A Quality Improvement Project on Heparin Infusion Safety in an Acute Teaching Hospital

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Introduction

Problem: Anticoagulants such as unfractionated heparin (UFH) are recognised as high risk drugs. UFH requires frequent monitoring of the activated partial thromboplastic time ratio (APTTr), ensuring therapeutic anticoagulation and minimising adverse effects. UFH infusions and the APTTr were recorded using a paper based system. Incident reporting identified the paper based system resulted in inappropriate monitoring and management of UFH infusions, and dose omissions which could have resulted in patient harm.

A Trust-wide electronic prescribing and medicines administration (EPMA) system was implemented in 2015. Complex infusions e.g. UFH infusions remained on paper due to EPMA functionality limitations. The complex infusion function was added into later EPMA upgrades. A multidisciplinary team (MDT) involving nursing, medical and pharmacy staff working within anticoagulation, EPMA and medication safety sought to design UFH infusions in EPMA.

Aims

To implement an EPMA system to replace paper for the prescribing, monitoring and administration of UFH infusions for all non-critical care adult inpatients, and to reduce the risk of error associated with UFH infusions.

Strategy for change

Prior to EPMA system launch:

- MDT analysed reported heparin incidents thereby identifying trends, revised the UFH infusion guideline, prescribing and monitoring.
- EPMA UFH infusion order set developed for prescribing, monitoring and administration.
- Ratification at Trust governance committees.
- End user testing with nursing and medical staff.
- Developed staff training videos and circulated to the Trust.
- Face to face training for nursing, medical and pharmacy staff.

Post EPMA system launch:

- Daily referral to senior anticoagulation pharmacist to review patients initiated/continued on heparin infusions to ensure medical/nursing staff were competent with the new process.

Method

Baseline audit (Paper system)*

- Patients prescribed UFH infusions (n=14) during March 2016 were identified by using IT SharePoint (e-reporting) by searching for the UFH infusion placeholder.
- Performance was measured against eight audit standards.**

Re-audit (EPMA system)*

- Patients prescribed UFH infusions (n=26) during March 2019 were identified by using IT SharePoint by searching for those prescribed a UFH infusion on the EPMA system.
- Performance was measured against the same eight audit standards.**
- Chi square applied to results to test for statistical significance.

Incident rate per prescription

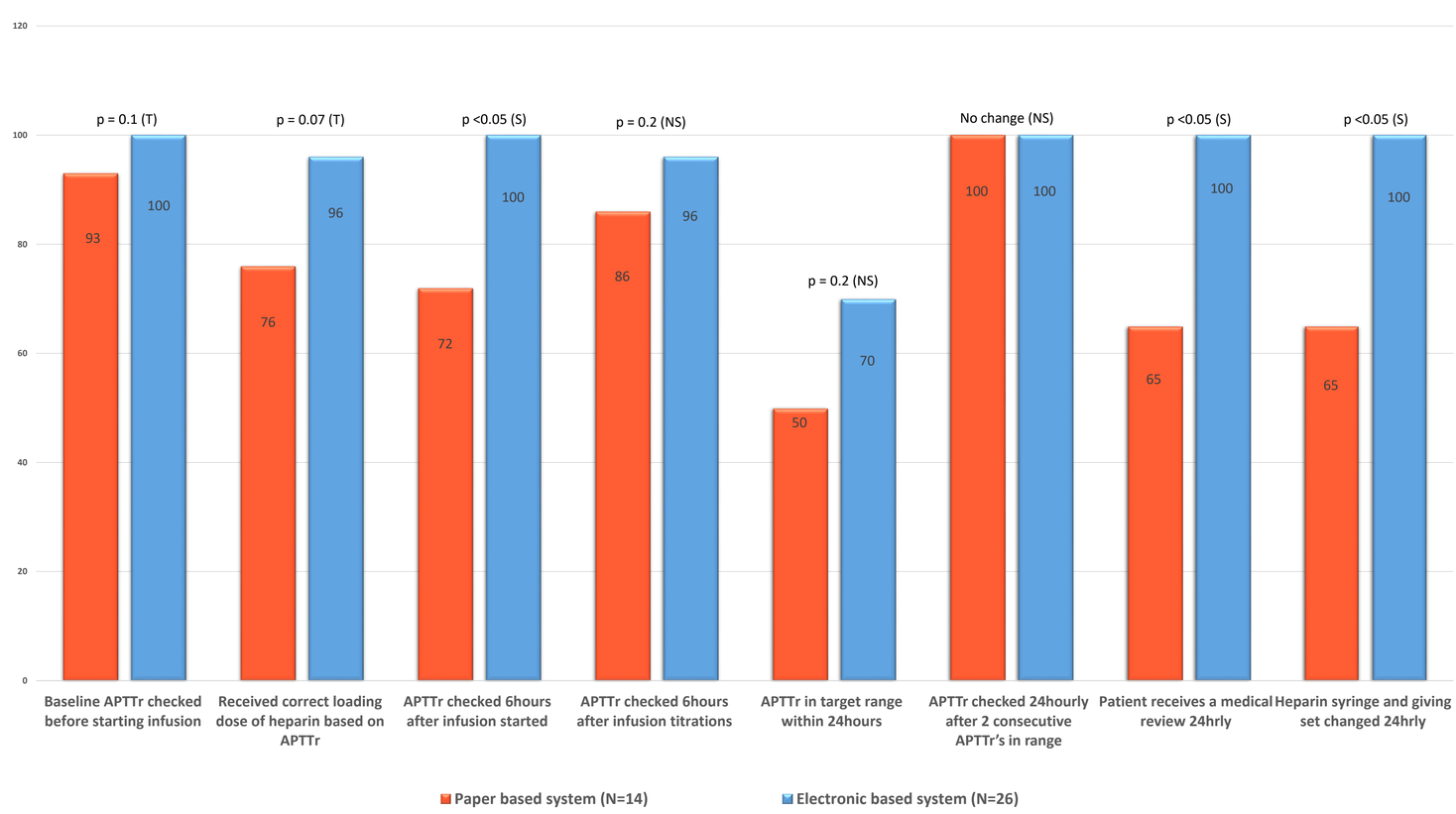
- The Datix system was searched to identify heparin incidents reported during the data collection periods.

*Ethics approval was not required but was registered as an audit.

**See results section for audit standards.

Results

Percentage of patients meeting eight audit standards on paper (n=14) and electronic systems (n=26)



UFH related incidents reduced from one incident per 1.6 infusions, to one incident per 6.5 infusions following the implementation of an EPMA system.

UFH incidents as a proportion of all anticoagulant incidents reduced from 43% (March 2016) to 20% (March 2019).

Discussion and limitations

Discussion: E-prescribing plus expert input improved UFH infusion use and reduced the number of incidents as reported. Moving UFH infusions to EPMA means less work for pharmacists to review the prescription (no longer searching for paper prescriptions), and facilitates the remote review of patients on a UFH infusion.
In seven standards, improvement in the monitoring, quality and safety of UFH infusions was observed (three showed statistically significant results $p<0.05$), and 2 showed trend for improvement $p=0.1 – 0.06$). In one standard, there was no change from the baseline audit (both audits scored 100% compliance for this standard).

Limitations:

- A small sample size limited the significance of some clinical standards assessed.
- There is a 3 year time difference between the baseline and re-audit.

Conclusion

An electronic solution for high-risk, complex infusions such as UFH prescribing and monitoring improved the safety and quality of care. However, such changes take significant time and staff to develop and implement.

https://www.ehnp.eu/gpis/quality-improvement-project-heparin-infusion-safety-acute-teaching-hospital

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