



(Re)defining nurse and patient roles in routine postoperative neurosurgical care: empowering autonomy and strengthening collaborative roles

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Chapter 8

General Discussion

This dissertation builds upon the historical importance of urine monitoring, a cornerstone of medical practice for millennia, and underscores the critical role of urinary catheterization in this process. The management of urinary catheters in patients undergoing neurosurgery, particularly transsphenoidal pituitary surgery, is complex and multifaceted (1). The challenges associated with urinary catheter use have been well-documented in the literature, which consistently emphasizes the need for a balanced approach that considers both clinical guidelines, complications and the unique needs of individual patients (2). This dissertation aims to transform critical gaps in postoperative neurosurgical care by proposing a nurse-led, patient-centered approach to urine monitoring and urinary catheter management, particularly after transsphenoidal pituitary and spondylodesis surgery. The goal is to enhance clinical practices, reduce complications, improve the patient experience, and empower both nurses and patients in the decision-making process.

Fluid management and decision-making dynamics

For patients undergoing transsphenoidal pituitary surgery, precise fluid balance management is essential due to the risk of developing AVP-D in the immediate postoperative phase (3, 4). Managing this risk effectively requires more than routine catheterization practices; it calls for a nuanced approach to the timing and removal of IDUCs. **Chapter 2** delves into the complex decision-making surrounding the timing of IDUC removal, a process influenced by multiple factors such as the need to prevent UTIs, maintain fluid balance, and manage nursing workload. This chapter focusses on both physicians and nurses as historically, catheter management has been the domain of physicians, with nurses in supporting roles. However, this chapter challenges the status quo, highlighting that nurse-led management can yield significant benefits by showing that nurses are uniquely positioned to lead in decisions on catheter removal due to their ongoing patient contact and monitoring responsibilities. Shifting catheter management from physician-driven to nurse-driven not only aligns with broader healthcare trends toward more efficient and patient-centered care but also supports literature showing that nurse-led protocols improve patient outcomes across healthcare settings (5).

Studies indicate that nurse-driven protocols are especially effective in high-risk environments, where the continuous patient interaction that nurses provide enhances decision-making quality (6)(6). By empowering nurses to lead in catheter management, these protocols encourage more flexible, responsive care that adapts to patient-specific needs, striking a balance between clinical guidelines and real-time adjustments (7).

Psychological and physical impact of urinary catheterization

Patient-centered care has become a cornerstone of quality healthcare, yet patients are often left out of key decisions, including urinary catheter use after transsphenoidal pituitary surgery, which we demonstrated in chapter 2. This exclusion can lead to discomfort and decreased satisfaction with care (8). To address the experiences from patients, **Chapter 3** delves into their perspectives, highlighting the psychological and physical challenges that catheterization poses. Many patients report discomfort, anxiety, a perceived lack of control and little knowledge of the rationale for IDUC placement, suggesting a need for greater involvement in decisions that impact their care experience (9). This aligns with existing literature indicating that there is often a lack of patient knowledge regarding the indication for urinary catheterization, and that patients generally do not express whether the urinary catheter can be removed (10). Therefore, we propose that patients should be more actively involved in the decision making process to work towards more collaborative care that enhances both physical and psychological

well-being. This proposal is supported by research that supports the idea that patients who are actively involved in their care decisions experience lower anxiety levels and greater satisfaction, contributing positively to their recovery process (11, 12). By informing patients about the risks and benefits of catheter use and involving them in decisions regarding removal, healthcare teams can help patients feel more in control, enhancing their immediate comfort and supporting long-term recovery (8).

Preventing complications through early removal

One of the most critical aspects of urinary catheter management is the timing of removal, as extended catheter use correlates with higher risks of infection and other complications (2). However, this decision must be carefully balanced against potential risks such as urinary retention and residue, particularly in hospitalized patients who require ongoing urine monitoring (13). Despite evidence supporting early removal, there has been limited research from a nursing perspective on the specific timing of postoperative catheter removal and its consequences. **Chapter 4** provides a systematic review of early catheter removal, demonstrating that this practice leads to reductions in CAUTIs, shorter hospital stays, and enhanced patient mobility. These findings advocate for early removal as a preventive care strategy, particularly within a nurse-driven framework. Early removal is a proactive approach that aligns with preventive healthcare principles and underscores the benefits of addressing risks before they manifest (19, 20). Early removal of indwelling urinary catheters IDUCs has been shown to be effective and cost-saving by reducing expenses associated with extended hospitalizations and infection management (14).

Standardized nurse-driven protocols

Consistency in catheter management is critical for delivering high-quality care across healthcare settings. Also, as described in chapter 4, since there are risks associated with urinary catheterization, it is important to ensure that catheters are inserted only when necessary (2). **Chapter 6** presents a study conducted across multiple hospitals aimed at reducing inappropriate urinary catheter use by introducing a standardized protocol nurse-led protocol for perioperative and postoperative care in patients undergoing pituitary and spinal fusion surgeries. By emphasizing the role of nurses in leading catheter-related decisions, this study offers a framework for integrating nursing expertise into clinical practice. These insights empower nurses with the knowledge and tools to take an active role in improving outcomes, while also advancing their professional development and confidence in managing complex clinical situations.

This research demonstrated that the introduction of this new protocol significantly reduced the number of urinary catheters used, which underscores the importance of standardizing care to reduce variations in practice that can lead to discrepancies in patient outcomes. By adopting nurse-led protocols, healthcare facilities can achieve greater consistency, ensuring that all patients receive optimal care (15). In addition to a reduction in the number of urinary catheterizations, it has also been shown that standardized protocols can reduce the incidence of catheter-associated UTIs (6). While our study did not find a statistically significant reduction in infection rates, the results are promising and suggest potential for future improvements. However, it is important to acknowledge that reducing variability in practice should not come at the expense of clinical judgment. There are situations where deliberate deviations from the standard protocol—based on patient-specific needs and clinical expertise—are both necessary and beneficial.

One of the key elements in the successful implementation of the standardized protocol in **Chapter 6** was the role of “local champions.” These champions—senior nurses who advocated for and supported adherence to the protocol—played a crucial role in driving change and ensuring that the protocol was effectively integrated into daily practice. The value of local champions is well-documented, with research showing that they facilitate adherence reduce resistance to change, and foster a culture of continuous improvement (16). This highlights the importance of incorporating local champions into the implementation of other protocols and innovations, particularly within nursing practice.

Empowering patients

In addition to fluid balance monitoring, postoperative assessment of urine concentration—particularly urine SG—is vital after pituitary surgery, as SG serves as a key indicator for detecting AVP-D (17). Traditionally managed by nurses, patients often lack insight into these values. However, research highlights that when patients actively participate in their care, adherence and outcomes improve (18). Integrating patient involvement also reduces healthcare burdens and enhances quality (19). **Chapter 7** explores self-monitoring of SG through urine test strips, showing that trained patients can accurately monitor SG in over half of cases. This shift allows patients to take greater control over their care, while also transforming the nurse’s role from primarily executing measurements to one of oversight and support. This supports a shift toward patient-driven monitoring, enhancing autonomy and aligning with evidence on the safety and feasibility of patient-centered approaches (20).

Limitations and future directions

While this thesis offers valuable insights into the management of urine monitoring in neurosurgical patients, several limitations must be acknowledged. First, the generalizability of the findings may be constrained by the specific patient population studied, which predominantly includes individuals undergoing pituitary surgery. The unique characteristics of this group, such as the possibility of developing the complication AVP-D, may not fully represent the broader hospitalized patient population. However, our findings can serve as a model adaptable to the specific needs of diverse patient groups, and the experiences gained from these studies can inform future research design. For example, these strategies could be adapted for orthopedic and general surgery patients, where individualized fluid management protocols are also likely to improve outcomes. Implementing these protocols across different healthcare environments would require comprehensive training programs, ongoing institutional support, and further research to validate effectiveness across diverse patient populations.

Second, this thesis primarily focusses on the immediate postoperative period, with less emphasis on long-term outcomes. While effective urine monitoring is crucial during the early stages of recovery, understanding the long-term impact of these interventions is equally important. Future research should address these limitations by exploring the extended effects of urine monitoring and urinary catheter management strategies.

Third, digital health technologies offer promising ways to extend patient-centered care beyond hospital settings, yet several limitations remain. Practical implementation challenges—such as patient adherence, varying accuracy of self-reported data, and accessibility—may hinder the reliability of these tools. Chapter 7’s examination of home urine test strips for specific gravity monitoring reveals that patient self-monitoring may not fully substitute clinical assessments, as it depends heavily on patient engagement and

accurate testing. This limitation suggests that digital solutions might not consistently detect complications like AVP-D, potentially delaying necessary interventions. Future research should rigorously evaluate the effectiveness of digital health tools in supporting patient participation and health outcomes, focusing on factors that influence adherence and the accuracy of self-monitoring practices. Studies could also explore systems that combine digital self-monitoring with remote clinical support, ensuring that nurse-led, patient-centered care remains safe, effective, and beneficial for long-term patient engagement and healthcare resource management.

Conclusion: a new standard in postoperative care

This dissertation proposes a transformative approach to postoperative care that redefines the roles of nurses and patients in urinary monitoring and catheter management. By advocating for nurse-led, patient-centered protocols, this work contributes to a new standard in healthcare—one that prioritizes preventive care, collaboration, and patient empowerment. The findings of this research lay the groundwork for broader adoption of these protocols, not only in neurosurgical settings but across other specialties where urine monitoring is essential to recovery. Empowering nurses as decision-makers and engaging patients as active participants represent more than minor adjustments to current practices; they introduce a fundamental shift toward a healthcare model that is responsive, dynamic, and ultimately more effective. By encouraging the widespread adoption of nurse-led, standardized protocols, healthcare systems can improve clinical outcomes, reduce the incidence of complications, and optimize resource use.

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