Improving the recording of surgical drain output

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Abstract

Monitoring the output from surgical drains is an important part of post-operative care and is often undertaken poorly. Failure to have accurate documentation of daily outputs may delay the removal of drains and increase the risk of complications. Following discussions with medical and nursing staff we listed eight key criteria that should be routinely monitored for surgical drains. A baseline measurement demonstrated only 20% compliance with these criteria. As such we decided to design a chart, after discussing with the multidisciplinary team, with adequate space to document drain output clearly. Post-intervention data collection showed a reasonable uptake of the chart (70%) with overall criteria compliance increasing to 55%.

We made further interventions designed to raise awareness of the chart, which increased chart uptake to 79% and compliance to 63%, leading to the adoption of the chart by the department. Twelve months after introducing the chart we conducted a final data collection which demonstrated the chart was now being used in 100% of patients and that overall criteria compliance had increased to 78%. While some of the key criteria are still not documented for all patients, we have demonstrated that the introduction of a simple and well-designed drain chart can significantly improve the documentation of drain output, thereby improving patient safety and discharge efficiency.

Problem

Drain output is often an under appreciated area of patient care. Clear daily totals are required to accurately assess a patient's fluid balance and are often pertinent to the timing of drain removal.[1,2]

As junior doctors on a plastic surgery rotation we noticed we were having regular difficulty in finding a daily drain output as there was no uniformity in the location or quality of documentation. Reasons for this are multifactorial, but a significant issue has been the shift in hospital documentation towards "early warning systems" and algorithmic systems of observations[4] that do not include output from surgical drains and thus are unlikely to afford sufficient space on these charts.

A similar problem is faced by fluid charts. These typically require some degree of adaptation to account for up to six drains, as they are present with plastic surgery patients. While it is possible to adapt a fluid chart, it adds time and complexity to the workload of nursing staff and results in significant variability in both the quality and method used to record drain outputs.

This problem added both time and frustration to the morning ward round as well as increasing the risk to patients associated with delaying drain removal.

Background

The output from surgical drains often guides management as drains are commonly not removed until the wound bed drains <50 mls a day. Failure to have a clear 24 hour output often results in drains that could be safely removed staying in-situ for a further day, increasing the risk of unnecessary pain and infection.

Output of surgical drains should be monitored for procedural complications such as bleeding and as such, the type and location of drains needs to be quickly and accurately established. The minimum daily data set to be documented from each drain should therefore be the location and type of each drain, its 24 hour output, and the nature of the fluid draining, ie serous, serosanguinous, or seroprulent.

Also of note is that the fluid in the drain in the immediate post-operative period is usually wash or blood from the procedure and is not produced by the wound. Unless documented in recovery, this fluid will be added to the first days total and delay drain removal and risk further complications.[3]

Baseline measurement

Following discussions with the entire plastic surgery team we decided upon what information should be documented for drain output. The agreed list of key criteria that should be collected for each drain were:

- Twenty-four hour output

- Running total

- Location of drain (ie right breast)

- Type of drain

- Type of fluid in the drain (serous, blood etc)

- Time and date when the output was measured

- Volume in the drain in recovery and on return to the ward.

A prospective evaluation of current practice was undertaken looking at 20 plastic surgery patients over 23 days period. All patients with drains were included; a total of 38 with an average of 1.9 drains per patient. We assessed all documentation against the eight key criteria.

Baseline performance showed that 65% had a 24 hour total, 55% of drains has a clear location, 0% record of type of drain, 35% documented time of recording, 0% type of fluid draining, 5% volume recorded on return from theatre. Drain output data were recorded in the following places: 40% of total were only documented on the observation chart, 25% used a fluid chart, 30% used both fluid and observation chart, and 5% had no documentation.

Design

Following presentation at the monthly audit meeting we discussed the problem with the medical and nursing staff. We then designed a new drain chart specifically to address the weaknesses identified by the baseline measurement.

The chart had space for six drains with a layout similar to the hospital drug chart so it was easily recognisable to use and covered all key criteria. The charts were printed on bright yellow card so they could be easily identified in the patient notes. It was hoped that giving a suitable space for recording data would encourage good practice and reduce the variability in both the method and location of documenting drain output.

Strategy

PDSA cycle 1: The new drain charts were introduced into all plastic surgery patients notes when admitted to the elective surgical admission unit. We asked the operating surgeon to start the chart in theatre and it would then be a single point of reference for all important information about the patient's drains throughout their admission.

PDSA cycle 2: Following the baseline data collection, four weeks were allowed pass between the introduction of the chart and the reassessment. We recorded an overall improvement in key criteria documentation from 20% to 55%. To further improve awareness of the chart we presented the initial data at the sister's and matrons meeting as well as regularly attending the ward to check the charts were in the notes and people understood how to use them.

PDSA cycle 3: Identifying that chart compliance remained an issue, were also put a bright sticker on the front of drug charts to remind the nursing staff. The project was also represented at the plastic surgery audit meeting and at two nursing staff training days to encourage staff to carry out good practice by using the drain chart.

PDSA cycle 4: Twelve months following the introduction of the chart we found 100% uptake of the chart by ward based nursing staff however there is still poor compliance in theatre recovery. We are currently working with theatre nursing staff and hospital management to tackle this issue.

Results

Four weeks after the introduction of the chart we re-assessed drain documentation against the eight key criteria. We studied 20 plastic surgery patients (28 drains in total). Post intervention results showed a 70% uptake of the new drain chart, 55% had documented location, 70% clear time, 70% had type of drain documented, 75% had clear totals, 35% type of fluid draining, 45% had a chart started in recovery and 30% had a volume on return to the ward.

Of those with a chart; 20% also had total output documented on the observation chart, 5% on the fluid chart and 5% had volumes recorded on both. The results from all the key criteria from the baseline measurement and cycle 2 were averaged and demonstrated an overall improvement from 20% to 55% following the introduction of the chart.

PDSA cycle 3 demonstrated some improvement (79% chart use, 71% location of drain recorded, 86% clear time, 64% type of fluid in drain and 79% had a running total) as well as some areas of poorer performance (29% started in recovery, 25% had an volume on return to the ward). Overall compliance improved from 55% to 63% from cycles 2 to 3 respectively.

Following cycle 3 the drain chart was formally adopted as standard practise for all plastic surgery patients.

PDSA Cycle 4, twelve months post introduction of the chart, assessed a further 10 patients and demonstrated a 100% uptake in chart use with 100% drain location, time, total and running totals documented. Improvement was seen in type of fluid (80%), and type of drain (70%). Documentation of the volume on return to ward and chart started in recovery were still poor at 30% and 20% respectively. Overall criteria compliance improved further to 78%.

Lessons and limitations

This is the first study to the authors' knowledge that has specifically assessed the methods used to document drain output and seek to improve it.

Whilst we did see an overall improvement in the compliance with most key criteria there were some (chart started in recovery, volume on admission to ward and type of drain) which had persistently poorer compliance. We suspect that uptake of the chart in recovery was poor due to the high turnover of staff and we were not able to maintain enough of a presence to change their practice. The failure to start the chart in recovery then makes it unlikely that an admission volume will be documented on return to the ward. Further involvement of important stakeholders could improve compliance throughout the patient admission.

Better relations with hospital management through a dedication QI team can greatly reduce the stress and difficulties involved hospital bureaucracy.

In restricting the study to plastic surgery patients and a single ward,

we can only speculate as to whether this chart would be as well used in general surgery or other surgical specialities. This restriction was implemented due to time pressures and further studies could assess the use of this chart in other surgical settings. Other limitations include a small sample sizes in each PDSA cycle.

Conclusion

Monitoring the output from surgical drains is important part of post-operative care. We have demonstrated that a well-constructed and simple chart improves the quality and quantity of data collected. This simple intervention has improved patient safety, the efficiency of patient discharge and the stress of the surgical ward round.

References

1. Okada N, Narita Y, Takada M, et al. Early removal of drains and the incidence of seroma after breast surgery. Breast Cancer 2013:1-5.
2. Barton A, Blitz M, Callahan D, Yakimets W, Adams D, Dabbs K. Early removal of postmastectomy drains is not beneficial: results from a halted randomized controlled trial. Am J Surg 2006;191(5):652-6.
3. Degnim AC, Scow JS, Hoskin TL, et al. Randomized controlled trial to reduce bacterial colonization of surgical drains after breast and axillary operations. Ann Surg 2013;258(2):240-7.
4. Kim H, Dykes PC, Thomas D, Winfield LA, Rocha RA. A closer look at nursing documentation on paper forms: Preparation for computerizing a nursing documentation system. Comput Biol Med 2011;41(4):182-9.

Declaration of interests

There are no conflicts of interests associated with this project.

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Ethical approval

This project was an improvement study and not original research on human subjects. Local policy meana that ethical approval was not required