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RESEARCH ARTICLE

PORT CHEMOTHERAPY IN CANCER PATIENT : OUR EXPERIENCE AND REVIEW

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Abstract

Port implant plays an important role in the management of cancer chemotherapy. A cancer patient needs long term chemotherapy, frequent intravenous medication, parenteral nutrition, blood transfusion and blood extraction for blood test. For many reasons peripheral lines are not available as patients have already received chemotherapy. The port is an excellent way to administer chemotherapy on a long term basis but it should be with at most care. It not only improves the quality of life in cancer patients but also reduces the burden on nursing care. Proper placement and care of the port implant is very important to avoid complications.

Methodology: This is a retrospective study in which collected data of patients who received the chemotherapy for cancer through Chemo port at SLV cancer center, Coimbatore, India.

Aims And Objectives: The main objective of this study is to analyze the complication and outcomes related to port implant.

Results: The Chemoport has been implanted in 84 patients in a period of three year (2017-2020) in which solid malignancy cases are (n =76) and hematological malignancy cases are (n=8). Among the solid malignancies cases, Breast cancer (n=48) was the most common malignant disease followed by Ovarian cancer (n=12) and Lymphoma (n=8). Of the 84 patients in the study group, for the first 24 patients, we started chemotherapy on the eighth day of the port implant and for the next 60 patients we started chemotherapy on the first postoperative day of the port implantation. The various complications developed in this study group are given in the descending order as follows: Infection(n=4), septicemia(n=3),catheter blockage due to blood clot(n=3), subclavian vein thrombosis(n=1), port site skin necrosis(n=1), catheter kink(n=1), pneumothorax(n=1) and pulmonary embolism and death(n=1).

Introduction:-

Port implant plays a major role in the management of cancer chemotherapy. The cancer patient needs patent venous line for long-term chemotherapy, parenteral nutrition, blood transfusion, and fluids infusion, etc. In modern Oncology practice port implant is the cornerstone for administration of chemotherapy [1]. In 1982, Niederhuber et al. introduced the technique of central venous port system which is usually implanted subcutaneously in the chest wall and very easy to access . The port implant consists of a catheter made up of teflon which is cannulated in the central vein usually through subclavian or jugular vein and it is firmly attached with a chamber which is made up of

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plastic or metal with silicone membrane. Access to this implanted chamber by using a Huber needle (opening at the side of needle) is very safe and easy. It will not affect daily routine activities of the patient. The long-term venous access devices used in oncology practice are peripherally inserted central catheters (PICC), Hickman line (tunneled) Catheter and Subcutaneous implanted "PORT" catheters [2]. The last two catheters are commonly used in delivering medication like chemotherapy, parenteral nutrition, and intravenous antibiotic, etc; in cancer patient [3]. All implanted port has the same risk of complications that is seen during central line deployments. Many cancer centers use ultrasonography or fluoroscopic guidance for the correct placement of central vein catheters. Peripheral line catheters not suitable for long term chemotherapy as they go for sclerosis and thrombophlebitis. When peripheral line used frequently, extravasation of drug like adriamycin causes soft tissue necrosis[4]. The purpose of this study is to analyze complications and outcome related port implant used in cancer patient for chemotherapy and intravenous medication on long term use. We only used port implant for cancer patient in our study but not PICC line or Hickman line.

Material And Methods:-

This is a retrospective study where data collected from SLV Cancer Centre Coimbatore, India. Information regarding the patient's age, gender, diagnosis, operator, date of implantation and removal, indication for implantation, complications, and duration of port in place was gathered from patient medical records. A specific note was made for co-morbidities like history of any thromboembolic disease, bleeding disorders, and whether the patient was ever treated for the same. Pediatric patients, poor performance status and patients who were denied for port implant excluded from the study. Histopathological diagnosis of cancer was confirmed before port implantation. All PORT implanted under General Anesthesia using Seldinger's Technique [5].

Results And Observation:-

Distribution

A total of 84 patient's medical records were collected and datas are retrieved retrospectively. Out of 84 patients, 54 patients (64.2%) catheter inserted and port implanted in a single attempt; in 30 (35.7%) patient catheter inserted in second attempt. Usually we preferred the right subclavian for catheter insertion. In right breast cancer (n=12), left subclavian vein accessed. In 9(11%) patients catheter inserted in internal jugular vein, as subclavian vein was not able to access.

Distribution of patient's age and sex in study group

Of the 84 patients in the "PORT" study group, 66 patients were female and 18 patients were male. All patients' ages were in the range of 34-76 yr. Out of this 10 patients were below 40 yr age and 24 patients were above 60 yr age and 50 patients were in age 41-60 yr age group.

Distribution of cancer

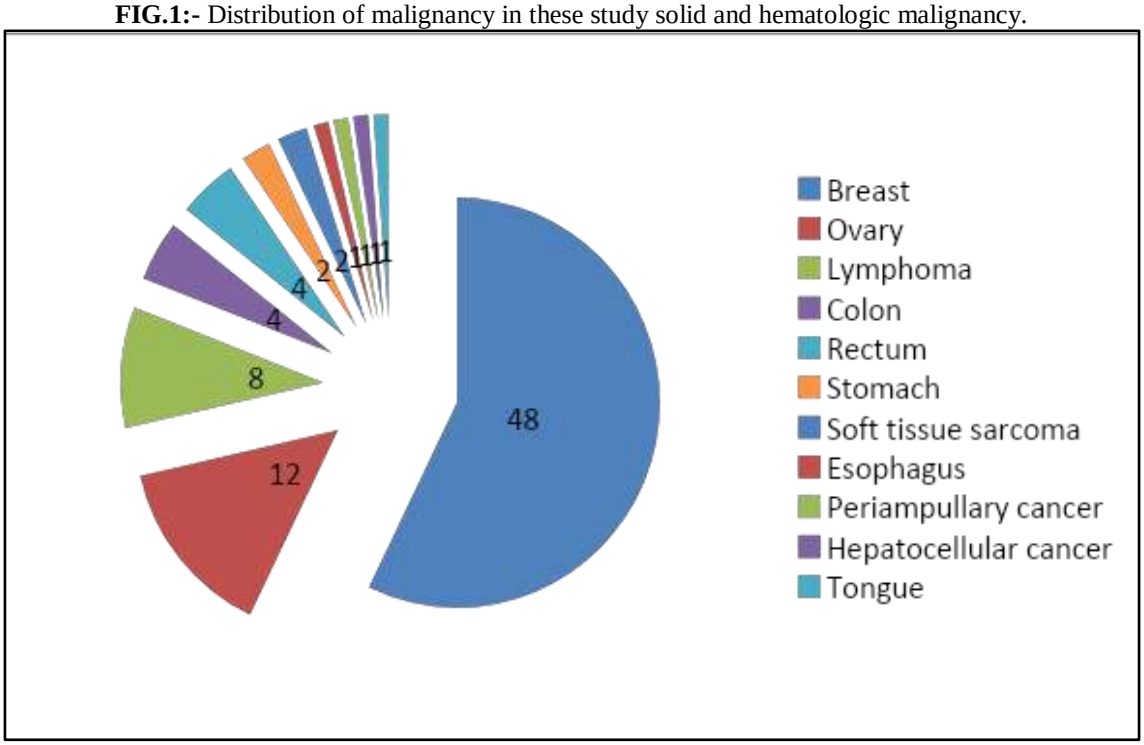
In our study both solid and hematological malignancies are included. In our study group, central venous ports inserted in patients with solid malignancy cases are (n =76) followed by hematologic malignancy cases (n=8). In solid malignancy breast cancer was most common followed by carcinoma ovary. In hematological malignancy we treated only lymphoma cases.

Table 1:- Distribution of malignancy in this study (Solid and hematologic malignancy.).

Malignancy	Patient number(n)
Breast	48
Ovary	12
Lymphoma	8
Colon	4
Rectum	4

Stomach	2
Soft tissue sarcoma	2
Esophagus	1
Periampullary cancer	1
Hepatocellular cancer	1
Tongue	1
TOTAL	84

FIG.1:- Distribution of malignancy in these study solid and hematologic malignancy.



Antibiotic prophylaxis:
In the initial period we didn't start antibiotic prophylaxis. Out of 84 patients, only 44 Patients received a single dose of injection cefotaxime ,Garamycin and metrogyl before the start of the procedure.

Day of starting chemotherapy:
Total 84 patients in our "PORT" study group, 24 cases received chemotherapy on the eighth day of the port implant. As we have gained experience in port chemotherapy, for the next 60 patients we started chemotherapy on the first day of port implantation.

Complication:
The various complications that occurred in our study are explained in the table given below (Table 2). The most common complication was Infection seen in 4 patients and port was removed. Three patients had septicemia in which one patient had staphylococcus aureus infection and second one had Ralstonia mannilotica infection and third one patient had E.coli infection. For all these cases port have been removed and sent for culture sensitivity. All three patients were treated with Injection meropenem one gm bid according to the culture sensitivity report. One patient

had subclavian vein thrombosis after completion of 6 cycle chemotherapy for carcinoma ovary. In this case port has been removed and patient treated with anticoagulants. One patient developed pulmonary embolism while starting of chemotherapy through port and patient died within minutes. One patient developed pneumothorax after catheter placement for which an ICD has been done. Three patients had catheter block due to blood clot, so after 40 chemo port implants we started prescribing tab aspirin 75mg orally od. Prophylactically[6]. and continued as long as port in situ.

Table 2:- Distribution of complications.

COMPLICATION	Number of cases (n)
1) Infection	4
2) Septicemia	3
3)Catheter blockage due to clot	3
4) Subclavian vein thrombosis	1
5) Port site skin necrosis	1
6) Catheter kink (Groshong 8Fr)	1
7) Pneumothorax	1
8) Pulmonary embolism and Death	1

FIG.2:- Distribution of complications.

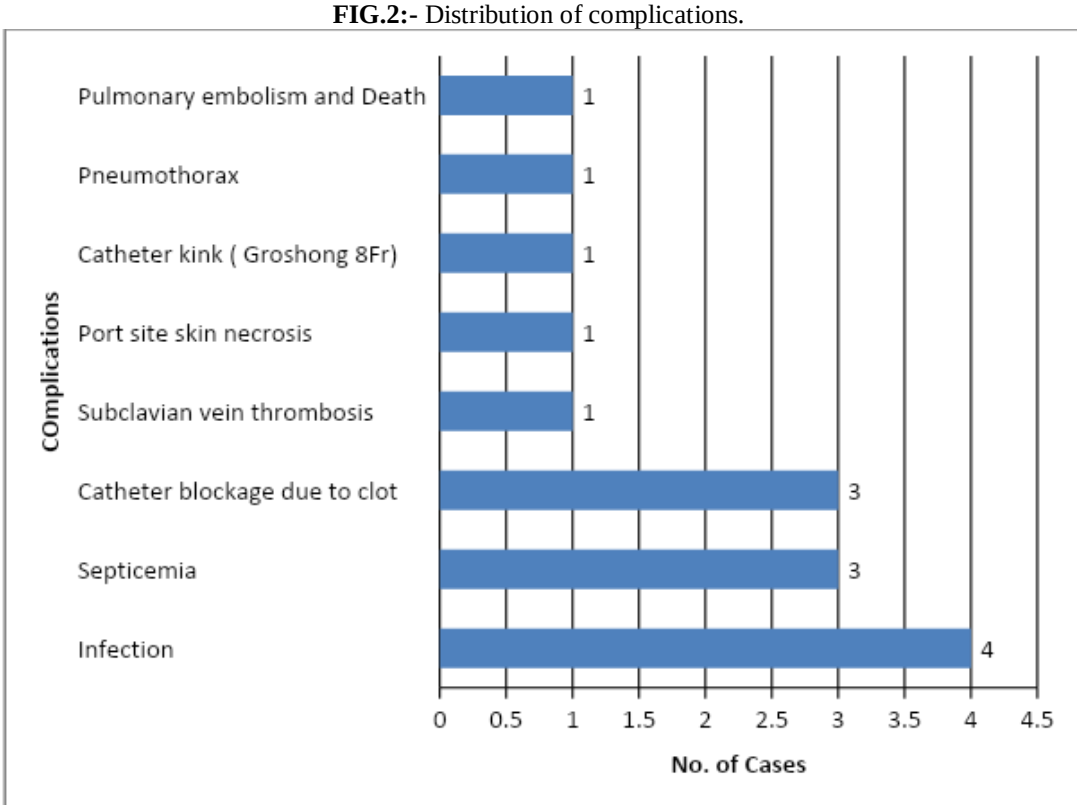


Fig 3:- Catheter blockage due to blood clot.

Fig 4:- Port site skin necrosis.

Discussion:-

Cancer patients always require a patent venous line for the administration of chemotherapeutic drugs, parenteral nutrition, IV fluids, blood sampling, and antibiotics etc. By the time we reached third adjuvant chemotherapy most of the peripheral lines were exhausted due to thrombophlebitis. It challenges routine nursing care and increases the work burden for nursing staff. Pediatric tumors like wilms tumor needs long term chemotherapy and recurrent ovarian carcinoma often needs repeated chemotherapy for which chemotherapy from peripheral line is not often possible. Sometimes chemotherapeutic agents cause thrombophlebitis and skin necrosis due to extravasation of the drug. After port implantation, qualities of a patient's life have certainly improved[7-10]. The purpose of this study is to analyze outcomes and complications related to the port implant used in cancer chemotherapy. After thorough research of the literature, it is found that there are only a few research studies from the Indian and Asian subcontinents on PORT implant used in cancer patients. In this retrospective study, we compared the study results with the previous studies from the published literature, related to specific findings from our study. This retrospective study contained a large number of patients and data related to the outcome of a port implant may be helpful in future. A study by Kumar et al[11] shows that there is male predominance compared to our study had female predominance. In our study Chemotherapy was the primary reason for Port implant and this was similar to studies

by Yap et al[12] and Cheong et al[13] We compared our study with some Indian and International studies related to specific findings from both studies.

Table 3:- Comparison Of Port-Study With Various Indian Studies.

CHARACTER	**JAIN ET A[14]**	**ABRAHAM ET AL[15]**	**PANDEY ET AL[16]**	**APARNA ET AL[17]**	**PRESENT STUDY SuVee ET AL**
NO OF CASES	25	81	9	200	84
ANTIBIOTIC PROPHYLAXIS	97%	100%	NA	100%	52%
FIRST DAY OF START OF CHEMOTHERAPY	77%	67%	68%	NA	64%
INFECTION	7%	10%	8.70%	12.5%	8%
SUBCLAVIAN VEIN THROMBOSIS	0.4%	6%	1.8%	0.5%	1.1%
CATHETER DISPLACEMENT	NA	2%	1.8%	0.5%	NA
PNEUMOTHORAX	NA	NA	NA	NA	1%
TAB. ASPIRIN PROPHYLACTIC	NA	NA	NA	NA	50%
PULMONARY EMBOLISM AND DEATH	NA	NA	NA	NA	1.1%

Table 4.:- Comparison Of Port-Study With International Studies.

CHARACTER	**MSKCC STUDY[18-19]**	**VARDY ET AL[20]**	**PRESENT STUDY SuVee ET AL (%)**
NO OF CASES	680	110	84
ANTIBIOTIC PROPHYLAXIS	100%	NA	52%
FIRST DAY OF CHEMOTHERAPY	NA	67%	64%
INFECTION	8%	4%	8%
CATHETER DISPLACEMENT	3%	NA	NA
SUBCLAVIAN VEIN THROMBOSIS	2%	2%	2%
MOST COMMON INDICATION	Breast Cancer	GIT	Breast Cancer
TAB. ASPIRIN PROPHYLACTIC	NA	NA	50%
PULMONARY EMBOLISM AND DEATH	NA	NA	1.1%

Summary And Conclusion:-

This retrospective study represents comprehensive data of port implant in cancer patients undergoing chemotherapy analyzing the type of implant used, complications associated with port implant and its management. A cancer patient needs multiple time venipunctures which causes physical discomfort, distress and agony to patient and it affects quality of their life. Chemoport is an advanced procedure for patients undergoing chemotherapy. Utmost care to be given while implanting a port and administering chemotherapy. We started prescribing Tab. aspirin 75 mg orally od. prophylactically and continued as long as port in situ to prevent catheter blockage. After experiencing death in ward in minutes while starting chemotherapy, we have modified our safety protocol. Following safety devices are kept ready while administering chemotherapy. They are pulse oximeter, oxygen and other facilities to intubate. In many center staff are trained to administer chemotherapy but in our center the staff who administer chemotherapy is supervised by medical officer. From our study we came to the conclusion that chemo port is a boon to cancer patients is not without serious complications and adding aspirin might prevent catheter clotting.

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