“Interventions to support Choosing Wisely for Coagulation Studies in the Emergency Department”

Running title: Choosing Wisely Australia

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Author contribution statement

K.P. & C.T.F conceived of the presented idea. M.S.K & P.F. collected the data and developed the theory. M.T. verified the analytical methods. K.P. & S.A. supervised the findings of this work. All authors discussed the results and contributed to the final manuscript.

Abstract

Objective: To evaluate effectiveness of two different strategies designed to facilitate implementation of Choosing Wisely Australia guidelines (1), aiming to reduce unnecessary coagulation study blood tests in patients presenting to a metropolitan hospital Emergency Department.

Method: In this real-world quality improvement study, the first intervention tested was an education strategy. The second intervention was physically removing coagulation pathology tubes from the bedside trolleys in the Emergency Department. Data was collected about clinical appropriateness of testing, as per the Choosing Wisely Australia guideline and total volume of coagulation studies ordered.

Results: No reduction in **inappropriate coagulation** testing was observed following the education intervention whereas a significant reduction in inappropriate coagulation testing was seen after the second intervention (**inappropriate testing reduced from 73.8% to 53.0%**).

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Conclusion: Physically removing coagulation pathology tubes from the trolleys was found to be effective at reducing unnecessary testing.

Introduction

Choosing Wisely guidelines have been developed internationally – the challenge remains to translate these recommendations into clinical practice.

Coagulation studies have been reported to be frequently performed despite a lack of clinical indication (2, 3). While there is a general perception that routine coagulation screening tests can identify patients at high risk of bleeding, these tests have limited sensitivity and specificity and do not accurately predict the risk of bleeding (4).

Choosing Wisely Australia have developed a suite of recommendations to reduce low value or inappropriate health interventions. The recommendation which forms the basis of this study is: “Avoid coagulation studies in emergency department patients unless there is a clearly defined specific clinical indication, such as for monitoring of anticoagulants, in patients with suspected severe liver disease, coagulopathy, or in the assessment of snakebite envenomation.”

The aim of this study is to investigate rates of unnecessary coagulation studies performed in the Emergency Department (ED) against the Choosing Wisely Australia recommendation, and to evaluate the effectiveness of two sequential interventions at reducing the number of inappropriate coagulation studies.

Method

The study was approved by Northern Health Ethics Committee (Reference No. ALR 20.2016).

A baseline audit was performed for an audit sample of 200 adult patients presenting to our ED during July 2016. Patients presenting with a “simple” condition (e.g. laceration) were excluded. Each patient’s medical record was reviewed to determine whether coagulation studies were ordered, and whether there were any recognised clinical indications for doing so as per Choosing Wisely Guidelines.

The first intervention was an education program incorporating teaching sessions for the medical and nursing staff using a published pathology testing matrix. (5) This matrix is a guide for ED clinicians in choosing appropriate pathology tests for common ED clinical presentations. (5)

The second intervention involved the removal of coagulation pathology tubes from all venepuncture trolleys in the ED (excluding resuscitation bays to avoid any delay in emergency situations). Collection tubes were accessible to clinicians in the ED pharmacy storage room (i.e. a distance of approximately 100-200 metres from various ED cubicles). Re-audit was undertaken after the first intervention (patients presenting from May to July

2017); and then following the second intervention (patients presenting from January to March 2018). Re-audits were performed using the same methodology as the baseline audit.

Results and Discussion

The findings are summarized in Table 1, demonstrating a significant reduction in inappropriate coagulation study testing following the intervention in which coagulation tubes were removed to a physically distant location. **Data regarding total volume of coagulation studies ordered was also collected from the Pathology department and compared with number of ED presentations (Figure 1). There has been a drop in total volume of coagulation studies ordered after the 1st intervention that was supported by the 2nd intervention.**

There are recognised limitations to this real-world quality improvement study. Firstly, this is a single centre study and our results may not be reproducible at other centres due to a variety of factors. Secondly, the educational strategy occurred via standard education meeting program running in the ED. It is not known what proportion of regular staff received education and it is likely that casual staff received no education. Thirdly, we cannot exclude that some patients admitted to hospital may subsequently have had coagulation studies ordered - therefore testing may have been deferred rather than avoided. Since this study is translating a peer-reviewed evidence-based published guideline into practice, safety outcomes were not in scope. To ensure the maintenance of the second intervention over time, a repeat audit would need to be conducted. **Finally, the drop in total number of coagulation studies ordered can be multifactorial and needs further evaluation.**

Literature and experience show that educational strategies often have weak impact on behaviour change due to factors such as lack of awareness of guidelines by busy and rotating medical/nursing staff (6). **A physical barrier or “nudge strategy” (physical and or psychological) may have a stronger impact in changing human behaviour by initiating new processes to achieve a desired change (7).**

Conclusion:

Our results illustrate no reduction in inappropriate coagulation study tests following an education intervention compared with a significant reduction after the second intervention. This study demonstrates that a small change (physical barrier or “nudge strategy”) in systems which influence human behaviour (“human factors”) can help translate best-practice guidelines into clinical practice.

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Figure 1 – Trend in total number of ED presentations and number of coagulation studies requested: January 2016 to July 2018

Table 1. Number and appropriateness of Coagulation Studies

Audit	Sample Size	Coagulation Studies		Choosing Wisely Guidelines	
		n (%)	p-value [^]	Inappropriate Studies	p-value [^]
Baseline	200	65 (32.5%)	-	48 (73.8%)	-
Second (post 1 st intervention)	200	63 (31.5%)	0.830	49 (77.8%)	0.604
Final (post 2 nd intervention)	200	49 (24.5%)	0.076	26 (53.0%)	0.021

[^] χ^2 test compared to baseline audit

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