Improving Peripherally Inserted Central Catheter (PICC) care on a Trauma and Orthopaedics ward

Marta Piorkowska, Zahra Al-Raweshidy, Keefai Yeong

Abstract

Peripherally Inserted Central Catheter (PICC) blockage rate was audited over a two month period on the Trauma & Orthopaedics ward at our District General Hospital. A 70% (five out of seven) PICC blockage rate was observed. High blockage rates lead to potential treatment complications, delays in delivery of treatment, increase in costs, and reduction in patient satisfaction. The factors contributing to the significant blockage rate include, long and contradictory PICC care guidelines, no information sheets in the patient notes, lack of training and awareness about care of, and flushing of, PICC lines, and lack of accountability for PICC flushing. Our project aimed to achieve a greater rate of PICC patency. We produced one succinct and comprehensive PICC care guideline, carried out staff training sessions, introduced a sticker reminding staff to flush the PICC line after use, and introduced a prescription of weekly heparin saline and PRN saline flushes (for monitoring and accountability). We used questionnaires to assess competency of hospital staff pre-teaching (doctors 6%, nurses 0%), and post-teaching (doctors 70%, nurses 38%). Blockage rate data post-intervention is pending. Education improved awareness of guidelines amongst staff and we anticipate that the proposed interventions will translate into reduced blockage rates, improving patient outcomes and reducing costs.

Problem

We observed a high (5 out of 7 lines, 70%) rate of PICC blockages on the Trauma and Orthopaedics Ward over a two month period. This led to compromised patient care by delaying drug administration and blood sampling whilst alternative intravenous access was obtained. Blockages were also associated with reduced patient satisfaction, as patients suffered with complications associated with delayed treatment. The cost of treatment increased with the need to replace the PICC. PICC blockages were considered to be time consuming for staff and distracting from other daily duties. Some of the PICCs were blocking repeatedly which was very frustrating for both the staff and patients.

To identify the contributing factors we compared current practice against the local and manufacturer’s guidelines and found considerable deviation from guidelines. The following problems were identified:

1. Long and contradictory PICC care guidelines which were difficult to find
2. Lack of information sheets provided in the notes of patients who had a PICC inserted
3. Lack of documentation and accountability regarding flushing PICCs
4. Lack of training and awareness of ward staff regarding care of PICCs

Background

PICCs are Peripherally Inserted Central Catheters used in patients requiring long term venous access. They may be safer than conventional central lines and can stay in-situ for longer. Indications for use include administration of long term antibiotics, chemotherapy, or total parenteral nutrition (TPN). As with other types of lines, PICCs are subject to complications.

The literature surrounding PICC blockage in the adult population is scarce. The majority of research concentrates on neonatal and paediatric practice, where complications associated with PICCs are well recognised. Barrier et al (1) reported that in their study of an immunocompetent paediatric population, more than 30% of PICCs developed at least one complication. A neonatal intensive care study undertaken by McCoy et al (2) looked at 1148 PICCs. 164 (14%) of these lines were replaced, either because of blockage, or migration of the line.

Baseline Measurement

We sampled all inpatients with indwelling PICCs over a period of two months on the Trauma & Orthopaedics (T&O) ward where we were working as Foundation Year 1 Doctors. Five out of the seven (70%) patients with PICCs in situ were affected by line blockage; some on multiple occasions. There was no formal documentation of blockages that had been resolved. Out of the five PICCs affected by blockage, two were unsuccessfully unblocked on the ward and required PICC exchange. This suggests that PICC exchange data would underestimate the scale of the problem.

Subsequently, hospital wide PICC activity was audited. There were 192 inpatient PICCs inserted in the hospital between October 2011 and 2012. 48 of those (25%) were inserted for T&O ward patients. During this period, 21 PICCs required exchange (11%). 8 out of 48 (17%) PICCs on the T&O ward required replacement compared with 13 out of 144 PICCs (9%) on other wards. This further alerted us to suboptimal PICC care on our ward. PICC blockage rates
the PICC line for: blood sampling, drug and fluid administration as
and easily available. Flow charts illustrated the steps of accessing
guidelines that, according to staff feedback, was clear, succinct,
be obvious from documentation in the drug chart. We produced two
a more consistent way. Non-adherence to the flushing regimen will
uniformity in practice and we believe the flushing will be executed in
departments to design new guidelines. We advocated prescription
on patient care. In future we would consult individuals involved in
approximately £1,000. There were 21 PICC exchanges
PICC replacement (either exchange or new insertion) was also
in our hospital within one year (2011-2012). If PICC
rates, improving patient outcomes, and reducing cost.
Estimating the cost of a single PICC insertion is difficult within the
NHS setting. Considering the approximate cost of the PICC, time
spent in the interventional radiology suite and staff involved, the
cost was estimated to be approximately £1,000. The cost of the
PICC replacement (either exchange or new insertion) was also
estimated at approximately £1,000. There were 21 PICC exchanges
undertaken in our hospital within one year (2011-2012). If PICC
exchange rate was halved, there is a potential for over £10,000
annually. Moreover, there is also a hidden cost; which
might be even greater, in time and effort needed to unblock PICCs
on the ward. The entire cost of printing the new guidelines and
stickers will amount to a fraction of the cost of one PICC exchange.

Lessons and Limitations

The biggest barrier to change came from staff reluctant to change
embbeded practice. This was overcome by communicating the
need for change and emphasising the benefits of change in
decreasing workload long-term.

We have learnt that simple measures can have a significant impact
on patient care. In future we would consult individuals involved in
the change process earlier on in the project. We also found that our
project sometimes was slowed down by other work commitments.
We hope to solve this problem by recruiting colleagues to assist us.

We have assumed that the size of the problem of PICC blockages
is greater than the PICC exchange rate from our audit on the
Trauma & Orthopaedics ward. It can be argued that a greater
sample of wards would be needed to justify such an assertion.

Conclusion

(14%) were comparable with data from a randomised controlled
study by Kamala et al (3) which highlights that this problem is not
confined to our hospital. Through problem analysis, we identified
poor staff training as one of the potential contributors to PICC
blockages. We assessed staff competency and confidence levels
regarding PICC care using a questionnaire based on PICC care
guidelines. Competency was assessed with an informal extended
matching questions test; all stems needed to be answered correctly
to be awarded a point. Nurses (n=8) all scored 0% whilst junior
doctors (n=30) answered 6% of questions correctly. This lack of
knowledge did not translate into low confidence levels. Staff were
asked to rate their confidence level in dealing with PICCs on a scale
of 1 (0%) to 5 (100%). Average confidence levels were 65%
amongst nurses and 38% amongst junior doctors (Table 1).

We asked staff about their potential ideas for change and discuss
our planned interventions to gauge feedback. Staff questionnaires
highlighted that both nurses and junior doctors were not familiar
with flushing regimens. Furthermore, as the flushes were neither
prescribed nor signed for, there was no monitoring or accountability
for the flushing of PICCs.

Feedback from nursing staff identified that due to shift patterns of
work, it was difficult to keep track of when the PICCs were flushed
and by whom. Nursing staff reported that this information was rarely
handed over. In conjunction with nursing staff, decided to prescribe
flushes on the drug chart.

We decided to carry out small-group hands-on teaching tailored to
specific staff groups. This was, however, time consuming. We
covered accessing PICCs, appropriate care to minimise risk of
blockage, infection, and splitting of the line.

Another intervention we designed was a sticker with simple and
clear instructions reminding users to flush the PICC after use. Aide-
memoires already in practice, for example stickers reminding the
need to replace a cannula, are in widespread use, and are
considered effective.

We collaborated with the radiology and infection control
departments to design new guidelines. We advocated prescription
of weekly heparin saline and as required (PRN) saline flushes for all
patients with PICCs through our guidelines. The guidelines outline
appropriate prescription of flushes and indications for PRN flushes.
By mandatory prescribing of the flushes on the drug chart, there is
uniformity in practice and we believe the flushing will be executed in
a more consistent way. Non-adherence to the flushing regimen will
be obvious from documentation in the drug chart. We produced two
guidelines that, according to staff feedback, was clear, succinct,
and easily available. Flow charts illustrated the steps of accessing
the PICC line for: blood sampling, drug and fluid administration as
well as how to manage a blocked line. One guideline was a short
reference guideline available on the wards and in the patient notes.
Second was a comprehensive guideline with detailed instructions
on care of PICCs. Both guidelines are now available on the Trust
Intranet.

We measured the improvement of staff competency and confidence
levels in caring for PICCs following a training session (Table 2). Our
results were very encouraging. Competence levels increased from
6% to 70%, (absolute improvement of 64%) for junior doctors, and
from 0% to 38%, (absolute improvement of 38%) for nurses.

Staff confidence levels followed a similar trend. We observed an
increase in confidence levels from 38% to 66% (absolute
improvement of 28%) for junior doctors and from 65% to 80%
(absolute improvement of 15%) for nurses. We are in the process of
implementing all the changes described, and we aim to re-audit
PICC blockages and exchanges three months post-intervention. We
anticipate our interventions will translate into reduced blockage
rates, improving patient outcomes, and reducing cost.

We have assumed that the size of the problem of PICC blockages
is greater than the PICC exchange rate from our audit on the
Trauma & Orthopaedics ward. It can be argued that a greater
sample of wards would be needed to justify such an assertion.
There is a lack of PICC care training for staff. Existing information leaflets were unclear and staff were unaware of where to access them. There was little insight from nursing staff as to the degree of variation in current practice from local guidelines and there was no accountability for PICC care. Our interventions should reduce delays in patient care (e.g. delivery of IV antibiotics), improve patient satisfaction and lead to a reduction in cost and overall reduction in workload for staff.

References

