

Every Little Helps



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Introduction

The National Health Service (NHS) is facing an unprecedented financial burden. We have to save up to £22 billion over next five years. Some savings can be obtained by efficient working but the majority can be achieved by working 'smartly' and reducing wastage. Our advances in medicine are putting greater pressure on our finances and therefore we need to be more focussed to ensure that the precious resources of the NHS are utilised as effectively as possible.

A large proportion of expenditure found in surgery is in the theatre environment [1]. Although implants, suture materials and cardiopulmonary bypass machine are the primary contributors to cardiac surgery costs, standardization of the surgical process provides an opportunity to decrease waste and improve efficiency. Cardiac surgeons can focus on the usage of instruments in theatre and assess the implementation of cost-effective measures to utilise the resources effectively. Several authors reported that across four different surgical specialties, the number of surgical instruments used per case ranged from 13-25% of the instruments contained on a surgical tray [2-4].

We found that a large proportion of instruments used in the cardiac surgery tray are consistently unused. Revising surgical trays with fewer instruments can result in significant cost savings [5]. The number of instruments on the surgical tray can be reduced by methodically investigating the requirements of individual instrument without compromising the fundamental principles of surgery or conflicting the surgeon's individual preference. The objective of the study was to identify the usage of instruments in common cardiac surgical tray and time utilised by the team in associated with processing unused instruments.

Methods

Study design

An observation study was conducted on surgical instruments in coronary artery bypass graft (CABG) trays. Data was collected from CABG operations over a period of four months. Four consultants in the unit were included in the study. Four cases

were observed in total from each consultant's theatre lists. The time was calculated to count the instruments by the scrub nurse. It was repeated three times for different grades of nurses.

Results

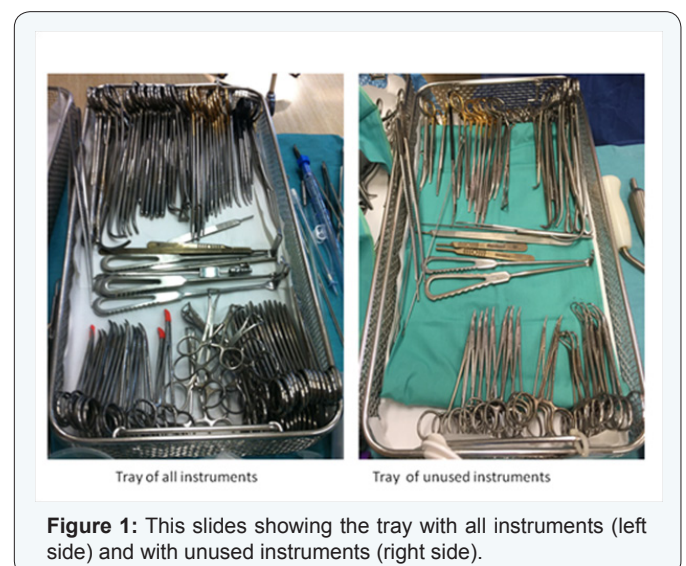


Figure 1: This slides showing the tray with all instruments (left side) and with unused instruments (right side).

A coronary artery bypass graft tray contains 119 instruments (Figure 1). Forty seven instruments were unused by one consultant at the end of the procedure. The table shows the individual consultants' usage of the instruments (Table 1).

Table 1: Showing the amount of redundancy in trays among four consultants.

	Unused instrument	Redundancy in percentage
Consultant A	47	39%
Consultant B	42	35%
Consultant C	39	32%
Consultant D	36	30%

It took three to four minutes by the scrub nurse to calculate all instruments in the tray. After removing the unused instruments, the time was reduced to 2mins. It is worthwhile to mention that

the scrub nurses count the number of instruments in every case three times (Table 2).

Table 2: Showing the amount of counting time for three nurses in trays with all instruments and with used instruments.

	Time to count trays with all instruments	Time to count trays with used instruments only	Time saved
Nurse 1	4min	2min 40sec	1min 20sec
Nurse 2	3min 40sec	2min 20sec	1min 20sec
Nurse 3	3min 10sec	2min	1min 10sec

Discussion

From our experience, we found that instruments are rarely removed from the trays. More often instruments are added to the trays and that trays have become heavier over the years. One of the trays weighed approximately 6.4kg. After removal of redundant instruments, the weight was reduced to 5.2kg. Heavy trays, and the physical consequences of handling these trays may contribute to an increase in the dropout rate of employees.

Florijn EP [3] studied a dataset of 12 tray types in the Academic Medical Centre (AMC) in Amsterdam, and found that on average 21% of the instruments in the dataset were obsolete. In our study, overall utilisation of the tray was low with substantial redundancy ranges from 30-39%. Another consequence of sterilizing unused instruments is the deterioration of the quality of material. This leads to a shorter life of the instruments and quicker replacement of instruments, resulting in higher costs. Less utilised instruments can be identified and replaced by a process of individual packing to meet surgeon specific needs. Single instrument packing can be employed for infrequently used instruments with a shelf life of 96 weeks. It will reduce the unnecessary processing of instruments, improve employee safety and cost effective practice [6]. Removal of redundant instruments can be ensured by effective input and instruction from surgeons and scrub nurses. In addition to individual trays, specific surgical trays (e.g. sternotomy open and closure tray) could be considered for review in order to eliminate unwanted instruments with potential savings of time, resources and cutting wastage.

It is well established that excess time spent counting instruments significantly compromises case progression in the theatre [7]. Time savings should be considered from the starting point of the cleaning, disinfecting and counting of instruments in the sterilisation unit [7,8]. Furthermore, autoclaving for smaller trays results in reduced sterilisation time. This improves the total turnover time of trays. There is reduced chance of missing instruments when fewer instruments are in the tray. We have to consider human error in this sterilisation process [9]. Stockert et al. [10] noted that there was a 49% error rate for trays with greater than 40 instruments contrasted against an error rate of 13% for trays with 40 instruments or less.

Van Meter et al. [4] have reported that excess processing cost can be saved by removing unwanted instruments from surgical tray [5]. We estimated that the cost for sterilisation of unused instruments per tray is £3.00. Average 17,630 coronary artery bypass procedure was done in 2013 in UK, we can save upto $17,630 \times £3.00 = £52,890$ [7]. If we apply similar principle in all cardiac surgery in 2013, the potential savings could be $36,134 \times £3.00 = £108,402$ in 2013 [11].

This simple concept can be applied to all surgical specialities. Here, we are looking for marginal gain. This small step in waste reduction and cost saving measures can make a considerable impact in the theatre management. This humble challenge should not be underestimated and can be translated into significant cost savings in the long term.

Limitations

Data was collected on only one surgical procedure in cardiac surgery. Usually, instruments are variable in different cases. The cost of individual packing of single instruments was not measured and compared with the set of instruments in the tray. We did not visit the sterilization suit and were not able to count the time spent to process the instruments over there.

Conclusion

This small study focuses on the advantages of small changes to reduce the cost and also to promote competency for utilising limited funding. Further research is warranted to investigate the efficiency of surgical processes for effective utilisation of precious resources in NHS.

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