Surgical Audit

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Enhancing Peripheral IV Cannula Management: A Clinical Audit on Optimal Replacement Time, Post-Insertion Documentation, and Rate of Superficial Phlebitis in Surgical Wards

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Cite this article as: *Jamal Z, Khubaib H, Shahzad F, Nawaz M, Hadi A, Safdar S, Waqar SH. Enhancing Peripheral IV Cannula Management: A Clinical Audit on Optimal Replacement Time, Post-Insertion Documentation, and Rate of Superficial Phlebitis in Surgical Wards. Ann Pak Inst Med Sci. 2025; 21(1):19-23. doi. 10.48036/apims.v21i1.1493*

Introduction

Peripheral Intravenous (IV) cannulation is a routine invasive procedure in surgical wards, crucial for delivering medications and fluids. However, the optimal timing for replacing peripheral IV cannula and the adequacy of post-insertion documentation are critical factors influencing patient safety and quality of care. The timing for changing IV cannula is a crucial aspect of patient care, impacting both clinical outcomes and resource utilization. Additionally, the occurrence of superficial phlebitis, a common complication of IV cannulation seen in surgical wards, necessitates attention to cannula management practices. This synopsis presents the methodology, findings, and implications of a clinical audit aimed at evaluating the adherence to the optimal timing for changing IV according to the clinical guidelines and the rates of superficial phlebitis in surgical wards.

A six-member team was established in the General Surgery department to carry out the audit including data collection, data analysis and data presentation.

Aim, Objective & Standard

Aim: To optimize IV cannulation replacement time and management for better clinical outcomes and resource utilization.

Objectives: The primary objectives of this clinical audit were to be:

1. Assess compliance with guidelines after reviewing existing and updated protocols and literature regarding the optimal timing for changing IV cannula in surgical ward
2. Evaluate the incidence rates of superficial phlebitis associated with IV cannulation.
3. Collection of data through retrospective review of patient records, nursing notes, focusing on IV cannula insertion and removal dates, clinical practices, documentation completeness, and incidence of superficial phlebitis.
4. Analysis of data to determine compliance with guidelines, assess rates of superficial phlebitis, and identify factors associated with delayed cannula replacement and documentation of deficiencies.
5. Development and implementation of targeted interventions, such as staff education, protocol revisions, and introduction of documentation tools or systems.
6. Monitoring of the impact of interventions through follow-up audits, ongoing data analysis, and assessment of superficial phlebitis rates and documentation quality.

Standards

- US Centers for Disease Control guidelines recommend replacement of peripheral intravenous catheters (PIVCs) no more frequently than every 72 to 96 hours.[1]
- According to NICE, PIVCs should be replaced when clinically indicated and not routinely. The catheter should be removed if complications occur

or when it is no longer needed.[2]

- Current literature indicates the optimal replacement time of an intravenous catheter, ranges from when "clinically indicated" (i.e. signs of complications such as infection, occlusion, and/or phlebitis) to three days.[3]
- The accepted rate of phlebitis from an intravenous (IV) cannula is 5% or less, as recommended by the Infusion Nurses Society (INS).[4,5]

Study Population and Methods

Study Population: The audit was conducted on patients inclusive of Department of General Surgery, Pakistan Institute of Medical Sciences, Islamabad. All pre-operative, post-operative and patients under conservative management of both genders and all age groups irrespective of diagnosis and surgical procedure were included.

Study design and Duration: A retrospective study was conducted over a period of six months constituted of two audit loops. First loop period was from April 2024 till June, 2024 in which data collection and data analysis was done to rule out the adherence to the updated standard protocols and intervention plan was recommended. Second loop period was from July 2024 to September 2024 which constituted of implementation of the intervention plan and improvement analyses by re data collection and analysis.

First Loop: April-June 2024

Sample size: Total number of patients was 110.

Data Collection: Data was collected for a period of 3 months by a four-member team through a retrospective review of patient records, nursing notes, detailed cannula history, cannula inspection through well-constructed detailed data proforma. Data collection was done to investigate the three parameters in consideration as following:

1. Cannula Replacement Intervals
2. Rate of Phlebitis and other variables
3. Post-Cannula Documentation

Data Analysis: Data was entered and analyzed on each parameter separately on Google Sheets respectively.

Results & Data Analysis

1. Cannula Replacement Intervals: Initially, data was collected on the first parameter under study "the total number of cannulas changed per patient" during their admission period in the ward. It was deduced that out of 110 patient cannula replacement rate as displayed in (figure 1) showed that 30 patients had only 1 cannula replaced, 39 had 2 cannulas, 18 had 3 cannulas, and 23 patients had more than three cannulas replaced. With a majority of 35% patients had an average of 2 cannulas replaced.

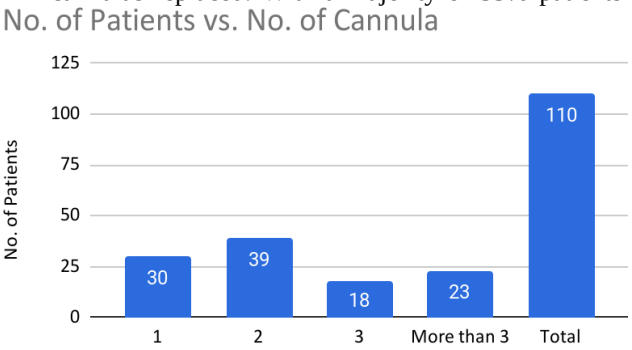


Figure 1. No of Cannula Replacement

Figure 2 shows time interval between first replacement on the IV cannulas. The interval, peaked on the very "1st day" after insertion, and after "more than 5 days". And it can be observed that both deviate drastically from the standard optimal time frame i.e. (3 - 4 days).

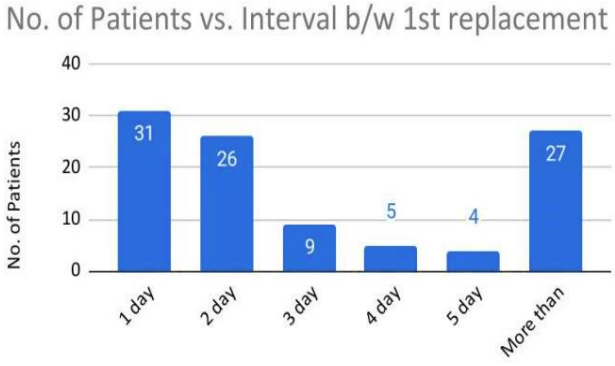


Figure 2. Interval b/w 1st replacement.

Figure 3 shows the time interval between second replacement which likewise, peaked on "1st day" and "more than 5 days" respectively and in this figure a similar trend being followed.

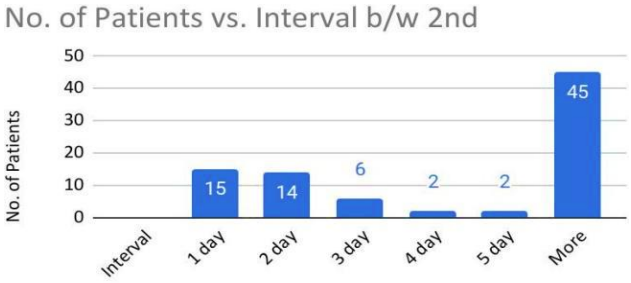


Figure 3. Interval b/w 2nd replacement

Figure 4 shows the time interval of third cannula replacement with similar results peaking on "1st day" and "more than 5 days". These results clearly demonstrate that cannulas were being changed either too early or too late with reference to the issued guidelines.

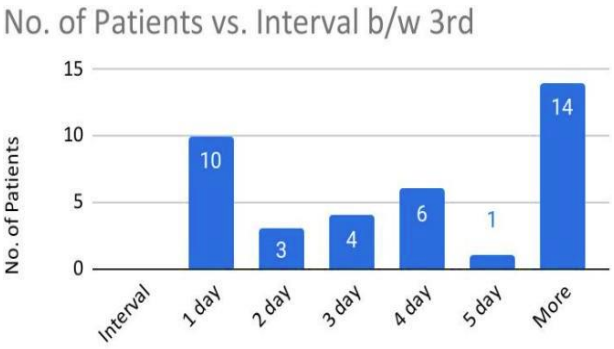
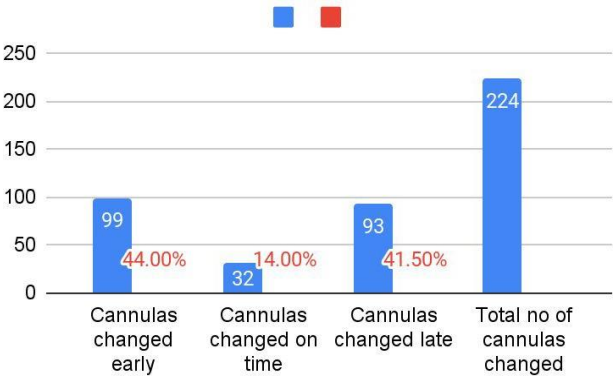


Figure 4. Interval b/w 3rd replacement.

Data was further analyzed. Out of 224 a total of cannulas that were changed in 110 patients, only 14% were changed on time. 99/224 (44%) were changed earlier and 93/224 (93%) were changed later than the standard time frame.



2. Rate of Phlebitis: 'Phlebitis is inflammation of a vein near the surface of the skin. It's not usually serious and often gets better on its own after 1 or 2 weeks', as per the definition currently used by the NHS. Phlebitis is also sometimes known as superficial thrombophlebitis or superficial vein thrombosis. Further data was collected through inspection to calculate the rate of phlebitis using Visual Infusion Phlebitis Score and associated signs and symptoms. Signs and symptoms include pain, tenderness, swelling and pyrexia, erythema, induration and palpable venous cord over the cannula site.

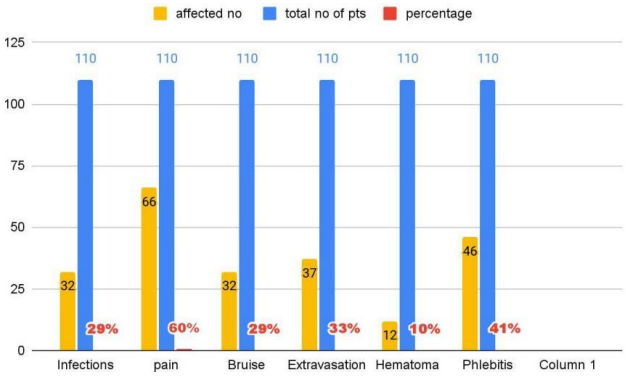
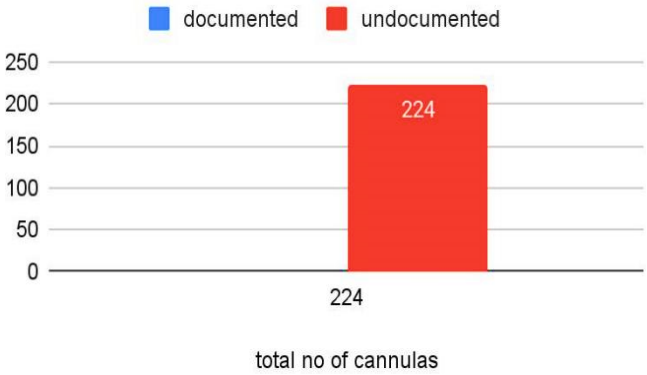


Figure 5 shows among all the variables taken into account, pain peaked among 66/110 (60%) of total patients with phlebitis among 46/110 (41%). The accepted rate of phlebitis from (IV) cannula is 5% or less, as recommended by the Infusion Nurses Society (INS).

3. Documented vs Undocumented Cannulas: Data was collected on documentation of cannulas through nursing notes and cannula site inspection. It was noted that no documentation is being done in the surgical ward regarding cannula insertion and removal dates. 0/224 cannulas had any dates documented on them.



Conclusions

The audit revealed based on data collection on three parameters that were investigated, analyzed and compared to the standard guidelines it is to be concluded that

1. Optimal cannula replacement time is massively deviated from the standard time frame in surgical

wards leading to only 14% of cannulas changed on time, 44% to be replaced early and 41% replaced late which requires immense attention to cannula management practice and shortcomings leading to huge deviation.

2. Rate of Phlebitis calculated in wards is 41% whereas the accepted incidence of phlebitis is 5% which shows a huge impact of poor cannula management clinically.
3. Documentation notes regarding cannula insertion and replacement dates were completely absent.
4. The audit revealed aforementioned findings, indicating substantial variability in practice regarding the timing for changing peripheral IV cannulas, high incidence of phlebitis rate and deficiencies in post-insertion documentation, highlighting the need for targeted interventions to improve practice consistency and documentation accuracy.

Second Loop: July-September 2024

Interventions:

Based on the audit findings, several interventions were implemented, including:

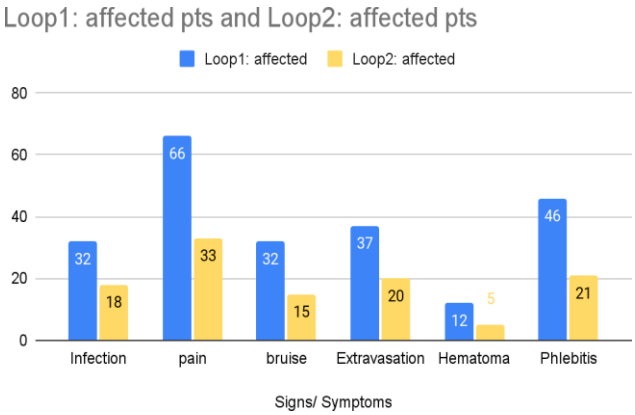
1. Education and training sessions for healthcare staff on guidelines for peripheral IV cannula management and documentation standards
2. Circulation and pasting of educational awareness posters in surgical wards for the awareness of both patients and staff members for better IV care and replacement management.
3. Right size of cannula insertion on first attempt was promoted to enhance patient comfort and to avoid complications and frequent early removal of cannulas.
4. Implementation of documentation templates in patient files to facilitate standardized and comprehensive documentation.
5. Introduction of regular audit cycles to monitor compliance with guidelines and sustain improvements over time.

Loop two

After implementation of interventions, second loop of audit was carried out to check the rate of phlebitis and other associated infection symptoms which showed a drastic improvement overall.

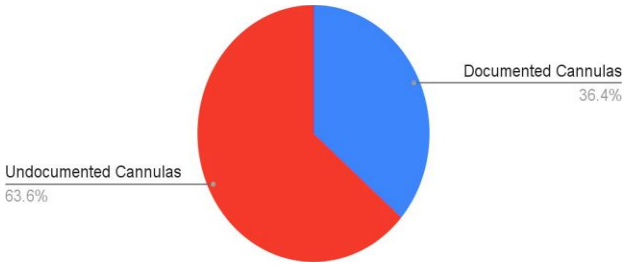
Data analysis and Results

Rate of phlebitis and complications: Rate of phlebitis and other infection related cannula complications of Loop 1 and Loop 2 are compared, which shows improvement in all parameters. It is to be noted that the rate of phlebitis was reduced from 46% to 21% and infection was reduced



from 32% to 18%.

Cannulas Documentation: It is to be noted documentation rate improved from 0 to 36% with the aforementioned



implementation

Impact

Preliminary data suggests that interventions have led to very positive outcomes in short duration of time, good improvement was noticed including increased adherence to guidelines and improvement in the quality of cannula insertion and cannula replacement time management with enhanced post-insertion documentation. This can be improved further with ongoing monitoring and evaluation conducted to assess the sustained impact of interventions and identify further areas for enhancement.

Conclusion

This clinical audit underscores the importance of standardized practices and documentation in peripheral IV cannula management. By identifying gaps in practice

and implementing targeted interventions, healthcare facilities can improve patient safety, optimize resource utilization, and enhance the quality of care provided. Continued commitment to quality improvement through regular audits and ongoing education is essential for ensuring the delivery of safe and effective healthcare services.

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