

Changing Trend of Central Venous Access in Adult Cancer Patients in A Tertiary Care Hospital- A Single Center Experience

Waqas Ahmad¹, Iffat Rehman¹, Imran Khalid Niazi¹, Khurram Aftab Mufti²

¹Shaukat Khanum Memorial Cancer Hospital and Research Center Lahore, Pakistan

²The Prince Charles Hospital, Brisbane, Australia

DOI: 10.29322/IJSRP.9.07.2019.p9161

<http://dx.doi.org/10.29322/IJSRP.9.07.2019.p9161>

Abstract- Central venous access is common procedure for long term medication in oncology patients. Various options are available with each having its benefits and risks associated. A study with aim to see the change in trend in central venous access in adult cancer patients at our institute comparable with international standards was performed over a period of one year for patients who had central venous access. All central venous access procedures done in adult cancer patients were included. Number of patients, primary cancer histology and site and complications after each procedure were observed and analyzed. Total number of patients, gender, frequency and type of malignancy and method of central venous access along with its complications were observed. A rise in referrals for port A catheter in the last 6 months with decreasing referrals for PIC and broviac catheters was noted former having least complications.

Index Terms- Central venous access, Interventional radiology, Port A catheter, Cancer patients

I. INTRODUCTION

Central venous catheter also called as central line is frequently used for long term therapy in cancer patients. Catheters can be placed in upper limb veins or central veins. Peripherally inserted central catheters also known as a [PICC line](#) is inserted through superficial veins in the arms. Various types of central catheters are available depending upon the use and indication including broviac lines, tunneled catheters, implanted port A catheters, dialysis catheters, PICC line etc. Common uses of central venous catheters include administration of long-term medicine treatment for pain, infection or [cancer](#) and to supply [nutrition](#) ^[1]. All central lines have their own associated early and late complications.

Cancer patients need regular, intermittent and long term IV access at various stages of treatment. Certain drugs cannot be used by routine peripheral venous access owing to potential serious damage to skin and tissue in case of extravasation ^{[4][5]}. Further continuous chemotherapy infusion (more than 24 hours or more) can collapse peripheral veins making conditions more worsen ^[1].

A PICC line (Fig.1) is the most common way to gain central venous access utilizing brachial or cephalic venous access to place a long catheter. It may stay for many weeks to months. There may be one or more lumens on the PICC depending upon clinical requirement. The catheter and the skin around it will need care and regular flushing ^[6].

A port A catheter is implanted central venous catheter (Fig.2) It has a small chamber/central port made of plastic or metal connected with a central catheter up to superior vena cava (SVC) with a self-sealing diaphragm to be accessed with a special non-boring needle.

In adult cancer patients only PICC lines were inserted by our interventional radiology department in our institute and broviac lines by anesthesia department in Operation Theater. Since we started offering implanted port A catheter insertion on elective basis from April 2016 we performed a study to look for change in trend of central venous catheter on the basis of complications and trust of our referring peers.

II. MATERIALS AND METHODS

In our department we conducted this single center retrospective study after institutional review board approval by usual pathway. The study was done for all the adult cancer patients were reviewed who underwent central venous catheter insertion in the hospital including the interventional radiology department and operation theater by anesthesia team over a period of one year between 15-10-2016 to 14-10-2017. Electronic records including procedure details and follow up physician notes were reviewed for any potential complications related to procedure in early course of time. Few of the patients underwent central venous catheter insertion twice as well during the study period due to complications. All male and female patients were included in the study. We divided the study in two halves, the initial six months was the time period when we were offering only PICC line insertion in the interventional radiology services and broviac line placement was done the anesthesia team in Operation Theater and the later six months when we started offering implanted ports in interventional radiology. PICC lines and broviac lines were still being used during the latter half of the study period. We compared the frequency of increase in implanted ports insertion and reduction in number of PICC lines

and broviac catheter placement between the two halves of study to look for change in trend of the central venous access. Number of patients, gender, primary malignancy on the basis of histology and complications associated were observed and analyzed.

III. RESULTS

A total of 297 adult cancer patients had central venous access during one year of study period. Out of these 181(61%) patients were males and 116(39%) were females with male predominance in both halves of study (Fig.3). Commonest primary malignancy was lymphoma followed by adenocarcinoma of upper and lower gastrointestinal tract, osteosarcoma of the limbs remained third in frequency. Breast cancer, squamous cell carcinomas and multiple myeloma cases were less in number (Fig.4).

During the first six months of study duration 137 underwent central venous access procedures, 116 (84.7%) patients underwent PICC line insertion in interventional radiology suit and broviac catheter insertion was done in 21(15.3%) patients by anesthesia team in Operation Theater. Port

A catheter insertion was started in second half (later six months of the year) by interventional radiology team. 160 patients underwent central venous access during later six months out of which 68(42.5%) patients had port A catheter insertion, PICC line insertion in 76(47.5%) and 16(10%) had broviac line insertion of which one was done by interventional radiology and 15 in operation theater by anesthetist (Fig.5).

Various complications associated with various lines were observed during the two halves of the study and compared. In the first half patient who underwent PICC line insertion developed deep venous thrombosis (DVT), PICC line got infected or dislodged the line within two months after insertion. Various factors were observed related to these complications especially while handling and use of the line. No complications were seen with broviac lines. In the later half none of the patient who underwent implanted port insertion developed any complication. Few patients who had PICC line insertion either on emergency basis or electively had dislodged PICC line or it got infected (Fig.6).

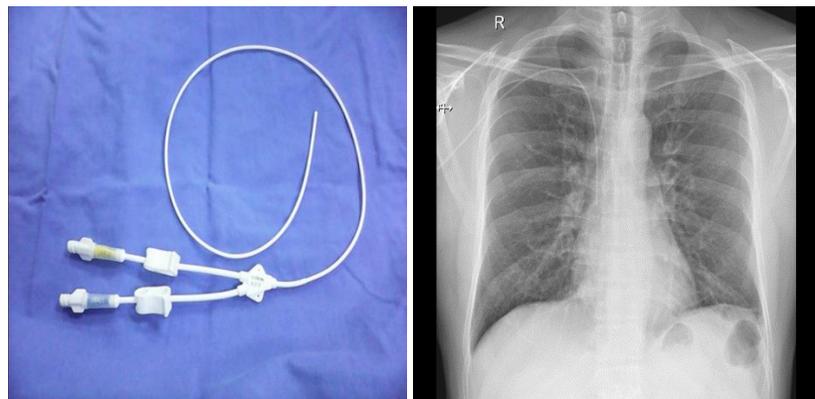


Fig.1 (A) Double lumen PICC line mostly used in our department (B) PICC line in place

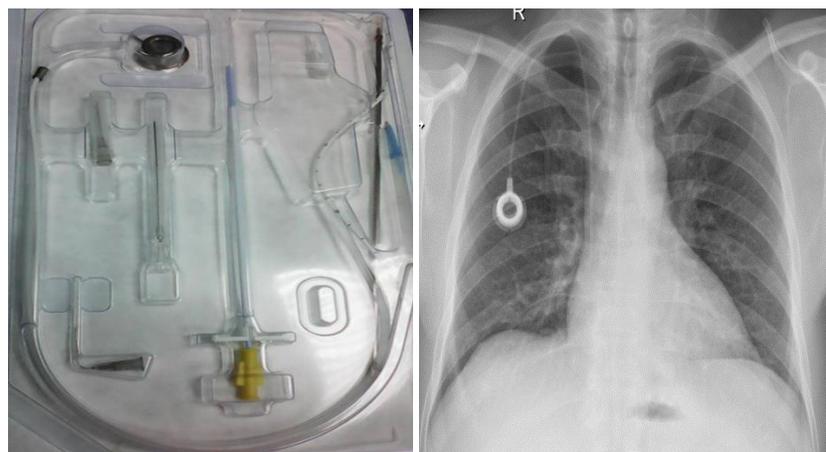


Fig.2 (A) Implanted port A catheter set with Huber needle (B) Implanted Port A catheter in place

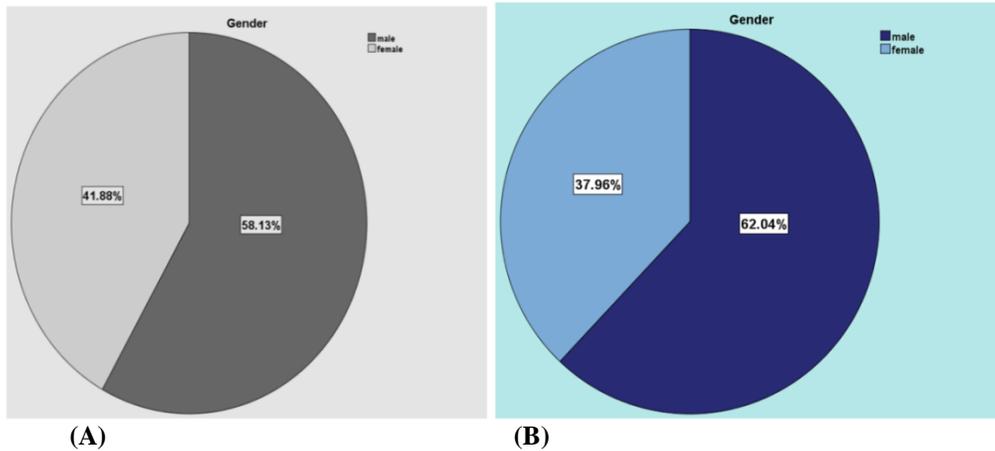


Fig.3 Percentages of male and female patients who underwent central venous access showing male predominance (A) first six months (B) later six months.

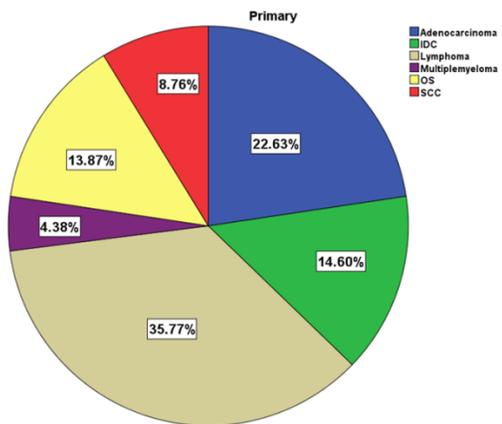
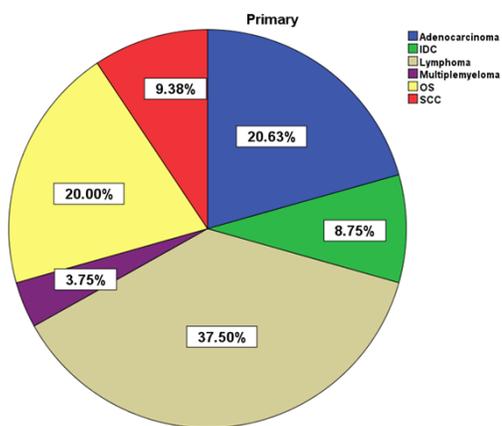


Fig.4 Percentages of patients who underwent central venous access on the basis of primary cancer histology (A) first six months(B) later six months.

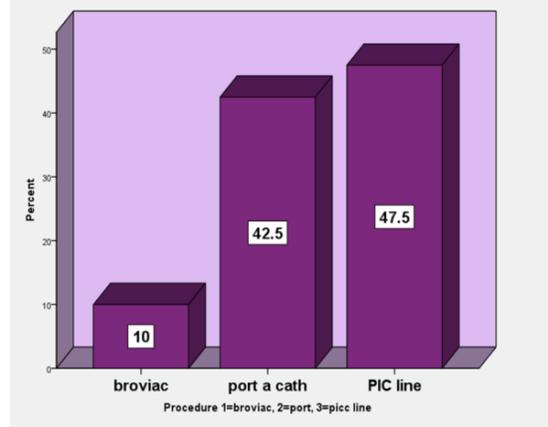
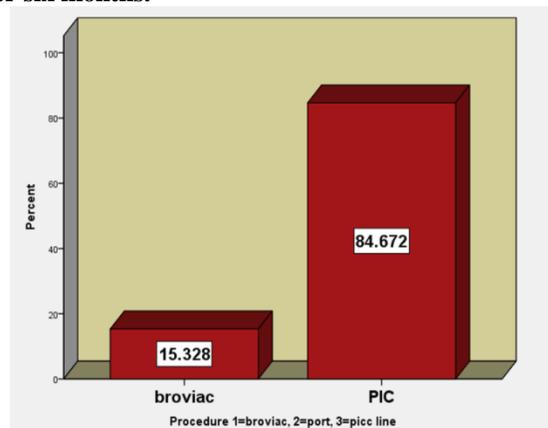


Fig.5 Graphic representation of percentage of patients who underwent various central venous lines during one year(A) first half of study period(B) later six months of study duration

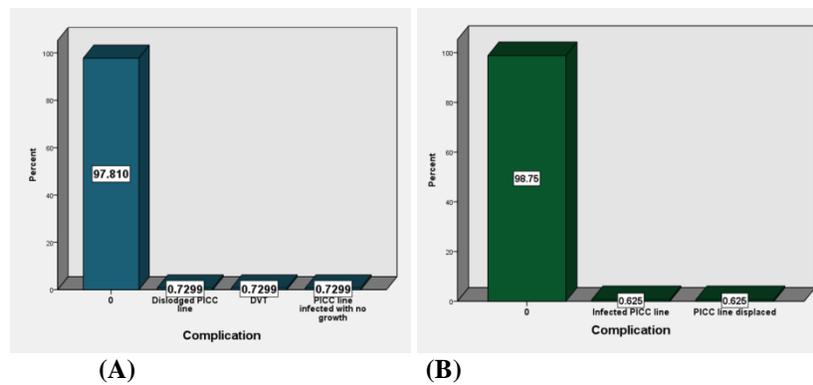


Fig.6 Graphic representation of percentage of complications with PICC lines (A) when only PICC lines and borviac lines were being offered (B) after port A catheter insertion.

IV. DISCUSSION

Central venous access remains one of the essentials procedures in cancer patients for their proper intravenous chemotherapy. Various options are available for central venous access all having own benefits and risks/complications associated with them. Implanted port A catheters remain most reliable way to get central access they being almost complication free for longer duration and easy to handle. PICC lines can be used as emergency alternative.

V. CONCLUSION

Since central venous access by various lines is common procedure done in most of adult cancer patients owing to their long term intravenous chemotherapy and repeated blood sampling over a period of months to years, implant ports remain complication free and most effective method of central venous access.

REFERENCES

- [1] Ge, Xiaoli (2012). "Central venous access sites for the prevention of venous thrombosis, stenosis and infection.". The Cochrane Library. doi:10.1002/14651858.CD004084.pub3.
- [2] Murray E.C., Deighan C., Geddes C., Thomson P.C. (2014). Taurolidine-citrate-heparin catheter lock solution reduces staphylococcal bacteraemia rates in haemodialysis patients. QJMed2014
- [3] Parienti JJ; Thirion M; Mégarbane B; et al. (May 2008). "Femoral vs jugular venous catheterization and risk of nosocomial events in adults requiring acute renal replacement therapy: a randomized controlled trial". JAMA. 299 (20): 2413–22. doi:10.1001/jama.299.20.2413. PMID 18505951.
- [4] Safdar N, Fine JP, Maki DG (2005). "Meta-analysis: methods for diagnosing intravascular device-related bloodstream infection". Ann. Intern. Med. 142 (6): 451–66. doi:10.7326/0003-4819-142-6-200503150-00011. PMID 15767623.

- [5] Watanakunakorn C, Baird IM (August 1977). "Staphylococcus aureus bacteremia and endocarditis associated with a removable infected intravenous device". Am. J. Med. 63 (2): 253–6. doi:10.1016/0002-9343(77)90239-X. PMID 888847.
- [6] Rosendaal FR; Reitsma PH (July 2009). "Genetics of venous thrombosis". J. Thromb. Haemost. 7 (suppl 1): 301–4. doi:10.1111/j.1538-7836.2009.03394.x. PMID 19630821.
- [7] Lee JA, Zierler BK, Zierler RE (2012). "The risk factors and clinical outcomes of upper extremity deep vein thrombosis". Vasc Endovascular Surg. 46 (2): 139–44. doi:10.1177/1538574411432145. PMID 22328450.
- [8] ^ Jump up to: a b Polderman, Kees H.; Girbes, Armand R. (2001-12-04). "Central venous catheter use". Intensive Care Medicine. 28 (1): 1–17. doi:10.1007/s00134-001-1154-9. ISSN 0342-4642.
- [9] Bartolini, Luca (2015). "Pearls & Oy-sters: Cerebral venous air embolism after central catheter removal". Neurology. 84: e94–e96. doi:10.1212/WNL.0000000000001414.
- [10] O'Leary, R; Bodenham, A (2011). "Future directions for ultrasound-guided central venous access.". European Journal of Anaesthesiology. 28 (5): 327–8. doi:10.1097/EJA.0b013e328343b148. PMID 21487264.
- [11] Bodenham, A (2011). "Reducing major procedural complications from central venous catheterisation". Anaesthesia. 66 (1): 6–9. doi:10.1111/j.1365-2044.2010.06583.x. PMID 21198502.

AUTHORS

First Author – Waqas Ahmad FCPS, EDiR, Locum Consultant Radiologist SKMH&RC waqasrad@gmail.com

Second Author – Iffat Rehman FCPS, FRCR, Locum Consultant Radiologist SKMH&RC

Third Author – Imran Khalid Niazi FRCR, FCPS, Consultant Radiologist SKMH&RC

Fourth Author – Khurram Aftab Mufti FRCR, FRANZCR, Consultant Interventional Radiologist The Prince Charles Hospital, Brisbane, Australia

Correspondence Author – Waqas Ahmad FCPS, EDiR, Locum Consultant Radiologist SKMH&RC waqasrad@gmail.com, +923044485533