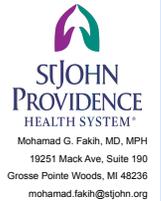


Improving Urinary Catheter Use: a Pilot of 18 Emergency Departments

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Abstract:

Background: Urinary catheters (UCs) are frequently used in the hospital setting and are associated with infectious and non-infectious complications. Avoiding placement of unnecessary UCs in the emergency department (ED) may significantly decrease the risk of patient exposure during hospitalization.

Methods: 18 ED units implemented institutional guidelines for UC placement and identified each physician and nurse champions to lead the work. The pre-post quasi-experimental design included baseline (7 days), intervention (14 days), and sustainability (1 day a month for 6 months) for UC use, indications for use, and presence of physician order. Changes were evaluated comparing the 3 periods.

Results: 13215 patients admitted through the ED were evaluated during the 3 periods, with 889 (6.7%) having a catheter placed. Catheter placement dropped from 309/3381 (9.1%) baseline, to 423/6896 (6.1%) intervention, and 157/2938 (5.3%) sustainability periods (p<0.001). Indications deemed appropriate improved from 226/309 (73.1%) baseline, to 384/423 (90.8%) intervention, and 144/157 (91.7%) sustainability periods (p<0.001). Physician order documentation in the presence of the urinary catheter was 785/885 (88.7%) and did not significantly change over the 3 periods. Improvements were noted for different size hospitals, and were more pronounced for hospitals with higher placement baseline.

Conclusion: The implementation of institutional guidelines for UC placement in the ED, coupled with the support of clearly identified physician and nurse champions, are associated with a reduction in unnecessary UC placement. The effort has a substantial potential of reducing patient harm hospital wide.

Background:

- Catheter-associated urinary tract infections (CAUTI) account for a significant proportion of device infections in the hospital setting. More than half of the hospitalized patients are admitted from the emergency department (ED), where decisions to place urinary catheters (UCs) are often made. Many UCs are placed without documentation of need or based on subjective evaluations of the patient (e.g., frail, elderly, needs the catheter for acute illness), instead of using objective criteria for use. The optimal prevention is not to place the UC unless indicated. Avoiding placement of unnecessary urinary catheters in the emergency department (ED) may significantly affect utilization and risk during the time of hospitalization.
- Ascension Health, a catholic non-for-profit health system, is one of 26 hospital engagement networks (HEN) working with the Centers for Medicare and Medicaid Services (CMS) "Partnership for Patients" to reduce hospital acquired conditions. We implemented an effort to reduce inappropriate UC placement in the EDs of 18 hospitals. The initiative included engaging both physicians and nurses through champions, and establishing clear indications for use, with a goal to reduce unnecessary UC placement.

Methods:

- The study was quasi-experimental with pre- and post design, with 3 periods (baseline, implementation, and post-implementation) involving 18 EDs. During baseline (7 days), the EDs were asked to collect data on newly inserted UCs in admitted patients to the hospital, and the reason for placement. A pre-implementation period (7 days) served to prepare for implementation by sharing the institutional guidelines and educational materials with the staff. During implementation (14 days), the ED physician and nurse champions were responsible to educate their peers on the appropriate indications, based on the Centers for Disease Control and Prevention (CDC) Healthcare Infection Control Practices Advisory Committee (HICPAC) guidelines in 2009. The post-implementation period encompassed a significant reduction in data collection burden, but feedback on performance was given to the ED units based on the baseline and implementation period results.
- The data included the number of patients admitted, newly placed UCs, and appropriateness. Only UCs initially placed in the ED were included. The ED nurse responsible for transferring the patient to the inpatient units was the one responsible for completing the data collection tool.
- Metrics: UC placement rate was defined as the number of newly placed UCs divided by the number of patients admitted during the same period and multiplied by 100. The documented physician order rate was defined as the number of physician orders for newly placed UCs divided by the number of newly placed UCs over the same period and multiplied by 100. Finally, the UC appropriateness rate was defined as the number of newly placed UCs with an appropriate indication divided by the number of newly placed UCs during the same period and multiplied by 100. The primary outcome measure was the newly placed UC rate.
- Analysis: We used Chi square tests and compared all 3 periods and individual periods looking at catheter use, appropriate indications and presence of physician order. We also compared the results based on hospital size (small: ≤200 beds; medium: 201-500 beds; large: >500 beds).

Results

Table: ED urinary catheter placement during the 3 periods of the study

	Baseline (%)	Implementation (%)	Post-implementation (%)	P value
All 18 emergency departments	309/3381 (9.1)	423/6896 (6.1)	157/2938 (5.3)	<0.001
Hospital size				
Large (>500 beds, n=5)	97/1167 (8.3)	130/2344 (5.5)	50/1192 (4.2)	<0.001
Medium (201-500 beds, n=8)	178/1903 (9.4)	258/3819 (6.8)	89/1467 (6.1)	<0.001
Small (≤200 beds, n=5)	34/311 (10.9)	36/733 (4.9)	19/279 (6.8)	0.002
Baseline urinary catheter use				
Baseline <5% (n=4)	31/734 (4.2%)	50/1508 (3.3%)	28/546 (5.1%)	0.16
Baseline 5-9.9% (n=6)	109/1314 (8.3)	148/2690 (5.5)	63/1245 (5.1)	0.001
Baseline ≥10% (n=8)	169/1333 (12.7%)	226/2698 (8.4)	67/1147 (5.8)	<0.001

Appropriateness improved from baseline (228/308, 74%), to implementation (385/421, 91.4%), and post-implementation (145/158, 91.8%; p<0.001). The inappropriate reasons for UC placement included monitoring fluids in non-critically ill patients (30/129, 23.3%), immobility not related to trauma or surgery (13/129, 10.1%), and debility (11/129, 8.5%). The most common reason for inappropriate placement was under the "other" category (45/129, 34.9%).

- Reduction in UC placement during intervention and sustainability for all size hospitals.
- Improved appropriateness for use with intervention and sustainability
- No significant change in documentation of physician order

Figure 1: The number of ED based on urinary catheter placement rate categories over the 3 periods of the study.

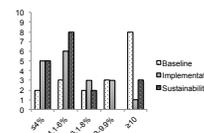
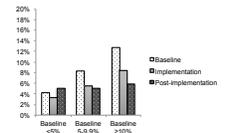


Figure 2: The change in urinary catheter placement in the 18 EDs based on their baseline use over the 3 periods of the study.



- The number of EDs with >10% use dropped from 8 to 3 by the end of the study
- Improvements were seen for both those with baselines of >10% and those between 5 and 10%.

Discussion

We report the largest effort to reduce unnecessary UC placement in the ED. Hospitals identified both physician and nurse champions to help engage their peers, and promote the adoption of published guidelines. We also provided the EDs with educational tools, and were conscious of the data collection burden required from the involved facilities. We observed more than 30% reduction in use in newly placed UCs and the results were sustained over 6 months. In addition, UC appropriateness increased further reflecting the success of the effort. The baseline UC use in the ED was an important factor to predict further reduction in use. Hospitals with baseline UC placement of ≥5% showed significant reductions in use with the initiative, while all 4 hospitals with baseline use of <5% did not have any significant change. Our findings indicate that there is a threshold to the benefit of such interventions, a factor that needs to be incorporated into future evaluations for interventions. The reduction in UC placement in the ED persisted for 6 months post-implementation. It is critical for the newly learned practices to be integrated in the workflow of the ED. Our results are similar to previous where we have shown that sustained improvements are not only associated with education, but with regular feedback on performance. Sustainability depends on multiple factors including the context (culture of safety, public reporting for CAUTI, and future value based purchasing), building capacity (champions, additional support), and processes (integration into daily work, audits and feedback).

Conclusions

Addressing the appropriate UC use in the ED results in a reduction in use. Substantial opportunities reside in avoiding the unnecessary exposure to the catheter, reducing harm risk. We suggest hospitals 1) evaluate their practice of UC placement in the ED, 2) have clearly identified institutional indications for UC placement, 3) have physician and nurse champions to ensure accountability, 4) and perform regular audits and provide feedback on performance.