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Stopping routine urine screening studies for stroke rehabilitation inpatient admissions

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ABSTRACT

Urine testing on asymptomatic patients is not aligned with guidelines; however, stroke survivors have trouble communicating symptoms, and urinary tract infections (UTIs) are a recognised poststroke complication. All stroke inpatients at a tertiary rehabilitation hospital underwent urine testing on admission. We led a quality improvement (QI) project on one stroke rehabilitation unit aimed to reduce admission urine testing from 100% to 0%. Baseline audit representing 2 weeks of admissions identified 27 of 28 patients had urine tests; however, none required UTI treatment despite 3 positive culture results. Estimated cost of testing was $C675. QI tools identified that a standardised paper-based admission form facilitated automatic urine testing. Project intervention strategies included education, clinicians crossing off urine orders and unit clerks flagging unaddressed orders for reassessment. A chart audit after 4 weeks and prescriber survey after 6 months assessed impact. Postintervention audit (n=23) revealed 1 patient had admission urine tests, 22 orders were crossed out, 1 chart was flagged and estimated testing cost declined from $C675 to $C25. Six urine tests were completed after admission and two patients required UTI treatment. Post 6 months, unit clerks assumed the role to cross out the order on the standardised form, and no patient had routine admission urine testing. There was no clinical benefit in screening for UTIs prior to stroke rehabilitation. This project is a practical example of deadopting a practice promoted by standardised order forms.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Guidelines recommend urine testing in symptomatic adults, but stroke survivors experience impairments that make expressing symptoms difficult.

WHAT THIS STUDY ADDS

⇒ Stopping admission urine tests resulted in no change to clinical decision-making or adverse outcomes.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ It is a practical example on how to deadopt unnecessary testing in a hospital.

PROBLEM

This quality improvement (QI) project was conducted on a 30-bed stroke rehabilitation unit at a tertiary rehabilitation hospital in Canada. The current practice included routine urine testing on admission to screen for urinary tract infections (UTIs), facilitated by a standardised paper-based admission order form. This practice was inconsistent with Choosing Wisely Canada guidelines, and our team undertook a QI study with a primary aim to reduce unnecessary admission urine testing from 100% to 0%, while ensuring outcomes related to urine infections remained optimised.[6] This project was completed prior to the implementation of an electronic medical record system at our rehabilitation hospital to ensure that appropriate guidelines were reflected in the new electronic order sets without compromising stroke survivor rehabilitation.

BACKGROUND

Approximately, 13.6%–44% of all stroke rehabilitation inpatients experience a UTI, and the majority are identified on hospital admission.[1–4] Infection reduction, including UTIs, has been a priority area for hospital QI programmes and has also been linked to changes in reimbursement.[4] As a result, including urine tests on standardised hospital admission order forms has become a practice norm. Overdiagnosis and overtreatment of asymptomatic bacteriuria are identified problems, as urine tests (urinalysis and urine culture) are often ordered without localising urinary symptoms.[5] Choosing Wisely Canada guidelines recommend urine testing in symptomatic patients only, except pregnant patients or those undergoing an invasive urologic procedure.[6] Stroke survivors may experience communication impairments and have difficulty expressing symptoms delaying urine testing.

MEASUREMENT

Adult patients (>18) with moderate-to-severe stroke are admitted to inpatient rehabilitative care and stroke recovery at this tertiary rehabilitation centre for an average length of stay of

3–4 weeks. To identify areas for improvement and to build our understanding of local urine test ordering practices, one team member completed a prospective chart audit of all new admissions over a 2-week period. The number of urine tests on admission, test results, presence of UTI symptoms and subsequent clinical actions (ie, prescribing antibiotics) were recorded without patient identifiers. This audit identified 27 screening urine tests completed for 28 patients on admission. Sixteen patients had abnormal urinalysis only (ie, presence of any protein, glucose, white blood cells or bacteria), and three patients had both abnormal urinalysis and urine cultures. No patient was symptomatic or required antibiotics. There were no clinically active UTIs and the estimated urinalysis and culture cost were determined ($C10 and $C15, respectively).[7] The estimated cost for 27 patients was $C675. This cost data was collected by retrospective chart review at the end of the Plan–Do–Study–Act (PDSA) cycles once the intervention was implemented to assess for change and effect of intervention.

Outcome measures included the number of urine studies ordered on admission, orders crossed out, stickers required to be placed on the chart and estimated cost of tests. Process measures included number of stickers missed, educational meetings held, views of an online educational video and pamphlets on the unit. Balancing measures were the number of urine studies ordered and UTIs identified after admission.

DESIGN

Our QI team consisted of a physiatry resident physician, a stroke physiatrist and a QI specialist. We employed the Model for Improvement[8] and the Donabedian conceptual evaluation model.[9 10] This QI study consisted of four stages: (1) reviewing the published literature and understanding the local context; (2) intervention development; (3) intervention trial; and (4) intervention sustainment. Formal ethics review was not required, according to the Canadian Tri-Council Policy Statement, Article 2.5, for QI studies.[11] Information collected from the prospective chart audit along with completed QI tools, fishbone analysis (figure 1) and process mapping, guided intervention development. We identified improvement opportunities such as clinician awareness of current resource stewardship guidelines, and the prefilled admission paper-order form design promoted reflex urine testing. The intervention consisted of disseminating Choosing Wisely Canada guidelines to ordering providers and unit staff and asking ordering providers to cross out urine tests on prefilled admission forms. Unit clerks were provided a sticker (figure 2) to apply when the urine order was not crossed out, prompting reassessment. Rationale for the sticker was to ensure that if a prefilled order was missed (not crossed out), the sticker would serve as a 'double check' with the assistance of unit clerks, preventing prefilled urine orders from going unassessed. Patients or the public were not involved in the design, conduct, reporting or dissemination plans of our research.

STRATEGY

The first PDSA cycle was 4 weeks from May to June 2020. In-person meetings with the unit nurse practitioner and unit clerk were held to support the intervention implementation. Project information pamphlets were posted in

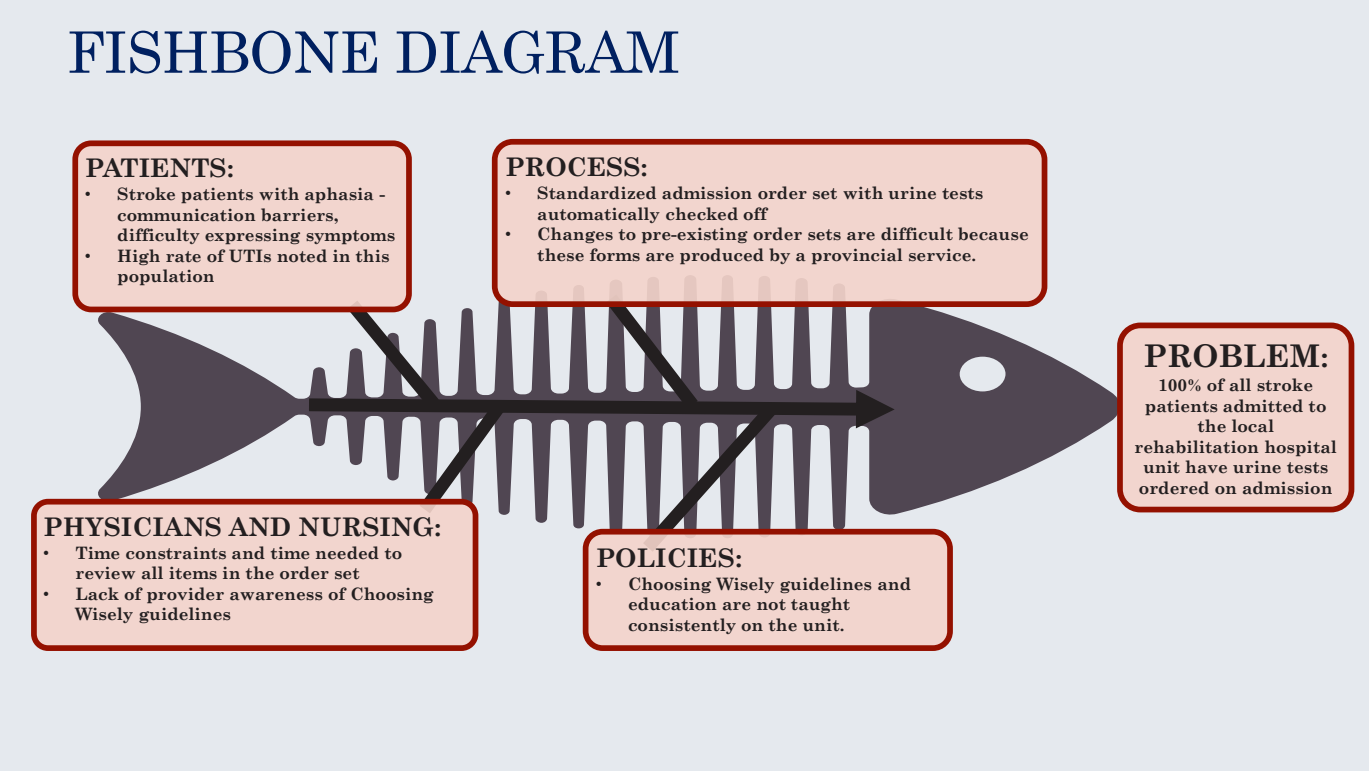

Figure 1 Fishbone diagram

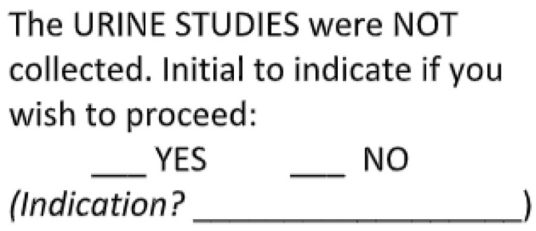

Figure 2 Sticker used by unit clerks to flag unaddressed prefilled admission paper-order forms

high-traffic areas on the unit. Unit staff were sent an email explaining the project with a link to an educational video to sustain project awareness. Post intervention, a study member (ASG) completed a retrospective chart audit of all new admission charts for a 1-month timeframe and recorded the number of urine tests ordered on admission, orders crossed out, stickers placed, urine tests ordered post admission and UTIs missed. Based on our findings and feedback gathered from PDSA#1, no intervention changes were suggested. Unit clerks assumed the responsibility to cross out the order when they were reviewing the admission paperwork. Based on this unit clerk action, we assigned this as the beginning of PDSA#2. Subsequently for PDSA#2, no intervention adjustments were made, intervention continued with no further education provided for the next 6 months. Post-PDSA#2, we completed a chart audit to determine if improvements sustained and if the intervention continued. Stroke rehabilitation unit staff (physicians, residents, nurse practitioner and unit clerks) were asked to complete an anonymous survey to obtain ordering providers' feedback about the intervention and methods to sustain this practice.

RESULTS

Post-PDSA#1, a chart audit was completed on 23 charts, and the primary outcome measure of 100% reduction of unnecessary admission urine tests was achieved. One patient had urine tests ordered appropriately on admission as the patient experienced new symptoms of urinary retention. Despite the urine culture being positive for mixed growth, this patient was asymptomatic, and antibiotics were not started. The overall cost of urine testing on admission was reduced to $C25.00.[7] Also, 22 of 23 orders were crossed out by ordering providers, and 1 sticker applied by the unit clerk. Five patients required urine tests to investigate for UTIs during hospitalisation. Of those, three urine cultures returned positive for *Escherichia coli*, two patients required antibiotic treatment and cost of urine testing was $C150.00. Two in-person educational meetings, three pamphlets were placed on the unit and ten views of the online video resulted.

Approximately 6 months after the intervention, a chart audit of currently admitted patients indicated that no admission urine tests were ordered without specific clinical indications. Unit clerks who print the admission order form for a chart had assumed the role of crossing out the order for urine testing on the form; therefore, stickers were no longer required. As a long-term solution or in case the unit clerk was absent, many copies of the printed order form with the order crossed out were prepared and made available for admissions. Shortly after this study, our paper-based charting was replaced by an electronic medical record, and the automatic urine testing on admission was removed from the electronic order set. Healthcare provider postintervention survey was distributed widely to physicians, resident physicians and nurse practitioners working on the stroke rehabilitation unit. A total of seven participants voluntarily responded, and three of seven indicated that they had not needed to order urine tests on any patient who had a stroke rehabilitation since intervention start. No respondent noted a change to the frequency of UTIs experienced by patients. No negative intervention impacts were noted due to eliminating urine testing from the prefilled, paper-based admission form. Reported positive intervention impacts included saving nursing and laboratory time related to processing urine tests, avoiding treatment of asymptomatic bacteriuria and cost-savings. A participant stated, 'There is the obvious benefit of cost to the healthcare system and the likely benefit of patients no longer getting inappropriately treated'. When asked if the intervention has impacted physician ordering behaviour, a frequent comment in six of seven responses suggested that physicians on the unit were more aware of the reason and clinical indications for ordering the urine test or initiating antibiotics. A participant stated, 'I think we all need to be mindful of what we order and use best practices for patient care and from a societal perspective considering the cost of tests'.

LESSONS AND LIMITATIONS

This QI study implemented existing Choosing Wisely Canada recommendations for not collecting urine specimens in adults who lack symptoms localising to the urinary tract and showed that outcomes experienced by stroke survivors are no different than other adult populations.[6] Even though stroke survivors may experience communication impairments and have difficulties identifying symptoms, we found that there was no clinical benefit in automatically screening this population for UTIs. The initial audit demonstrated that approximately $C675 was spent with no apparent benefit over the 2-week audit period, as 16 abnormal urinalyses and 3 abnormal urine cultures did not influence clinical decision-making and no patient required antibiotics. If a similar rate of patient admissions and testing was completed over a full calendar year, this would equate to approximately $C17 550 in unnecessary testing costs. While this amount would still be considered minimal across a large healthcare budget, it represents the impact of such intervention on a single 30-bed inpatient rehabilitation unit and thus could have larger impacts if implemented in a widespread fashion. Unnecessary testing may also yield false positive urine tests and expose patients to risks associated with urine screening and treatment of asymptomatic bacteriuria, including adverse medication effects and antimicrobial resistance.[12] Educating ordering providers, increasing awareness of the standardised order

form and implementing a 'double-check' system with the unit clerks, the aim of reducing unnecessary urine screening from 100% to 0% was achieved. Two patients experienced a UTI during hospitalisation but were treated promptly. Compared with published findings of 13.6%–44%, a lower rate of 7% of study inpatients experienced a UTI.[1–3] Recent literature suggests that UTIs in stroke survivors may have little impact on discharge clinical condition, length of stay or even hospital billing.[4]

The secondary aim of this project was to draw attention to standardised order form design and to demonstrate the potential negative influence on physician ordering behaviours.[13] Although standardised forms improve time efficiency and make orders easier to read, these forms have directly influenced physician ordering behaviour for many years resulting in both a financial cost to the system and unnecessary testing. From our health provider survey, participants identified that patient care had not been impacted negatively and no adverse outcomes were identified. Participants identified that being responsible for crossing the order off the form encouraged admitting providers to be mindful of the clinical indications for ordering any test, and most providers acknowledged that automatic admission urine testing was inefficient and had low clinical benefit. Over the intervention period, one sticker was applied to flag an order that went unaddressed on admission, suggestive that the admitting providers were reviewing and crossing out the order on the standardised form. Post intervention, the unit clerks assumed the role of crossing out the order on the admission form and prepared additional forms with this change in place for regular use, in order to increase efficiency on the unit. Following completion of this study, an electronic health record was implemented, and the admission order set no longer contained standard urine testing. The results of this study suggest the lack of clinical utility of admission urine testing on every inpatient admission. Ordering urine tests when clinically indicated is more appropriate. Post intervention, no patient had urine tests ordered on admission unless the ordering provider specifically requested. This intervention serves as a starting point for providing a practical example of deadopting previous ordering practices can be accomplished through simple system-based change.[5] This intervention also highlights the importance of evidence-informed electronic order form design as health systems transition from paper-based charting to electronic.

Limitations that affect transferability of the results include a single hospital unit, low participant survey response, a short evaluation timeframe (less than 12 months) and for clinical environments that do not use a paper-based system with an opt-out style for ordering. The unit clerks assumed the role of crossing out the order for urine testing on the admission form, and a provider behaviour practice change has resulted with only clinically appropriate urine tests being ordered post admission.

CONCLUSION

Screening for UTIs on hospital admission was a reflexive practice without clear clinical indications on a stroke rehabilitation unit. This study demonstrates the importance of order form design and influence on physician ordering behaviour. We hope this simple approach can serve as a starting point for others to review and re-examine order forms or standard order sets to make updates that promote clinical best practice. This project makes QI work more approachable for the average clinician and offers interventions to deadopt ingrained yet inappropriate clinical practices.

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Competing interests None declared.

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