AN AUDIT FOR PERIPHERALLY INSERTED CENTRAL CATHETER AT TERTIARY CARE CENTER

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ABSTRACT

BACKGROUND: Venous access is a critical issue in the care and management of wide variety of patients. Central venous catheters are required for long-term venous access. Peripherally inserted central catheters provide effective, short and intermediate term intravenous access. PICCs have several potential advantages including use of local anesthesia, a low risk of major hemorrhage, and no risk of pneumothorax. PICCs are now increasingly placed by interventional radiologists. With use of fluoroscopic and ultrasound guidance higher success rates are achieved. The aim of this study was to evaluate the success and immediate complication rates. **OBJECTIVE:** To evaluate the success and immediate complication rates of radiologically inserted PICC. **MATERIALS AND METHODS:** Six months data was retrospectively evaluated of patients who underwent PICC insertion in interventional suit of our department. All procedures were performed under strict aseptic measures after infiltrating local anesthesia. 4 Fr single lumen catheters were inserted in all patients under fluoroscopy guidance after ultrasound guided puncture of an arm vein. Clotting parameters of all patients were assessed prior to venous puncture. Tip of the catheters were placed in distal third of superior vena cava. **RESULTS:** Total of 416 PICC lines were inserted in 337 patients. 279 (82.7%) patients underwent single insertion and 58 (17.2%) patients underwent multiple insertions. 58 patients had multiple insertions total 137 (32.9%) PICC lines were placed. Success rate for PICC insertion was 99.52%. Immediate complication rate for was 0.48%. **CONCLUSION:** Radiologically guided placement of PICC is a simple, safe and effective procedure in patients requiring venous access.

Keywords: Catheters, central venous access, Interventional procedures.

Introduction

Venous access is vital for providing care and management to a wide variety of patients. Medium-term to long-term access is required for purposes like chemotherapy, long-term antibiotics and parenteral nutrition.[1, 2] Peripheral IV cannula frequently become infected and has average life of 72-96 hours.[3] Peripheral veins get damaged by infusion of antibiotics high-osmolality solutions & parenteral nutrition. Peripherally inserted central catheters offer certain advantages over other forms of long-term venous access.

1. Radiologically guided Peripheral Insertion of Central Catheter (PICC) have high success rates with low complication rates as they are inserted via peripheral veins (usually in the upper limb) without general anesthesia or sedation, and unlike other indwelling central venous catheters (CVCs), are neither tunneled nor implanted and thus do not require a surgical procedure for insertion. Peripherally inserted central catheters (PICC) are also easier to remove and cost analysis suggests that PICCs are less expensive to insert than tunneled CVCs or implanted vascular access ports.[4,5,6,7,8] We performed an audit to evaluate the success of PICC inserted in our department for various clinical indication and assessed the immediate complication rates.

Objective

To evaluate the success and immediate complication rates of radiologically guided PICC insertion.

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Materials and Methods

This was a retrospective study carried out at Department of Radiology; Aga Khan University Hospital. All patients who underwent PICC insertion between the duration of January 2008 to July 2008 were evaluated for procedural success, safety and complication rate.

Platelet count was checked prior to procedure to avoid excessive bleeding or risk of hematoma formation. Platelets were transfused when the platelet count is below 30,000. Informed consent was obtained from patient or relative. Patient was cleaned and draped in sterile manner with long sheets to avoid infection. The attending radiologist wears mask and sterile gown. 4 Fr single lumen catheters (arrow) were inserted in basilic, brachial or cephalic vein under ultrasound and fluoroscopy guidance over wire and using peel away sheath. Tip of catheter was positioned in distal SVC. In a few cases because of central stenosis the tip was left in the brachiocephalic vein. Catheters were secured by external stat lock device.

Results

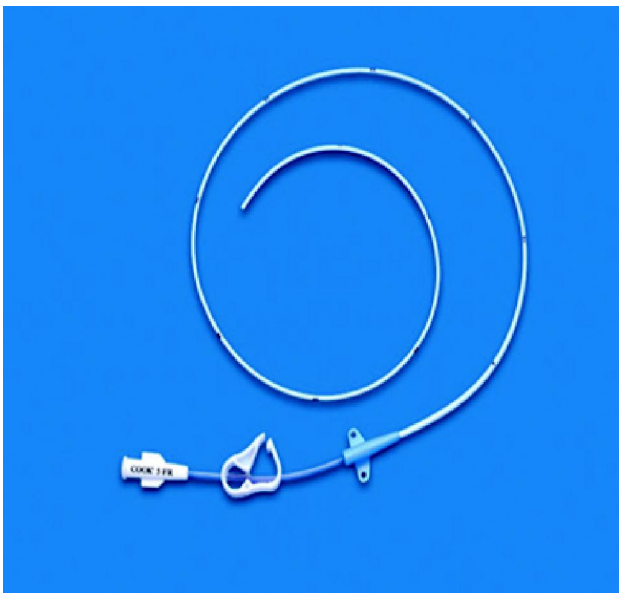
A total of 416 PICC lines were inserted in 337 patients between January 2008 and July 2008. 279(82.7%) had single PICC inserted. Fifty eight (17.3%) patients had more than one PICC placed during the study period; 43 patients had two PICCs inserted while 40 patients had three PICCs inserted. 4 patients had 4 PICC line and 1 had 5 five lines inserted.

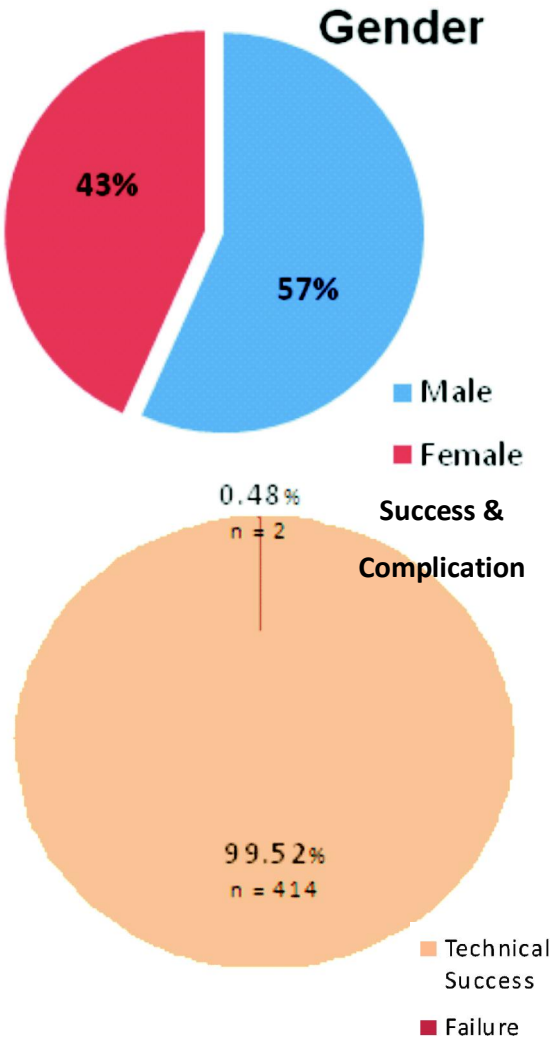
Overall, there was a slight male predominance, with age range 5 months to 86 years. The indication for PICC insertion was intravenous access in 107 patients with most having difficult cannulation; infusional chemotherapy in 128 patients, 102 patients had PICC line inserted for long term antibiotic injection as in cases of cellulitis, osteomyelitis, abdominal collections etc. The right basilic vein was the most frequently used site for PICC insertion.

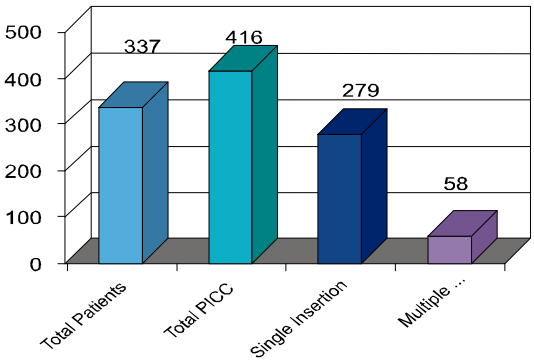
Successful placement of PICC was possible in 414 patients (99.5%) with inability to pass the line in 2 patients (0.48%). The reason for failure in these patients was fracture of floppy end of mandrill wire in one patient and thrombosis of vessels during intervention in other patient.

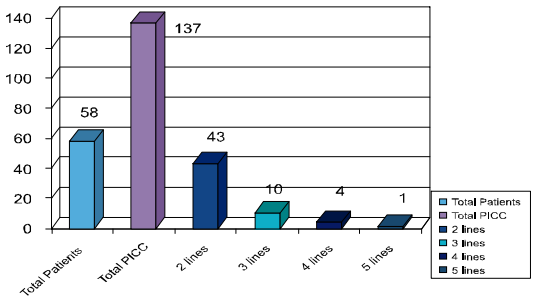
Table 1: Demographic data and Reason for peripherally inserted central catheter (PICC).

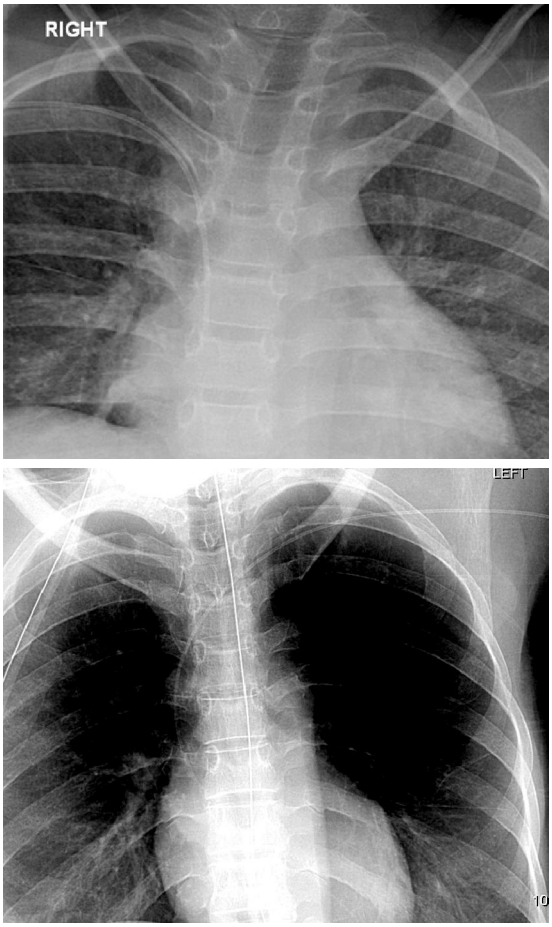
Characteristic	No. of Patients	%
Gender		
Male	236	56.8
Female	180	43.2
Age (years)		
≤10	11	2.0
11 - 20	36	8.6
21 - 30	77	18.5
31 - 40	41	9.8
41 - 50	79	18.9
51 - 60	68	16.3
61 - 70	55	13.2
71 - 80	32	7.6
>80	17	4.0
Indication for PICC		
Intravenous fluids, medications	102	
Chemotherapy	128	
Miscellaneous	107	
Site of PICC insertion		
Right basilic vein	273	
Right brachial vein	46	
Right cephalic vein	21	
Left basilic vein	58	
Left brachial vein	16	
Left cephalic vein	2	











PICCs were removed by primary physicians with main reason for removal being completion of therapy including chemotherapy, IV antibiotics or total parenteral nutrition. Other reasons included infection of PICC or thrombosis of the involved vein however our study has the limitation of not having detailed data of follow up.

Immediate complications included thrombosis of vessel. There were no PICC-related deaths. The demographic and disease characteristics influence on risk of complications was not formally analysed due to the small number of complications although no obvious trend was seen across patient subgroups.

Discussion

All over the world PICC's are increasingly placed by interventional radiologists in angiography suite. Advantages of radiological insertion are outpatient procedure, simple insertion, use of local anesthesia, low risk of major hemorrhage. No risk of pneumothorax or hemothorax. Facilitates transition from hospital to home based care resulting in decreased length of

hospital stay, which usually is one factor of decrease in cost for patients and increase in cost for institution because of occupancy. The shorter stay also put into account a significant factor of minimizing the possibility of hospital acquired infection the greater the length of stay the greater are the chances of acquiring infections. PICC's are well suited for treatments lasting several weeks to 6 months with frequent need for access. Risk of complications is low when compared with surgical complications of CVC insertion. Possible complications include arterial puncture, catheter damage or mal-position, infection[9,10] and thrombophlebitis.[11] Placement under radiological guidance offers higher technical success rates with fewer complications and shortened procedure times. During the period of study, infection control team of our hospital was also involved for their observation on the infection control measures practiced in our VIR suite during the placement of PICC. The result of those observation signified that the measured practiced were satisfactory and would not be account for any infection which could result later to patient if studied.[12] There are instances reported in various studies for the infection of patients post to placement of PICC, the possible reason for which could be improper infection control practices at the time of insertion, mal handling during using of PICC.

Use of PICC for long-term access not only minimizes discomfort of frequent cannulation and preserves peripheral veins but also allows prolonged administration of medications.

Conclusion

Radiologically guided placement of PICC by interventional radiologists is simple, safe and effective procedure and is being increasingly used for long term venous access .

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