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Visualization Analysis of Research Hotspots on Traditional Chinese Medicine for Prevention and Treatment of Postoperative Urinary Retention Based on CiteSpace

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Abstract

Objective: To understand the research hotspots and development trends of TCM in the prevention and treatment of postoperative urinary retention. **Methods:** Relevant literature on TCM for preventing and treating postoperative urinary retention from January 1, 2002 to December 31, 2022 was retrieved from CNKI, Wanfang, VIP, and the Chinese Biomedical Literature Database. NoteExpress was used for merging and deduplication, and CiteSpace 6.2.R3 software was employed for visual analysis of authors, institutions, and keywords to generate knowledge mapping. **Results:** A total of 1,769 articles were included, showing an overall upward trend in publication volume. The journal with the most publications was ‘Chinese Journal of Coloproctology’ (61 articles). The most prolific author was Li Chungeng (7 articles). A total of 511 institutions were included, with Tangshan Hospital of Traditional Chinese Medicine being the most productive institution. A total of 638 keywords were included; those with high frequency and betweenness centrality included TCM nursing, acupuncture therapy, mixed hemorrhoids, auricular acupressure, and efficacy. **Conclusion:** Research hotspots in TCM for preventing and treating postoperative urinary retention mainly focus on clinical observation and efficacy application of external TCM therapies for urinary retention after gynecological/obstetric and colorectal surgeries, promoting rapid patient recovery and improving quality of life. However, the research lacks high-quality literature and related mechanism studies. Future studies could further explore mechanism research and conduct multi-center, large-sample, high-quality clinical studies to provide theoretical basis for clinical prevention and treatment of postoperative urinary retention.

Full Text

Visualization Analysis of Research Hotspots in Traditional Chinese Medicine for Prevention and Treatment of Postoperative Urinary Retention Based on CiteSpace

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Abstract

Objective: To understand the research hotspots and development trends in the prevention and treatment of postoperative urinary retention (POUR) using traditional Chinese medicine (TCM).

Methods: Literature related to TCM prevention and treatment of POUR published between January 1, 2002 and December 31, 2022 was retrieved from CNKI, Wanfang, VIP, and the China Biomedical Literature Database. NoteExpress was used to merge and deduplicate records, and CiteSpace 6.2.R3 software was employed to conduct visual analysis of authors, institutions, and keywords, generating knowledge maps.

Results: A total of 1,769 articles were included, showing an overall upward publication trend. The most prolific source journal was *China Journal of Anorectal Diseases* (61 articles). The most productive author was Li Chungeng (7 articles). A total of 511 institutions were included, with Tangshan Hospital of Traditional Chinese Medicine being the most productive. Among 638 keywords, those with high frequency and betweenness centrality included TCM nursing, acupuncture therapy, mixed hemorrhoids, auricular point pressing with beans, and therapeutic efficacy.

Conclusion: Research hotspots in TCM prevention and treatment of POUR primarily focus on clinical observation and efficacy application of external TCM therapies for postoperative urinary retention in obstetrics/gynecology and anorectal surgery, promoting rapid patient recovery and improving quality of life. However, the field lacks high-quality literature and mechanism studies. Future research should further explore underlying mechanisms and conduct multi-center, large-sample, high-quality clinical studies to provide theoretical foundations for clinical prevention and treatment of POUR.

Keywords: Traditional Chinese Medicine; Postoperative urinary retention; Bibliometrics; CiteSpace

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Postoperative urinary retention (POUR) is primarily characterized by bladder distension and inability to void normally after surgery, often accompanied by pain and fullness in the bladder region [1]. It is a common complication following anorectal, orthopedic, and obstetric/gynecological surgeries, with incidence rates reaching as high as 70% [2]. The occurrence of urinary retention directly impacts postoperative quality of life and increases psychological burden. Currently, prevention of POUR remains a challenge in modern medicine [3, 4]. In terms of treatment, modern medicine typically employs indwelling catheterization, which can lead to complications such as urinary tract infections and injuries, causing patient discomfort [5]. Traditional Chinese medicine offers advantages in preventing and treating POUR, including safety, reliability, minimal trauma, and fewer adverse reactions [6], and has demonstrated significant clinical efficacy. However, comprehensive knowledge mapping analyses in this field are scarce. Therefore, this study employs CiteSpace software and its principles [7] to generate and analyze knowledge maps of authors, institutions, and keywords from relevant literature, exploring research hotspots and scientific frontiers to provide references for future studies [8].

1.1 Data Sources and Search Strategy

Literature on TCM prevention and treatment of POUR was retrieved from CNKI, VIP, Wanfang, and the China Biomedical Literature Database. Search terms included “urinary retention,” “dysuria,” “voiding dysfunction,” “urodialysis” (癃闭), and “postoperative.” The subject areas were limited to “integrated traditional Chinese and Western medicine,” “traditional Chinese medicine,” and “Chinese materia medica,” with document type set as “academic journal.” The search timeframe was from January 1, 2002 to December 31, 2022, yielding 1,769 included articles. Inclusion criteria: topic-related journal articles. Exclusion criteria: dissertations, conference papers, newspaper articles, etc.

1.2 Data Analysis

CiteSpace 6.2.R3 software was used to conduct visual analysis of authors, institutions, and keywords from the 1,769 articles, generating knowledge maps. Software parameters: time span set from January 1, 2002 to December 31, 2022, time slice set to “1” year, node types selected as author, institution, and keyword, with remaining parameters set to default.

2.1 Publication Volume Distribution

As shown in [Figure 1: see original paper], a total of 1,769 articles were included. Over the past two decades, publications on TCM prevention and treatment of

POUR have shown a fluctuating upward trend, peaking in 2016 with 132 articles. Based on publication patterns, the field's development can be divided into three phases: 2002-2005 showed slow growth; 2006-2013 was a period of rapid growth; and 2014-2022 remained relatively stable, consistently maintaining over 90 articles annually, indicating that TCM prevention and treatment of POUR has remained a sustained research focus.

2.2 Author Collaboration Visualization

[Figure 2: see original paper] reveals that among the 1,769 articles, there were 573 authors. According to Price's law [9], M (number of papers) 1.98 , thus authors with $\$2$ publications were considered core authors. A total of 125 core authors published 271 articles, accounting for 15.3% ($271/1,769$) of all literature—below the 50% threshold, indicating that no distinct core author team has formed in this field.

The most prolific author was Li Chungeng (7 articles), followed by Kong Xianguyun, Wang Jianmin, Fu Tigao, and Fu Huazhi (4 articles each). These high-output authors had not formed research teams, suggesting limited collaboration. Although other authors had lower individual output, four small teams had emerged, led by Chen Rutao, Chen Aixia, Li Zexun, and Zhang Junjing. While internal connections existed within teams, inter-team collaboration was minimal, indicating that the field has yet to develop a tight-knit author collaboration network.

2.3 Institutional Collaboration Visualization

shows that 12 institutions published $\$6$ articles. Tangshan Hospital of Traditional Chinese Medicine was the most productive institution in POUR prevention and treatment. Chengdu University of Traditional Chinese Medicine began research in this field relatively early (2003). Additionally, a cross-regional collaboration network had formed among Hunan University of Traditional Chinese Medicine, Chongqing University of Traditional Chinese Medicine, and Chengdu University of Traditional Chinese Medicine (see [Figure 3: see original paper]). Other regional networks showed limited connections, with most institutions conducting independent research or collaborating only between universities and their affiliated hospitals.

** Institutions with $\$6$ Publications**

Institution	Publications	Start Year
Tangshan Hospital of Traditional Chinese Medicine	-	-

Institution	Publications	Start Year
Chengdu University of Traditional Chinese Medicine	-	2003
Shuguang Hospital Affiliated to Shanghai University of Traditional Chinese Medicine	-	-
Guangdong Provincial Hospital of Traditional Chinese Medicine	-	-
Longhua Hospital Affiliated to Shanghai University of Traditional Chinese Medicine	-	-
Nanjing University of Traditional Chinese Medicine	-	-
Hunan University of Traditional Chinese Medicine	-	-
Affiliated Hospital of Jiangxi College of Traditional Chinese Medicine	-	-
Guang'anmen Hospital, China Academy of Chinese Medical Sciences	-	-
Urumqi Hospital of Traditional Chinese Medicine	-	-
Hebei Provincial Hospital of Traditional Chinese Medicine	-	-
Zhejiang Provincial Hospital of Traditional Chinese Medicine	-	-

2.4 Keyword Co-occurrence Analysis

The keyword co-occurrence map contained 638 nodes and 881 connections, with a network density of 0.0043, indicating relatively close connections among key-

words (see [Figure 4: see original paper]). Keyword co-occurrence analysis can identify research hotspots and directions; higher frequency indicates greater attention, and higher betweenness centrality (0.1) indicates greater influence.

presents the top 20 keywords by frequency and betweenness centrality. Keywords with both high frequency and centrality included TCM nursing, acupuncture therapy, mixed hemorrhoids, auricular point pressing with beans, therapeutic efficacy, and moxibustion therapy, demonstrating that TCM nursing and external TCM therapies have remained research hotspots. Researchers primarily focused on clinical efficacy studies of TCM nursing and external therapies for patients with POUR related to conditions such as mixed hemorrhoids, anorectal diseases, and cervical cancer.

2.5 Keyword Clustering

Keyword clustering reveals popular research directions in TCM prevention and treatment of POUR. Clustering analysis yielded $Q=0.8767$ and $S=0.9154$, indicating significant and efficient clustering (see [Figure 5: see original paper]).

shows that clusters #0, #1, #8, and #13 had high silhouette values, indicating tight internal keyword connections and demonstrating that keywords such as electroacupuncture, acupoint application, Zhongji (CV3), Shenque (CV8), and Baihuanshu (BL30) are widely applied in POUR prevention and treatment.

Specifically, #0 urinary retention, #5 complications, #3 clinical observation, #6 therapeutic efficacy, #7 prevention, and #10 treatment explored main research content; #1 electroacupuncture, #11 acupuncture, #12 Chinese medicine, #13 acupoint application, and #14 moxibustion examined primary intervention methods; #4 Zusanli (ST36) and #9 Sanyinjiao (SP6) addressed important acupoints for disease treatment; and #2 quality of life focused on main evaluation methods.

** Keyword Cluster List**

Silhouette Value	Cluster Content (LLR)
-	并发症; 肛肠疾病; 电针治疗; 尿潴留
-	尿潴留; 术后尿潴留; 并发症; 癃闭
-	电针; 穴位; 宫颈肿瘤; 白环俞
0.908	针灸; 临床研究; 按摩; 腰椎
-	中药; 关元穴; 大蒜; 外敷
0.956	艾灸; 护理; 中医护理; 热敷
Cluster ID	Cluster Label

2.6 Keyword Timeline

The timeline view intuitively displays keyword evolution within clusters over time, with keywords from the same cluster on the same horizontal line and

more recent time points on the right. [Figure 6: see original paper] shows that clusters #1, #2, #3, #4, #5, #6, #7, #8, and #11 span nearly the entire timeframe, indicating that future research will continue focusing on electroacupuncture, acupuncture, Zusanli, quality of life, and efficacy analysis. In recent years, thumb-tack needles, rapid rehabilitation, rehabilitation training, and herbal compress therapy have emerged as current research frontiers and trends.

2.7 Keyword Burst Analysis

Keyword burst analysis reflects the degree of attention received by keywords during specific periods. Burst strength (Strength) indicates attention level, with higher values representing greater focus. [Figure 7: see original paper] shows that the keyword with the highest burst strength was “treatment” (10.53), indicating that clinical studies and efficacy observation remain the primary focus in TCM POUR research. Acupuncture therapy (10.31), moxibustion (9.47), and acupoint application (8.34) represent external TCM therapies with high research interest and constitute research hotspots. Sanyinjiao (6.38) is an important acupoint in POUR prevention and treatment. Research hotspots in the past 3-5 years have included acupoint application, quality of life, mixed hemorrhoids, cesarean section, pain, and thunder-fire moxibustion. Recent research has concentrated on applying external TCM therapies to prevent and treat POUR, alleviate pain and anxiety, improve quality of life, and promote rapid patient recovery.

The etiology of urinary retention is complex, and its specific mechanisms remain unclear. Modern medicine suggests that POUR may be related to anesthesia factors, surgical stimulation, psychological factors, anal pain, and changes in voiding habits [10]. This common postoperative complication varies in incidence across surgical populations; studies indicate rates of 9.5% after inguinal hernia repair [11], 14.8% within 24 hours after hemorrhoid surgery, and 17-42% after radical hysterectomy [12]. Advanced age, anesthesia type, male gender, operative time, and history of benign prostatic hyperplasia are important risk factors [13, 14]. Current modern medical treatments primarily include indwelling catheterization, rehabilitation training, and medication, but outcomes are often unsatisfactory with complications such as infection [15].

TCM emphasizes treating the root cause, values the preventive concept that “nurturing before illness is superior to treating after,” and stresses “preventive treatment” and syndrome-based therapy. Urinary retention falls under the category of “urodialysis” (癃闭) in TCM, with pathological location in the bladder and close relationships with the lung, spleen, kidney, and triple burner [16]. TCM theory attributes POUR to postoperative meridian damage, qi-blood stagnation, or blood loss during surgery leading to qi-blood deficiency, resulting in dysfunction of bladder, kidney, and triple burner qi transformation [17]. The *Suwen • Linglan Secret Canon* states: “The bladder is the official of the capital, where fluids are stored; qi transformation enables discharge.” Therefore, the

prevention and treatment principle focuses on relaxing muscles and meridians, activating blood and resolving stasis, promoting diuresis and opening orifices, and regulating the triple burner [18]. Currently, TCM prevention and treatment of POUR remains a research hotspot due to its clear efficacy, minimal adverse reactions, and ability to improve bladder function. This study employs CiteSpace software to statistically analyze relevant literature, elucidating development status and trends from perspectives of publication volume, authors, institutions, keyword co-occurrence, clustering, and burst analysis.

3.1 Research Overview

Publication volume analysis reveals an overall upward trend, indicating sustained attention to TCM prevention and treatment of POUR with continuously emerging achievements and diversified research content, including clinical efficacy observation, data mining, and experience summarization. However, the field lacks studies on disease and treatment mechanisms, standardized efficacy evaluation, and clinical guidelines or consensus. While TCM demonstrates clear advantages in POUR prevention and treatment, experts have not yet reached unified diagnostic and treatment opinions, and reliable evidence-based medical evidence is lacking. Future research should address these gaps by developing relevant diagnostic and treatment standards to provide theoretical foundations for clinical practice.

From author collaboration networks, high-output authors have not formed their own teams, and inter-author communication is limited, hindering disciplinary progress. Therefore, future multi-center collaboration needs strengthening. Institutional collaboration maps show minimal cooperation between teams; future academic exchange and research collaboration between institutions should be enhanced to increase multi-center, large-sample randomized controlled trials, deepen and broaden research, and promote field development.

3.2 Research Hotspots

Research hotspots in TCM prevention and treatment of POUR can be summarized in several main areas: First, clinical efficacy studies of acupuncture. Keyword visualization results show that “acupuncture” and “moxibustion” serve as important nodes in TCM POUR prevention and treatment, with wide clinical application. This indicates that acupuncture plays a key role in POUR prevention and treatment. Keyword clustering results further demonstrate that acupuncture modalities such as electroacupuncture and moxibustion show good efficacy and remain research hotspots. The primary reason is that acupuncture can unblock meridians, relieve pain, improve pelvic nerve function, alleviate urethral sphincter spasm, and promote bladder qi transformation recovery [19, 20]. Liu Huaru et al. [21] applied acupuncture, warm acupuncture, combined acupuncture, and medication to 120 post-anorectal surgery patients, finding that acupuncture groups effectively reduced post-void residual urine volume.

Additionally, research shows electroacupuncture has significant advantages in POUR prevention and treatment. Long Qing et al. [22] applied electroacupuncture 30 minutes preoperatively to 40 mixed hemorrhoid patients, demonstrating that electroacupuncture pretreatment effectively reduced POUR incidence and shortened time to first postoperative voiding compared to simple induced voiding.

Second, research on key acupoints for TCM POUR prevention and treatment currently focuses on the lower abdomen, primarily combining abdominal acupoints with distal points. Abdominal acupoints focus on Zhongji (CV3) and others, while distal points emphasize Zusanli (ST36) and Sanyinjiao (SP6). Zhongji, the bladder's front-mu point, can treat bladder disorders, strengthen kidney qi, and regulate the three yin channels, making it a key acupoint for POUR prevention and treatment. Long Qing et al. [23] used auricular thumb-tack needles combined with acupoint application for mixed hemorrhoid postoperative urinary retention, showing that applying plasters to Zhongji, Guanyuan (CV4), and Qihai (CV6) combined with auricular needles on bilateral ear points (kidney, bladder, triple burner, ureter) effectively shortened time to first voiding and reduced POUR incidence. Studies also show lower extremity acupoint selection has been widely applied in POUR clinical research with effects comparable to abdominal points [24]. Research indicates Sanyinjiao is the most commonly used acupoint for improving cervical cancer-related POUR [25]. As the intersection point of the three foot-yin meridians belonging to the spleen channel, water metabolism is closely related to the lung, spleen, and kidney. Acupuncture at Sanyinjiao can strengthen the spleen, promote diuresis, and assist in regulating water movement, making it an essential point for promoting urination [26]. The *Lingshu Jing* records: "Lower abdominal pain and swelling with inability to urinate, evil in the triple burner, take Zusanli." Located on the foot-yangming stomach meridian, Zusanli has functions of supplementing middle qi, unblocking qi mechanism, and guiding qi downward [27], and can also regulate the triple burner to facilitate urination, playing a role in "treating internal organs at he-points." Research shows [28] that acupuncture for anorectal disease POUR patients using Zusanli as the main point combined with other acupoints can excite bladder smooth muscle and facilitate urination. Moreover, acupuncture at Zusanli not only can dry dampness, strengthen the spleen, and unblock bladder qi transformation, but also supplement qi-blood and body fluids consumed during surgery [15].

3.3 Development Trends

A research field's frontiers and development trends can be reflected through keyword burst analysis [29]. Combined with burst and timeline results, from 2002-2009 the field evolved from initial stages to clinical efficacy studies of acupoint injection and acupuncture therapies. With the rise of the "preventive treatment" concept, researchers gradually applied electroacupuncture, moxibustion, and auricular point pressing to prevent POUR. From 2017 to present, with

improving medical standards, healthcare providers have increasingly focused on postoperative complications. How to prevent postoperative complications and improve patients' quality of life has become a future research trend. In recent years, acupoint application, thunder-fire moxibustion, and thumb-tack needles have received widespread attention, and future research can explore more effective external TCM therapies and herbal medicines for this field. Regarding diseases, postoperative pain, cesarean section, and mixed hemorrhoids have also attracted researchers' attention, though currently only some researchers have focused on disease etiology, pathogenesis, and syndrome patterns. Future research can apply syndrome-based treatment and nursing according to each disease's etiology, pathogenesis, and syndrome patterns to reduce complications and improve quality of life.

In summary, external TCM therapies play a pivotal role in POUR prevention and treatment. Researchers continue exploring additional external TCM therapies such as thumb-tack needles and thunder-fire moxibustion for this field, indicating substantial research prospects. However, current POUR research primarily focuses on prevention and treatment, with scarce mechanism studies. Future research should further explore disease and treatment mechanisms and conduct multi-center, large-sample, high-quality clinical studies to provide theoretical foundations for clinical POUR prevention and treatment.

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