

Optimizing postoperative handover to the intensive care unit at a tertiary centre

ABSTRACT

Background: Comprehensive handover of patients transferred from operating theatre to the intensive care unit is crucial in ensuring ongoing quality and safety of care. Handover in this setting poses unique challenges, yet few studies have considered or tested approaches to improve the process. A quality improvement project was undertaken to assess and improve the quality of information transfer during the handover of postoperative patients to the general intensive care unit at a tertiary centre.

Methods: This quality improvement project considered all postoperative patients aged 18 years and over, using the plan-do-study-act (PDSA) approach, over a 3-month period in 2015. Baseline audit encompassing intraoperative details (allergies, grade of intubation, estimated blood loss, difficulties and complications) and the postoperative plan (analgesia, thromboprophylaxis, antibiotics and their proposed duration and nutrition) was undertaken to define the extent of the clinical problem. Changes were implemented over two cycles, centred around a novel checklist, and the transfer of information was re-audited after each cycle.

Results: Baseline audit ($n=30$) revealed a need for improvement across all domains. In PDSA cycle 1, a novel checklist was introduced which led to global improvement across all areas with performance exceeding 70% in all but three out of nine domains ($n=33$). Engaging key stakeholders (PDSA cycle 2) resulted in overall improvement from baseline but decreased performance in just under half of domains in comparison to PDSA cycle 1 ($n=31$).

Conclusions: Successful implementation of a series of simple interventions resulted in more effective handover of postoperative patients admitted to an intensive care unit. Sustained long-term improvement is a major challenge and can only be achieved with the global engagement of all staff and incorporation of changes into routine clinical practice.

place (Warren et al, 2004). The process can represent a significant risk to patient safety, highlighted by a cross-sectional analysis of incident reports in the intra-hospital transfer of intensive care patients; 36% of adverse events involved the transfer of patients to and from the operating theatre (Beckmann et al, 2004). There are also medicolegal implications, demonstrated by an analysis of surgical malpractice claims involving communication failures which found that at least 43% were directly attributable to inadequate handover (Greenberg et al, 2007). In spite of this, the medical literature examining handovers in this setting is sparse and few studies have considered or tested approaches to improve the process (Segall et al, 2012).

This quality improvement project aimed to assess and improve the quality of information transfer during the handover process of postoperative patients to the general intensive care unit. Review of such handover arrangements, as part of the clinical governance strategy, to ensure they are appropriate is advocated to maintain good standards of medical practice (The Royal College of Surgeons of England, 2007).

Methods

Ethical waiver was obtained from the hospital local ethics and research and development committees as this was part of an ongoing local audit of service development and quality improvement. Informed consent was not required and patient confidentiality was guaranteed by anonymisation of the data collection. The Standards for Quality Improvement Reporting Excellence (SQUIRE 2.0) criteria for systematically improving the quality, safety and value of health care were adhered to (Ogrinc et al, 2015).

Design and setting

This quality improvement project was undertaken at St George's University Hospitals NHS Foundation Trust over a 3-month period in 2015. All postoperative

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Handovers form an integral part of daily medical practice and are essential in providing good medical care (Starmer et al, 2014). A comprehensive handover is imperative for patients undergoing surgery who are transferred to an intensive care unit postoperatively to ensure the ongoing quality and safety of their care (Segall et al, 2012). These patients may be high-risk surgical candidates as a result of pre-existing comorbidities or the complexity, duration or urgency of the surgery itself (Bonifacio et al, 2013).

Handovers between operating theatres and intensive care departments pose unique challenges because multiple groups are involved in the process including the anaesthetic and surgical teams, and because of the need to transfer critical information about the surgical procedure while concurrently assessing and stabilizing the patient who may be intubated, have multiple lines and invasive monitoring in

patients aged 18 years or over admitted to the general intensive care unit were eligible for inclusion. Baseline audit was performed to assess how effective the transfer of key information was during handovers for postoperative admissions against national standards (The Royal College of Anaesthetists, 2012). These standards propose a target of 100% when conveying information, encompassing operative details and the postoperative plan for best practice.

Changes were implemented using the Model for Improvement – plan, do, study, act (PDSA) approach over two cycles of intervention following the initial baseline audit with the aim of improving the quality of information transfer at handover (Taylor et al, 2014).

Data collection and analysis

Clinical data were collected from the general intensive care unit admission clerking documentation which serves as a record of the handover of key information described by the Royal College of Anaesthetists as follows: operative details, allergies, grade of intubation, estimated blood loss, any difficulties or complications and elements from the postoperative plan including analgesia, thromboprophylaxis, antibiotics and their proposed duration, and nutrition. All data were entered into a spreadsheet and analysed using the statistical package, Stata 12 (Stata Corp, College Station, Texas, USA). Data range and logic checks were performed and descriptive statistics generated.

Results

Baseline measurement

Thirty consecutive patients were considered in the initial baseline measurement (Table 1). All areas were well below the Royal College of Anaesthetists suggested target of 100% for best practice. Transfer of information regarding analgesia and duration of antimicrobial therapy was documented in fewer than 50% of cases.

PDSA cycle 1: raising awareness and introduction of a novel checklist

These initial findings were presented and discussed at a departmental meeting attended by a wide range of clinical staff including nurses, junior doctors and consultants. This provided an excellent forum to highlight the issues, raise awareness and engage all members of the multidisciplinary team in

an attempt to improve the effectiveness of the handover. Those attending the departmental meeting agreed that the results from the baseline measurement were representative. There was unanimous agreement that the handover process posed a number of difficulties. Colleagues suggested that the unstructured and often rushed approach led to a lack of communication and documentation when patients arrived in the unit. Possible interventions that could be made to improve the handover were discussed and a number of ideas were generated. In this way, those intimately involved in the process were shaping the design of any interventions introduced, increasing the likelihood of engagement.

Following the departmental meeting, a novel checklist was introduced highlighting the key areas of information that should be discussed and documented at the handover (Figure 1) and its impact was measured 1 month after introduction. Nursing staff and doctors were familiarised with the format of the checklist and it was placed at the bedside of postoperative general intensive care unit admissions. A re-audit of 33 consecutive patients revealed a global improvement in the transfer of information across all areas, with performance exceeding 70% in all but three out of nine domains (Table 1).

PDSA cycle 2: engaging senior staff

The final stage of this quality improvement project was designed to ensure unit-wide dissemination of the checklist to maintain and promote further improvement. The matron and senior clinicians on the general

Postoperative handover to GICU – checklist

Key operative information:

Grade of intubation

Difficulties/complications

Estimated blood loss

Postoperative plan:

Analgesia

Nutrition

Antibiotics (agent(s)/review date)

Thromboprophylaxis

Additional comments:

Figure 1. Novel checklist introduced in cycle 1. GICU = general intensive care unit.

intensive care unit were consulted with to encourage pan-unit adoption of the checklist. It was considered that involving the most senior and influential members of staff would offer the best opportunity for continued, regular use of the checklist and further improvement. A subsequent measurement of 31 patients, taken 2 months after introduction of the checklist, showed improvement in all areas compared to baseline data. However, despite this intervention, there was decreased performance in just under half of the domains considered in comparison to PDSA cycle 1 (Table 1), highlighting the challenges of maintaining improvement.

Discussion

In the UK, over 78 000 patients who undergo surgery are admitted to an intensive care setting postoperatively, accounting for 44%

Table 1. Summary of handover information from each cycle of the study. Percentages in brackets		Baseline (n = 30)	Cycle 1 (n = 33)	Cycle 2 (n = 31)
Operative details	Allergies	20 (66.7)	25 (75.8)	23 (74.2)
	Intubation	21 (70)	25 (75.8)	24 (77.4)
	Blood loss	24 (80)	26 (78.8)	25 (80.6)
	Difficulties/complications	26 (86.7)	31 (93.9)	30 (96.8)
Postoperative plan	Nutrition	20 (66.7)	25 (75.8)	23 (74.2)
	Analgesia	13 (43.3)	18 (54.5)	18 (58.1)
	Thromboprophylaxis	18 (60)	19 (57.5)	19 (61.3)
	Antimicrobials	15 (50)	22 (66.7)	20 (64.5)
	Duration of antimicrobial therapy	12 (40)	24 (72.7)	22 (71)

KEY POINTS

- A comprehensive handover is vital for patients undergoing surgery who are subsequently transferred to an intensive care unit, yet few studies have considered or tested approaches to improve the process.
- This quality improvement project aimed to assess and improve the quality of information transfer during the handover of postoperative patients to the general intensive care unit at St George's University Hospitals NHS Foundation Trust, London.
- Baseline audit revealed a need for improvement across all domains, including both intraoperative details and the postoperative management plan.
- Changes were implemented over two cycles, centred around a novel checklist, and the transfer of information was re-audited after each cycle.
- Successful implementation of a series of simple interventions resulted in a more effective handover of postoperative patients admitted to the intensive care unit, but sustained long-term improvement is a major challenge.

of all admissions to critical care departments annually (Health and Social Care Information Centre, 2014). In those undergoing major surgery, even when a low mortality is anticipated, the incidence of postoperative complications is disproportionately high and difficult to predict. Taken together, a comprehensive, effective handover is vital to optimize patient safety and mitigate these risks (Beckmann et al, 2004). The current work attempted to address this clinical problem with demonstrable improvement achieved. Using the Model for Improvement through the PDSA approach, the authors have increased the effectiveness of the clinical handover of postoperative patients to the intensive care unit at their hospital.

The strategy for improvement centred around the introduction of a checklist in conjunction with full engagement of the multidisciplinary team. The initial baseline measurement revealed imperfections in the quality of the current handover process at the authors' institution, consistent with published data (Segall et al, 2012). The initial departmental meeting to raise awareness of the clinical problem supported the findings

derived from the baseline measurement, emphasizing the need for a more direct, formal and standardized approach and confirming the importance of using measurement to assess the impact of interventions (Smith et al, 2008; Bonifacio et al, 2013).

The development and introduction of a simple, non-intrusive checklist, acting as an aide memoire, served as the main driver for improvement with enhanced transfer of information in all areas studied. It was not designed to be a proforma, but instead a visual prompt of the key domains that needed discussion, clarification and documentation at the handover. The aide memoire facilitated the multidisciplinary discussion central to effective handover. Local clinicians appreciated the simple, yet effective nature of the checklist which did not add to the ever-increasing administrative workload in modern medical practice. The final stage of this framework for improvement was to engage the key stakeholders, primarily medical and senior nursing staff, with the expectation of maintaining sustained improvement long term. Despite a slight tailing off in performance in certain categories from cycle 1, there was a tangible, sustained, detectable improvement from the baseline measurement.

This quality improvement project demonstrates that enhancement of patient care is achievable when members of the multidisciplinary team are universally engaged and involved in the entire process. However, sustaining improvement long-term poses a major challenge with numerous barriers. Questioning and challenging existing practice, as often happens as a result of audit and quality improvement projects, is often met with resistance and barriers to change in long-held beliefs and practices. These factors may account for the relatively modest improvements observed in this study, although the authors aimed to minimize resistance through maintaining motivation and engagement with the clinical team.

Staff turnover, especially incoming junior doctors, poses a major obstacle for continued engagement and consolidation of changes made in routine clinical practice. The importance of effective inductions and communication of protocols cannot be overstated. Indeed, the authors presented the data and formally handed over the checklist to the incoming junior doctors before moving on from the department.

Furthermore, this is an opportunity to introduce a formal educational session on the importance of handover on the unit before the next re-audit cycle, to build on the improvements to date.

This study is limited by its retrospective design, with the potential for introduction of bias. It was performed at a single centre so caution must be exercised when spreading this innovation to other intensive care units. However, the design was appropriate to quantify and improve local practice with comparison made to a proposed national standard. The improved handover process was not correlated with an objective outcome measure reflecting better patient care, such as a reduction in the rate of adverse events observed. The project measurement period was not long enough nor the sample size large enough to capture any adverse incidents, which may happen rarely, but the authors would expect to see a reduction in harm resulting from poor communication demonstrated over time as the aide memoire becomes integrated into routine clinical practice. Finally, the authors did not formally assess the verbal handover taking place between the surgical, anaesthetic and intensive care teams although it has been suggested that verbal handover with documentation is superior to engaging in verbal handover alone, because the latter places too much emphasis on memory skills and has been deemed a high-risk strategy (Bhabra et al, 2007).

Conclusions

Successful implementation of a series of simple interventions can result in a more effective handover of postoperative patients admitted to the intensive care unit. Attainment of the proposed target of 100% of transfer of information at handover is a major challenge and can only be realized with continued long-term improvement supported by the global engagement of all staff and incorporation of changes into routine clinical practice. The authors aim to introduce this checklist across other intensive care settings in the hospital to ascertain whether the improvement can be reproduced. Further prospective studies are needed to assess the effect of intervention on a long-term basis, the relationship between improvement and adverse outcomes and measures addressing other components of the handover process. **BJHM**

Conflict of interest: none.

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