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Urinary catheters in the emergency department: a prospective audit to improve quality control

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Introduction The best way to prevent urinary catheter related complications is to avoid unnecessary insertions of catheters and removing the catheters when they are no longer necessary. Previous studies have shown 47% documentation rate of urinary catheter (UC) insertion in the Emergency Department (ED) and have found one-sixth of patients in the ED have no indication for UC insertion. The aim of this audit was to record the indications and documentation of UC insertion in the ED and to propose an intervention to improve the quality of these processes.
Material and methods A prospective audit was conducted in a tertiary university teaching hospital in Ireland over an eight-week period. A week-long intervention was conducted in the ED to educate staff, an ED doctor was involved in directly communicating this to the staff thereafter and concise labels were introduced to document relevant details about each UC insertion. The pre-intervention and post-intervention data was compared using Chi-Square tests.
Results A total of 103 (50 pre-intervention and 53 post-intervention) consecutive age and gender matched patients were recruited in the audit over 8 weeks. The documentation for UC insertion improved by 22% (8% to 30%, (p <0.001, chi-square) while the non-indication for UC insertion reduced by 6% (36% to 30%, p = 0.53, chi-square).
Conclusions A simple intervention achieved significantly improved documentation of UC insertion and a trend toward increased appropriateness of UC insertion. This audit serves as an example to improve quality control around UC insertion which could be adopted in other institutions.

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INTRODUCTION

Catheter acquired urinary tract infection (CAUTIs) is one of the most common healthcare acquired infections and 70–80% of these infections are attributable to an indwelling urinary catheter (UC) [1]. In addition, iatrogenic urethral injuries can occur during insertion of urinary UC and previous studies have quoted the incidence of iatrogenic urinary catheter injuries as 6.7 per 1000 urinary catheters inserted [2].

Both CAUTIs and urinary catheter injuries can lead to significant patient morbidity and add to healthcare costs. The best way to prevent urinary catheter related complications is to avoid unnecessary insertions of catheters and removing the catheters when they are no longer necessary. The NICE guidelines [3] on UC emphasize on safe insertion, maintenance and appropriate removal of urinary catheters to avoid complications. UC is touted to be the most common indwelling device with 17.5% patients

in 66 European hospitals having a catheter and 23.6% in 183 US hospitals having an indwelling catheter [1]. The emergency department (ED) is the point of entry for a significant number of patients in the hospital and most catheters are inserted here. It is imperative to apply quality control measures during insertion of catheters at this point to reduce catheter related complications. Previous studies have shown 47% documentation rate of UC insertion in the ED and have found one-sixth patients in ED have no indication for UC insertion [4].

The aim of this audit was to record the indications and documentation of UC insertion in ED and to propose an intervention to improve the quality of these processes.

MATERIAL AND METHODS

Setting

This was a prospective audit conducted in a tertiary university teaching hospital in Ireland over an eight-week period. The ED in this hospital has a patient load of approximately 47,000 patients per year. We performed an initial 4-week study in the ED to identify patients who had a UC insertion and then investigated the indications and documentation of this UC insertion. Physicians insert male UC in this hospital while female UCs are inserted by nurses. All decisions for UC insertion are made by the physician. The guidelines for appropriate UC insertion were based on a study by Fakih et al. and are outlined in Table 1 [4]. Patients who had a UC insertion were identified prospectively by ED personnel. Documentation of this UC insertion and other requisite data was collected from electronic and chart based patient notes in the ED. In cases where there was no documentation of UC insertion, a further chart review was done to obtain the indication of UC insertion from the patient's history. We then introduced an intervention to improve quality control of UC insertion in the ED. This was a quality improvement audit and ethics approval was granted for the same.

Intervention

The department of urology was involved in informative educational sessions in the ED with the nurses and doctors. These educational sessions were aimed at providing guidance on appropriate indications for UC insertion, technique of insertion and timely removal of the UC when no longer required. These were small group sessions involving 5-6 ED doctors and 5–6 ED nurses. They were delivered by a senior member of the urology department, each session lasting 15–20

Table 1. Demographics of pre- and post-intervention patient cohort

	Pre-intervention (n = 50)	Post-intervention (n = 53)	p value
Age (median, range) years	64.7 (24.9–96.6)	68.6 (20.6–88.9)	0.13
Gender M:F ratio	1.0 : 0.92	1.1 : 1.0	0.62

Table 2. Guidelines for urinary catheter insertion

Compliant with guidelines (n = 70, 68.0%)	Overall n (%)	Pre-intervention n (%)	Post-intervention n (%)
Urologic procedures	1 (0.9%)	1 (2%)	0
Intubated	2 (1.9%)	2 (4%)	0
Emergency surgery	6 (5.8%)	4 (8%)	2 (3.7%)
Urinary obstruction	6 (5.8%)	3 (6%)	3 (5.6%)
Output monitoring in intensive care	9 (8.7%)	3 (6%)	6 (11.3%)
Unresponsive	6 (5.8%)	3 (6%)	3 (5.6%)
Acute hip fracture	15 (14.5%)	8 (16%)	7 (13.2%)
Non–intensive care ≥6 L/min oxygen	20 (19.4%)	4 (8%)	15 (28.3%)
Acute mental status changes with agitation	5 (4.8%)	5 (10%)	0
Emergent pelvic ultrasound	0		
Hospice or palliative care	0		
Stage 3 or 4 sacral decubitus ulcers with incontinence	0		
Neurogenic bladder	0		
Noncompliant with guidelines (n = 33, 30.0%)			
No clear reason	2 (1.9%)	2 (4%)	0
Oxygen supplementation <6 L/min	3 (2.9%)	3 (6%)	0
Output monitoring outside intensive care	28 (27%)	12 (24%)	16 (30.1%)
Dementia	0		
Urine specimen collection	0		
Incontinence	0		
Patient request	0		

minutes. The ED medical personnel outlined the importance and significance of UC insertion and documentation during the handover sessions. We introduced concise UC labels to improve adherence to UC insertion documentation. This label aimed to record

relevant information during the UC insertion and was affixed in the patients' notes after every UC insertion. The ED staff was well-informed about this and were requested to comply with the same.

Post-intervention

After the week-long intervention involving educational and informative sessions, 50 stickers containing details of UC insertion i.e. indication and other relevant information were circulated in the ED. The UC insertion indications and documentation were re-audited over a 4-week period in the ED.

Statistical tests

The pre-intervention and post-intervention data was compared using Chi-Square tests in excel and SPSS version 21 (SPSS Inc., Chicago, IL). The student's t test was used to compare the demographics of the pre-intervention and post-intervention group. A p value of less than 0.05 was considered statistically significant.

RESULTS

A total of 103 patients who had a UC insertion in the ED in this hospital were studied during this audit. A total of 50 patients were pre-intervention and 53 patients were post-intervention. These groups were comparable in terms of age and gender (p = 0.13). The demographic data of the pre- and post-intervention cohort is depicted in Table 1.
Overall, only 19% of patients (n = 20) had a documented note of UC insertion in the ED. A total of 68% (n = 70) of patients had an appropriate indication for UC insertion obtained from a detailed review of patient's notes.

Pre-intervention

Of the 50 patients with UC insertion studied in the pre-intervention phase, only 4 had a documented UC insertion (8%) in their notes. From the detailed chart review, an appropriate indication for UC insertion was obtained in 64% patients (n = 32).

Post-intervention

Of the 53 patients with ED based UC insertion in the post-intervention phase, 16 (30%) had a documented note of the same. There was a statistically significant improvement in the recording of UC insertion in the ED after the intervention (p <0.001, chi-square). The UC insertion documentation was also followed every

week to note an improvement in adherence to documentation from 20% in the first week to 40% in the third week (Figure 1).
In the post-intervention phase, 70% patients had an appropriate indication for UC insertion (n = 37). Though there was an improvement in the adherence to guidelines for indications of UC insertion, this difference was not significant statistically (p = 0.53, chi-square). The indications for UC insertion pre- and post-intervention are summarised in Table 2. The trend of indicated UC insertion is depicted in Figure 1.

DISCUSSION

A clinical audit is defined as a "quality improvement process that seeks to improve patient care and outcomes through systematic review of care against explicit criteria and the implementation of change" [5]. This was a clinical audit aimed at improving quality control in UC insertion with regards to indications and documentation. With the aid of a simple intervention we were able to achieve a clinically and statistically significant improvement in the UC documentation quality over 4 weeks. There was also a positive trend in the proportion of indicated UCs inserted (this was not significant statistically).
Fakih et al. performed a similar audit in their ED in the United States (US) [4]: they formulated guidelines on appropriate UC placement in ED and communicated these to the ED staff via a lecture and assigned an ED doctor to directly communicate this to their colleagues and provide them cards enlisting appropriate indications for UC insertion. They collected data pre- and post-intervention over a total period of 21 months that spanned over three quarters. They collected data for 5 consecutive days pre- and post-intervention during each quarter. They found a significant decrease in UC utilisation post-intervention (14%) but there were no significant differences between the proportions
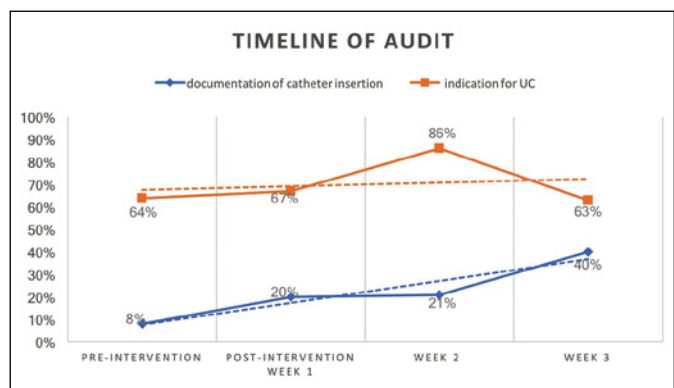

Figure 1. *Rate of urinary catheter (UC) documentation and rate of indicated urinary catheter insertion pre-and post-intervention.*

of nonindicated UCs placed before (33.6%) and after the intervention (29.5%) in the next year. They found that a presence of a physician order for UC insertion in the chart was associated with a higher compliance with UC insertion indications and nearly half the UC s were placed without physician orders and half of these did not fit any indications in the guidelines. This intervention was focused on doctors, and nurses were not involved. Hence, the authors concluded engaging nurses in the ED might be a vital contributing factor to improving compliance with guidelines. A follow-up pilot study in 30 EDs across the US engaging both physicians and nurses showed a 50% drop in rate of UC placement with increased improvement in appropriate reason for placement from 70% to 92% over 6 months [6]. Our intervention involved both nurses and doctors but proportions of nonindicated UCs inserted did not change significantly after the intervention.

Common indications for inappropriate UC placement include immobility, elderly females, incontinence, morbid obesity, debility, non-critically ill cardiac and renal patients [7]. These findings were similar in our study. The findings of these two audits conducted in different settings in two different parts of the world show the issue with low adherence to documentation and appropriate indications for UC insertion is similar and conducting such educational interventions has a positive impact on UC insertion in terms of indications, numbers, and documentation. Despite the positive results, it is difficult to change the mindsets of clinicians with regards to indications of UC insertion. It is imperative to establish clear institutional guidelines for UC insertions and ensure engagement of the nurses and doctors alike to improve appropriate UC use in the ED.

Limitations

This audit was conducted over 8 weeks, we did not record long-term data to check for sustainability of the improvement over time.

CONCLUSIONS

Preventing unnecessary UC insertion is the best way to prevent catheter related complications. A simple intervention achieved significantly improved documentation of UC insertion and a trend toward increased appropriateness of UC insertion. This audit serves as an example to improve quality control around UC insertion which could be adopted in other institutions.

CONFLICTS OF INTEREST
The authors declare no conflicts of interest.

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