✓	✓	✓	✓
Zhou <i>et al.</i> ^[19]	✓	✓	✓			
Wei ^[20]		✓		✓	✓	✓
Mao <i>et al.</i> ^[21]	✓	✓	✓	✓	✓	✓
Li <i>et al.</i> ^[22]		✓				
Yang ^[23]		✓		✓	✓	✓
Lin <i>et al.</i> ^[24]		✓				✓
Ma <i>et al.</i> ^[25]		✓				✓
Dong <i>et al.</i> ^[26]	✓	✓	✓	✓	✓	✓
Chen <i>et al.</i> ^[27]	✓	✓		✓		✓
Qiao <i>et al.</i> ^[28]		✓			✓	✓

Table 4
Number of ERAS items a in postoperative interventions in the included RCTs.

References	Nonsteroidal analgesic painkillers	Intravenous fluid restriction	Early oral feeding	Early ambulation	Prophylactic medication	Early drainage tube removal	Total items
Zhang <i>et al.</i> ^[4]	✓			✓		✓	8
Yang <i>et al.</i> ^[5]	✓			✓	✓		7
Ou <i>et al.</i> ^[6]	✓		✓	✓		✓	12
Chen <i>et al.</i> ^[7]			✓	✓	✓	✓	10
Li <i>et al.</i> ^[8]	✓	✓	✓	✓	✓		11
Shen <i>et al.</i> ^[9]	✓		✓	✓			8
Cai <i>et al.</i> ^[10]	✓			✓			6
Li <i>et al.</i> ^[11]	✓	✓	✓	✓	✓		15
Zhang <i>et al.</i> ^[12]	✓	✓	✓	✓		✓	13
Tan ^[13]			✓	✓		✓	8
Li ^[14]	✓		✓	✓		✓	9
Luo <i>et al.</i> ^[15]			✓	✓		✓	9
Ma <i>et al.</i> ^[16]		✓	✓	✓	✓	✓	10
Hou <i>et al.</i> ^[17]	✓	✓	✓	✓	✓	✓	13
Zhuang <i>et al.</i> ^[18]	✓	✓	✓	✓	✓	✓	15
Zhou <i>et al.</i> ^[19]	✓			✓	✓		9
Wei ^[20]	✓		✓	✓			10
Mao <i>et al.</i> ^[21]	✓	✓	✓	✓		✓	14
Li <i>et al.</i> ^[22]							2
Yang ^[23]	✓		✓	✓		✓	11
Lin <i>et al.</i> ^[24]	✓		✓	✓	✓		6
Ma <i>et al.</i> ^[25]	✓						4
Dong <i>et al.</i> ^[26]	✓						11
Chen <i>et al.</i> ^[27]	✓		✓	✓			11
Qiao <i>et al.</i> ^[28]	✓						6

and missing either of the preoperative, intraoperative, and postoperative care phases when we performed subgroup analyses based on factors such as sample size and stone location, the study was excluded. Each item of enhanced recovery after surgery in the perioperative period was listed in Tables 2–4. Finally, three studies (Ma, 2014; Lin, 2015; Li, 2017)^[22,24,25] were excluded.

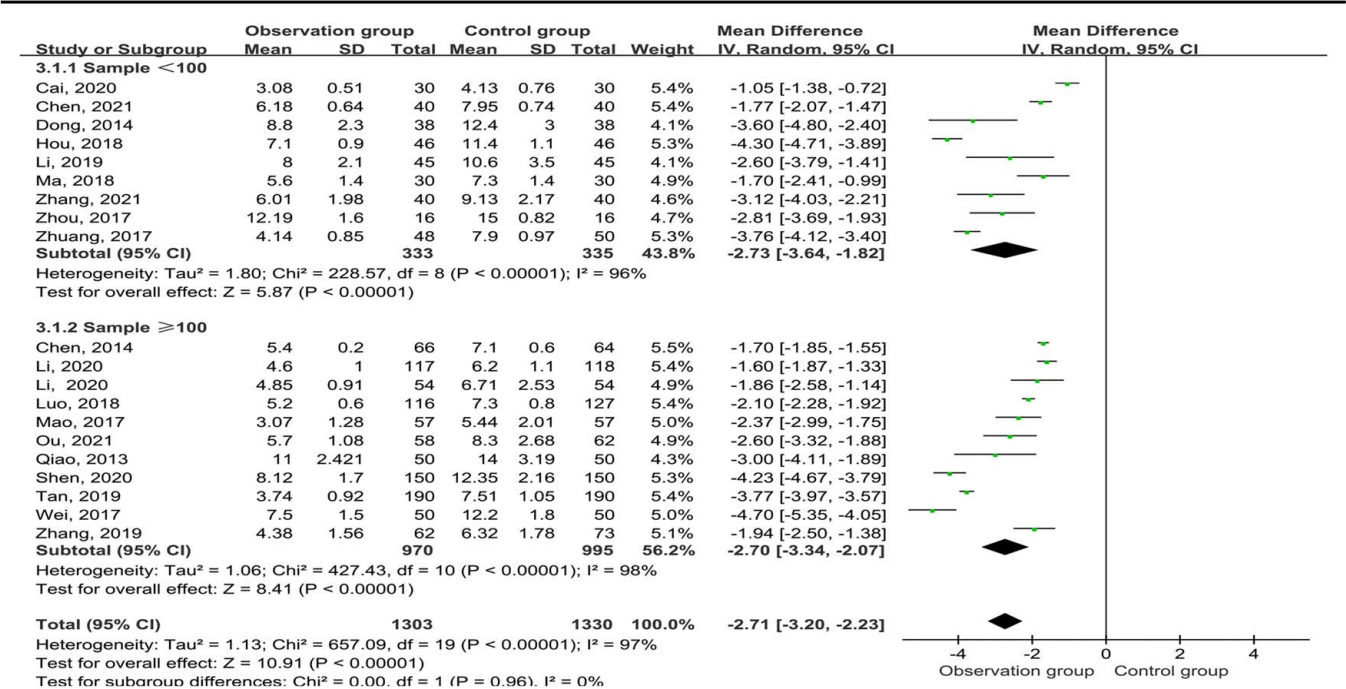


Figure 1. Forest plots showing postoperative hospital stay for subgroup analysis (according to sample size) in the observation and control groups.

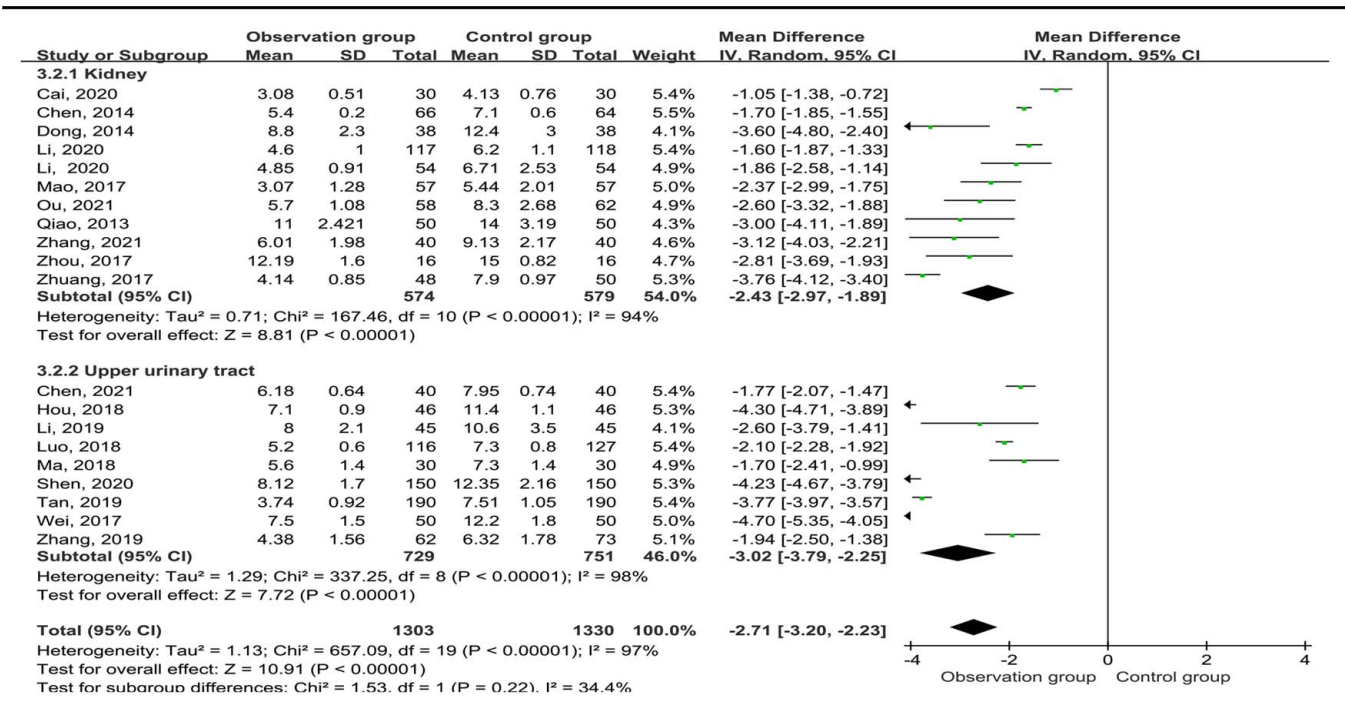


Figure 2. Forest plots showing postoperative hospital stay for subgroup analysis (according to stone location) in the observation and control groups.

Results showed large heterogeneity between studies about postoperative duration of hospital stay. We still divided the study population into subgroups based on sample size and stone location. Additionally, there were no significant differences between each subgroup's heterogeneity and that of the entire sample, and the results of each subgroup analysis were also consistent with the overall results (Figs 1,2). Thus, our results are relatively consistent and reliable. Therefore, we assumed that the differences in subsequent patient care might not be responsible for clinical heterogeneity between the included studies.

This study has limitations, as with any research. In view of this, we hope to see more RCTs and more studies with a greater number of subjects to further demonstrate the safety and efficacy of enhanced recovery after surgery in percutaneous nephrolithotomy.

Ethical approval

Ethical approval was not required

Consent

Not applicable.

Source of funding

Not applicable.

Author contribution

L.L., J.Z., and Q.W.: contributed substantially to the conception, design of the protocol, and critically revised the manuscript for intellectual content; L.A. and X.Y.: drafted the manuscript; L.L.,

Y.S., and Y.X.: drafted the manuscript and critically revised the manuscript for intellectual content.

Conflicts of interest disclosure

The authors declare no conflicts of interest.

Guarantor

Liang Liu.

Data availability statement

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Provenance and peer review

Not commissioned, internally reviewed.

Assistance with the study

Not applicable.

Presentation

Not applicable.

Acknowledgements

Not applicable.

References

- [1] Liu L, Xiao Y, Yue X, *et al.* Safety and efficacy of enhanced recovery after surgery among patients undergoing percutaneous nephrolithotomy: a systematic review and meta-analysis. *Int J Surg* 2024;110:3768–77.
- [2] Huang Y, Shen W, Han M, *et al.* Letter to the Editor: a commentary on 'safety and efficacy of enhanced recovery after surgery among patients undergoing percutaneous nephrolithotomy: a systematic review and meta-analysis'. *Int J Surg* 2024. doi:10.1097/JS9.0000000000001561
- [3] Tian Q, Wang H, Guo T, *et al.* The efficacy and safety of enhanced recovery after surgery (ERAS) Program in laparoscopic distal gastrectomy: a systematic review and meta-analysis of randomized controlled trials. *Ann Med* 2024;56:2306194.
- [4] Zhang H, Li Q, Chen W. Application of fast track surgery nursing based on evidence-based practice in percutaneous nephrolithotomy. *J Qilu Nursing* 2021;27:130–2.
- [5] Yang L, Wu X, Lai W. Application of fast track surgery nursing in percutaneous nephrolithotomy. *J Qilu Nursing* 2021;27:72–4.
- [6] Ou M, Li R, Lv F, *et al.* The effect of fast track surgery protocol combined with cluster nursing on postoperative outcomes in percutaneous nephrolithotomy. *J Qilu Nurs* 2021;27:29–30.
- [7] Chen M, Yan X, Wang H, *et al.* Influence of fast track surgery combined with postoperative predictive nursing on the prognosis condition of patients undergoing percutaneous nephrolithotomy. *China Modern Med* 2021;28:212–5.
- [8] Li Y, Yin Q, Ma X. ERAS concept in perioperative nursing of tubalss mPCNL: a clinical study. *J Urol Clin (Electronic Version)* 2020;12:42–5.
- [9] Shen L, Yang F, Long Y, *et al.* Application of enhanced recovery after surgery in the perioperative period of urolithiasis. *Chinese Community Doctors* 2020;36:17–8.
- [10] Cai J, Wang Z, Gao X, *et al.* Application effect of nursing intervention based on ERAS nursing concept in patients with renal stone surgery. *J Gannan Med Univ* 2020;40:964–6.
- [11] Li Q, Wan L, Liu S, *et al.* Clinical efficacy of enhanced recovery after surgery in percutaneous nephrolithotripsy: a randomized controlled trial. *BMC Urol* 2020;20:162.
- [12] Zhang H, Mao P, Jiang T, *et al.* Application of enhanced recovery after surgery in percutaneous nephrolithotomy. *J Fujian Med Univ* 2019;53:187–90.
- [13] Tan L. Rapid rehabilitation surgical nursing for patients after percutaneous nephrolithotomy holmium laser lithotripsy. *China Med Pharmacy* 2019;9:153–6.
- [14] Li W. The effect of fast track surgery nursing in postoperative rehabilitation of upper urinary stone patients. *Chinese J Rural Med Pharmacy* 2019;26:60–1.
- [15] Luo, Chen X H, Li W, *et al.* Efficacy of enhanced recovery after surgery in minimally invasive percutaneous nephrolithotomy. *Chinese J Endourol* 2018;12:240–3.
- [16] Ma Y, Chen D, Chang F. Application of fast track surgery concept in perioperative nursing of percutaneous nephrolithotomy. *J Bengbu Med College* 2018;43:547–9.
- [17] Hou Y, Bai L, Liu C, *et al.* Effect of nursing intervention based on FTS concept on postoperative rehabilitation and nursing satisfaction of patients with upper urinary calculi. *Chin General Practice* 2018;21(z1):418–20.
- [18] Zhuang G, Yu L, Dong L, *et al.* Application of enhanced recovery after surgery on percutaneous nephrolithotomy. *Chin J Front Med Sci (Electronic Version)* 2017;9:12–5.
- [19] Zhou H, Liu J. Efficacy analysis of the clinical application of ERAS nursing concept in patients with percutaneous nephrolithotomy. *Chinese J General Practice* 2017;15:2145–7.
- [20] Wei Z. Application of FTS concept in perioperative nursing of percutaneous nephrolithotomy. *Chinese Community Doctors* 2017;33:133–4.
- [21] Mao Y, Chen J, Luo M, *et al.* Application of fast track surgery concept in the treatment of percutaneous nephrolithotomy during the perioperative period. *Chinese J Woman Child Health Res* 2017;28(S3):612–3.
- [22] Li F, Zhang M, Feng Q, *et al.* Application of fast track surgery concept to the nursing of patients undergoing superminimally invasive percutaneous nephrolithotomy. *Int J Nurs* 2017;36:1430–3.
- [23] Yang J. Observation of complications and nursing countermeasures after percutaneous nephrolithotomy. *China Practical Med* 2015;10:254–5.
- [24] Lin Y, Qiu J, Lin N, *et al.* Rapid rehabilitation surgical nursing for patients after percutaneous nephrolithotomy holmium laser lithotripsy. *Int J Nursing* 2015;34:2437–9.
- [25] Ma L, Chen J, Li X. The effect of fast-track surgery on anxious in percutaneous nephrolithotomy. *Guangdong Med J* 2014;35:1969–70.
- [26] Dong C, Fu W, Fu Y, *et al.* Application of fast-track surgery in perioperative nursing of patients with percutaneous nephrolithotomy lithotomy with upper-pole access. *Chinese J Modern Nursing* 2014;20:2102–5.
- [27] Chen X, Cai M, Qiu L, *et al.* Application of fast track surgery concept plus traditional Chinese medicine nursing in the treatment of percutaneous nephrolithotomy. *Chinese J Geriatric Care* 2014;12:96–8.
- [28] Qiao G, Wang Y, Xing L, *et al.* Fast-track surgery in percutaneous nephrolithotomy nursing application. *Chinese J Endourol (Electronic Edition)* 2013;7:41–3.