A Step Towards Automated and Standardized Bladder Irrigation: A First Evaluation of the *filax*ONE Monitoring System

Anna Czarniawska[1], Dominik Abt[1], Kurt Ruffieux[2], Jennifer Blarer[1], Roland Seiler[1]

[1]Department of Urology, Spitalzentrum Biel, Switzerland
[2] Filax Medical AG, Basel

Spitalzentrum Centre hospitalier Biel-Bienne

Introduction and Mechanism of the filaxONE Catheter Irrigation System

filaxONE is an innovative digital management system designed for postoperative bladder irrigation (Fig. 1). It continuously monitors irrigation in the background, relieving nursing staff by providing real-time alerts and complete digital documentation. The system uses advanced sensor technology to record irrigation duration, fluid bag changes, urine output, and even detects changes in irrigation fluid color, which may indicate complications.

Key features include:

- Load-cell sensors for up to two 5L irrigation bags and one 5L urine bag
- Integrated color sensor for monitoring irrigation fluid discoloration
- Wireless, battery-powered operation with up to 100 hours runtime
- Secure digital data transmission and hospital information system (HIS) compatibility
- Central and decentralized monitoring stations for nursing workflow optimization

Fig. 1: filaxONE monitoring system

Background and Objectives

Postoperative bladder irrigation is a standard procedure after urological surgeries such as TURBT and HoLEP. Traditional manual systems require constant supervision, which increases staff workload and creates variability. The study aimed to clinically evaluate the functionality, reliability, and impact of filaxONE on workflow and patient safety.

Methods

The system was tested at the Department of Urology, Hospital Center Biel, Switzerland, over four weeks in spring 2025. Three devices were used in 16 patients receiving postoperative irrigation. Data such as irrigation duration, bag changes, and interruptions were recorded and analyzed (Fig. 2). Nursing staff also provided structured feedback via questionnaires.

Fig. 2: Display screen of the filaxONE monitoring system

Results

A total of 784 hours of irrigation monitoring was performed across 16 patients. Durations ranged from 21 to 163 hours. Interruption rates decreased over time: 2.1 per 24h in week one, 2.8 in week two, 1.5 in week three, and 0.5 in week four (Fig. 3). This indicated system stabilization and user adaptation. Daytime interruptions were more common (65%), and total irrigation fluid used reached 571 liters with 210 bag changes recorded.

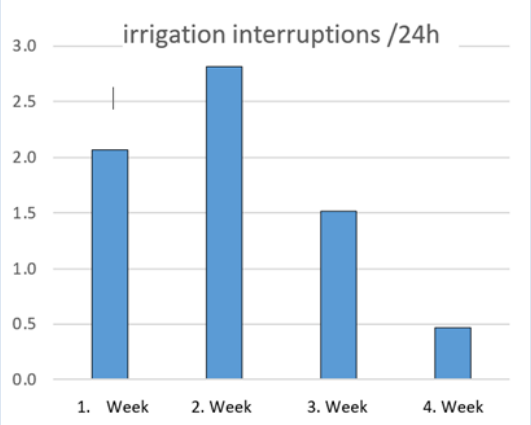

Fig. 3: Average number of irrigation interruptions per 24 hours across four consecutive weeks

Drawbacks

- Comprehensive education of all nursing staff was essential before clinical implementation.
- Both patients and nurses experienced challenges with the stand, mainly due to its considerable weight.
- Mismatches between color codes and irrigation fluids were noted, especially in cases of persistent macrohematuria.

Limitations

- Small sample size: Only 16 patients were included
- Short observation period: The evaluation covered just four weeks, preventing assessment of long-term reliability and clinical outcomes.
- Single-center study
- Early-stage evaluation: The system was still under refinement, so technical issues and learning effects may have influenced results.
- No control group: Results were not directly compared against standard manual irrigation, so relative benefits remain to be quantified.

Discussion and Conclusion

The filaxONE system demonstrated functional reliability, reducing manual workload and improving standardization in bladder irrigation. Nurses reported relief in monitoring tasks, and workflow across shifts improved. Although the system showed promising results, further refinement and broader usability testing are necessary before large-scale implementation. Its integration with HIS and automated monitoring features hold significant potential to improve patient safety and nursing efficiency.