

CENTRAL VENOUS CATHETER BASED PORT FOR MULTI-DOSE CHEMOTHERAPY; TECHNIQUES AND COMPLICATIONS

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Abstract

Background: the utility of percutaneous Chemo port devices in the administration of multi-dose systemic chemotherapy in malignancy patients for long term therapy. It is a small port that is implanted under the skin in subcutaneous tissue to allow easy and repeated access to the bloodstream. To avoid thrombophlebitis and extravasation of drugs

Objective: To study the utility of percutaneous Chemo port devices in the administration of multi-dose systemic chemotherapy in malignancy patients.

Methods: this was a prospective study. The study was done in the department of cardiovascular and thoracic surgery SKIMS soura Srinagar Kashmir .from October 2018 to January 2020.We included 50 patients who were advised for Chemotherapy by the Medical Oncology department .The gender distribution being 38 females and 12 males. The mean age group was 43 and 54 years respectively for females and males. A single type of port was used, constructed of titanium and silicone. Puncture was done ultrasound guided. All patients had baseline investigation and dopplar for upper limbs and to rule out central venous stenosis.

Results: We included total 50 patients, 43 (87%) patients completed their chemotherapy regime including .one (2%) patient who developed ipsilateral pneumothorax which was managed by intercostal tube placement. 2 (4%) patients developed severe wound infection that prompted the instantaneous removal of chemoport device followed by irrigation of the infected pocket and antibiotics. 1 patient developed catheter block which required flushes of heparinised saline. 2 patients required re-orientation of port device for port tilting. One (2%) patient had refractory arrhythmias that did not settle with drugs and hence warranted port removal. None patients had spontaneous extravasation of the port through the skin.

Exclusion criteria: Pediatric patients age less than 18 years. Patients having Central venous stenosis. Patients having deep venous thrombosis of bilateral upper limbs.

Conclusion: Central venous based catheter device is a very good means of delivering chemotherapeutic agents in patients of malignancy who have to receive a multi-dose drug therapy.

Keywords: *Chemotherapy, device implantation, utility, complications and management*

Introduction

A chemotherapy port (also known as a "port-a-cath") is a small device that is implanted under the skin to allow easy and repeated access to the bloodstream.

A port can be used to draw blood and infuse chemotherapy drugs. Without a port a new intravenous needle (IV) will need to be placed each time one has to have chemotherapy, and separate IV lines will need to be placed every time of infusion. Some chemotherapy medications can *only* be given through a port, as they are too caustic to be delivered into a peripheral vein. In some patients an IV access is difficult due to small thready veins,

making a port a better option than placing an IV line. A port is often easier than inserting an IV cannula each time.¹

Catheters are long, narrow, hollow tubes made of soft plastic. A catheter in the upper arm or neck can stay in place for weeks or months but Ports can remain in place for weeks, months, or years.²

Image-guided chemo port insertion gives low periprocedural complication rates.³ These guided insertions of chest ports should replace rather than supplement unguided placement.⁴ Using a right IJV as the entry site, the image guidance gives good success rate with least complication. The technical success rate can be as high as 99.4%.³ or 100%.⁴

Subcutaneously placed ports are effective for central venous access with excellent functionality and a very low procedural complication rate. These devices are associated with a very low incidence of both immediate and long-term complications.⁵

There are different types of ports available but the factors used in selecting a device include the intensity and frequency of therapy and the preferences of the patient.⁶

Although infections are more frequent in HIV-infected individuals these devices are associated with a very low incidence of both immediate and long-term complications.^{5,6} Early recognition of catheter-related infection may save the catheter. Removal of an infected catheter depends on the nature of the offending agent, severity of infection, success of treatment, and degree of difficulty in obtaining alternative access.⁷

Material and Methods:

this was a prospective study. The study was done in the department of cardiovascular and thoracic surgery SKIMS soura Srinagar Kashmir .from October 2018 to January 2020. . After ethical clearance from institutional ethical board. puncture was done ultrasound guided. All patients had baseline investigation and dopplar for upper limbs and to rule out central venous stenosis and upper limbs deep venous thrombosis.

We included 50 patients who were advised for Chemotherapy by the Medical Oncology Department, SKIMS.The gender distribution being 38 females and 12 males. The mean age group was 43 and 54 years respectively for females and males. A single type of port was used, constructed of titanium and silicone rubber (Dome Port, Bard Inc., Salt Lake City, U.S.A), connected to an 8 F silastic Groshong catheter tubing (Bard Inc.) The patients were sequentially admitted in the day care surgery ward after routine investigations. A standard dose of IV antibiotic was administered 1 hour before the procedure. Different sites of puncture were selected, depending upon the malignancy like if patient had right side breast cancer we avoided that side access but right internal jugular and right subclavian veinous route was preferred. Other access sites were reserved for unfeasible cases. After a formal part preparation, local infiltration with xylocaine was given at the proposed site of port insertion. The puncture was done ultrasound guided central catheter was inserted into the internal jugular vein over a guide wire, under radiological guidance. The catheter was tunneled subcutaneously and re-routed to the subclavian area on the ipsilateral side. This was followed by 2 cm incision and blunt dissection up to the deep pectoral fascia. After checking the placement of catheter tip at the junction of right atrium and superior Vena Cava (SVC,) junction it was connected to the injection

port. The injection port was placed in the already dissected space or pocket above this deep fascia. Subscapular region three centimetres away from clavicle.

In 25 patients the Chemo port was left there without any holding or stay sutures while as in the remaining 25, the port was fixed with three separate sutures with 2-0 Vicryl after proper placement and angulation. The patients were observed for few hours and a Chest x-ray was done after which they were discharged the same day. The skin sutures were removed on the 8th day.

All the patients were followed weekly for 3 weeks then bi-weekly for 2 weeks and thereafter the median follow-up was 6 weeks. The potential complications that were anticipated included immediate pneumothorax, inadvertent arterial rupture and haemorrhage, cardiac arrhythmias, inflammatory or allergic reactions to silicone catheter, port leakage or blockade (by mechanical or thrombotic occlusion), wound inflammation or infection and late catheter dislodge or entrapment.

Results

Out of total 50 study patients, 43 (87%) patients completed their chemotherapy regime including 1 (2%) patient who developed ipsilateral pneumothorax which was managed by intercostal tube placement. 4 (8%) patients developed severe wound infection that prompted the instantaneous removal of chemoport device followed by irrigation of the infected pocket and antibiotics. 1 patient developed catheter block which required flushes of heparinised saline. 2 patients required re-orientation of port device for port tilting. One (2%) patient had refractory arrhythmias that did not settle with drugs and hence warranted port removal. 2 (4%) patients had spontaneous extravasation of the port through the skin. It is pertinent to mention here that both these patients had unfixed Chemo port devices. None among the 25 patients who had fixed Chemo ports did dislodge the port.

Table 1: Showing Gender distribution in our study

Gender	Males	Females
	12	38
Percentage	24%	76%
Mean Age (yrs)	54	43

Table 2: Showing the Site of puncture for placement of catheter.

Site of puncture	Number of patients	Percentage
Right Internal Jugular Vein	21	42%
Left Internal Jugular Vein	7	14%
Right Subclavian Vein	13	26%
Left Subclavian Vein	9	18%

Table 3: Showing the Complications in our study group.

Complication	Number of patients	Percentage
Local Haematoma	1	2%
Pneumothorax	1	2%
Wound infection	2	4%
Catheter block	1	2%
Port displacement(tilting)	2	4%
Port extrusion	None	
Others (arrhythmia)	1	2%

Discussion

Central venous port catheters are usually set on the purpose of periodic administration of chemotherapy for the treatment of various malignancies. It is a good option for long-term access to central veins and delivery of chemotherapeutic regimens, including continuous intravenous infusions. The low incidence of major complications related to implantation and management of these devices support the increased use in oncology patients.^{5,7}

Subcutaneous venous port devices are of major importance in the care of oncology patients by providing reliable vascular access. They have great advantages over tunnelled catheters, such as low infection rates, long life, and patient comfort.⁸ Their implantation is associated with some risk of serious complications if not picked up and attended timely. Care of the catheter and the patient should be maintained to decrease the risk of these complications.⁹

Image-guided placement of internal jugular vein chest ports has a high success rate and low complication rate compared with reported series of unguided subclavian vein port insertion. The internal jugular vein should be used as the preferred venous access site compared to the subclavian vein.¹⁰

Chemo ports provide an excellent method of chronic venous access, having a lower rate of infection and thrombosis in historical comparison with external vascular access devices.¹¹

Conclusion

Central venous based catheter device is a very good means of delivering chemotherapeutic agents in patients of malignancy who have to receive a multi-dose drug therapy. The access to the central venous system is quick and convenient with minimal complications. The complication

spectrum can further be narrowed down by certain precautions such as proper subcutaneous tunnelling of catheter without any kink or rotational torsion, proper placement of catheter tip to avoid cardiac irritation and the proper fixation of the base of injection port to avoid gliding and tilting. The port should be fixed with an absorbable suture to maintain its position and integrity more so in patients with too much of fat or having loose subcutaneous tissue. Besides resorting to strict aseptic surgical practices the delivering proper wound care alleviate the risks of wound infection.

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