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Comparative Study between Portacath Placement in the Central or Peripheral Veins for Chemotherapy

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Abstract

Background: The conventional approach for central peripheral intravenous catheter [PaC] insertion involves the utilization of a central vein, such as the internal jugular or subclavian vein, often necessitating the administration of a general anesthesia.

Aim of the study: This work aimed to evaluate the safety and convenience of peripherally placed Portacath catheters in comparison to central venous catheters for the administration of chemotherapy in cancer patients.

Patients and Methods: A randomized controlled trial included 50 cancer patients at Al-Hussein and Sayed Galal University Hospitals and Menoufia University Hospital, during the period spanning from July 2023 to April 2024. Participants were assigned to group A consisted of 25 patients who required the insertion of a central vein Portacath catheter through the internal jugular veins using a Portacath 8:10 f and group B comprised 25 patients who required the insertion of a peripheral vein Portacath through the basilic veins, utilizing a Portacath 3:5 f.

Results: Group A and B exhibited statistically significant disparity in regarding local infection, skin condition, and wound healing outcomes [$p<0.05$]. All individuals included in the study exhibited normal X-rays and free Doppler evaluations. A substantial statistical difference was seen between groups A and B in terms of hematoma at the access location and arterial puncture [$p<0.05$]. A statistically significant disparity was seen between group A and group B concerning various dimensions of comfort, anxiety induced by the device, disruption in daily activities, and overall satisfaction score [$p<0.05$].

Conclusion*:* The jugular Portacath and basilic Portacath techniques were both safe and effective for central venous catheterization while administering chemotherapy. Furthermore, port catheters offer optimal vascular access for those diagnosed with cancer, hence enhancing their overall quality of life.

Keywords: Central Catheters; Internal Jugular Vein; Peripheral Inserted Portacath; Postoperative Complications.

INTRODUCTION

The global incidence of cancer has been on the rise due the evolving demographic of an aging population. The demand for implantable central venous [CV] ports has experienced a significant surge due to groundbreaking advancements in outpatient cancer treatment [1]. Implantable venous access ports [IVAP] are extensively utilized in medical practice, facilitating the delivery of chemotherapy, artificial nourishment, and blood sample to patients [2].

Numerous devices have undergone comprehensive evaluation in diverse anatomical regions, such as the chest, upper arm, and forearm. These evaluations have consistently demonstrated remarkable technical efficacy and little incidence of problems, particularly when the reservoir is positioned in the arm [3].

There are several potential advantages that warrant a more comprehensive examination of this technique. These include the potential to mitigate the likelihood of intraoperative complications such as arterial injury, pneumothorax, or hemothorax, minimize interference with breast imaging, enhance accessibility to puncture, yield superior cosmetic outcomes, and improve overall quality of life[4].

Permanent venous access is essential for ensuring the safety of treatment and providing supportive care to adolescent patients with chronic illnesses. The conventional method for establishing venous access involves the insertion of a Hickmann line or PaC into a central vein while the patient is under general anesthesia [5].

A Portacath is a compact reservoir that is inserted beneath the skin and can be accessed as necessary using a needle connected to a catheter that is threaded into the venous system. One notable advantage of these devices is that they do not release any plastic material when not in use, so enabling young individuals to maintain a more conventional lifestyle and reducing their susceptibility to infections [6, 7].

In children or young adults, the conventional approach for central PaC insertion involves the utilization of a central vein, such as the internal jugular or subclavian vein, often necessitating the administration of a general anesthesia. In patients with significant cervical/supraclavicular lymphadenopathy, the utilization of central vein access presents potential hazards such as pneumothorax and arterial puncture [8]. Due to its high incidence in mediastinal and cervical lymph node groups, lymphoma is the predominant malignancy among adolescents, rendering this patient population particularly susceptible to the development of associated problems [9].

The insertion of PaC can be conducted under local anesthesia [LA] by utilizing the basilic vein, thereby mitigating associated hazards. Therefore, the utilization of peripheral PaC has been investigated in appropriate older children who are receiving care at The Great North Children's Hospital [10].

Literature is scarce on PaC, especially in children and adolescents. We investigated the safety and practicality of inserting and utilizing PaC in teenage patients and determined the level of satisfaction among nursing staff and patients [10]. The objective of this study is to conduct a comparative analysis of the internal jugular and upper arm vein methods using basilic veins to insert implanted central venous ports, with a specific focus on early postoperative complications and patency rate.

PATIENTS AND METHODS

A randomized controlled trial included 50 cancer patients to evaluate the safety and convenience of peripherally inserted Portacath catheters in comparison to central catheters. The study was conducted at AL Azhar University Hospitals [Al-Hussein and Sayed Galal University Hospitals, Cairo] and Menoufia University Hospital between July 2023 and April 2024. Participants were assigned to group A consisted of 25 patients who required the insertion of a central vein Portacath through the internal jugular veins using a Portacath diameter of 8:10 f. Additionally, group B consisted of 25 patients who required the insertion of a peripheral vein Portacath through the basilic veins, utilizing a Portacath 3:5 f.

Ethical considerations

All research protocols were conducted and authorized by the ethical committee of A-Azhar University Hospitals in accordance with the principles outlined in the Declaration of Helsinki. Prior to their inclusion in the study, all participants were provided with a comprehensive elucidation of the study's purpose, goals, and research approach. The lead investigator was responsible for obtaining the subjects' agreement and signed informed consent.

Criteria of the studied Patients

The study encompassed individuals who were 21 years of age or older and had malignant tumors that were proven through pathological examination. Additionally, patients who were scheduled to undergo chemotherapy using a central venous catheter and patients who did not have any contraindications for chemotherapy or venous catheterization were included.

All patients underwent the following procedures

Comprehensive medical history collection, encompassing age, gender, and any concurrent medical conditions; systematic assessment of vital signs, body weight, height, and body mass index [BMI] in kilograms per square meter; medical history encompassing diabetes mellitus, hypertension, cancer type, treatment modality, and regular diagnostic tests such as complete blood count. The Sysmex XN-450/XN-430 is a quantitative automated hematology analyzer that performs liver function tests, international normalized ratio [INR] using CX9 Beckman Colter auto analysis and coagulation profile. Additionally, it includes radiological investigations such as X-ray and Doppler ultrasound evaluations.

Study procedures

This paper describes the implantation of an upper arm peripheral venous port. The preferred method of access is through the right arm. Before the surgical procedure, the catheter implantation site was shaved if needed and the entire limb was disinfected using Povidone Iodine. To mitigate the challenges associated with vein acquisition using both cutting-down techniques and US-guided techniques, the intraoperative duplex can be employed to ascertain the precise location of the cut-down on the basilic veins. Within the surgical setting, it is recommended that the patient assumes a supine posture, wherein the upper limb is abducted and rotated outwards

using a basilic approach. Additionally, the forearm should be supine in the same approach, while the medial side of the arm should be elevated to enhance the visualization of the basilic vein. The flexion of the elbow and the pronation of the forearm should be avoided while employing a basilic approach.

Peripheral venous catheter placement and port implantation

The point for a skin incision is 3-4 fingers breadth from the medial epicondyle of the arm. Local anesthetic was applied to areas about 2 cm right and left from the point of skin incision and to areas 2 cm peripheral to establish a subcutaneous pocket. Subsequently, a scalpel was used to make a skin incision extending 2 cm to the right to 2 cm to the left of the incision point. This incision was later used as the entrance for making a subcutaneous pocket with forceps. The connective tissues between the skin and the basilic vein were then removed. The basilic vein was identified and accessed through a peripheral 22-gauge cannula in open technique or punctured by 5 f angio needle by us guided technique**.**

A 0.014mm guidewire was inserted through the lumen of the peripheral cannula placed in the vein and negotiated proximally until SVC is reached under X-ray fluoroscopic guidance. If there was abnormal resistance during wire passage, appropriate use of a contrast injection was performed to confirm a run-through of the vessel and presence of stenosis or occlusion. After introducing the guidewire, the peripheral cannula was withdrawn and replaced by the sheath, followed by the advancement of the catheter over the wire through the sheath**.**

The catheter was appropriately positioned in the SVC. The optimal CV catheter tip location was about 2 cm passed centrally from the SVC confluence, as recognized by fluoroscopy. The sheath peeled off **.**A subcutaneous pocket for a port was made by blunt dissection using forceps. The port and catheter were then connected according to the manufacturer's manual. Fixing the port to connective tissue through the suture hole was optional with our upper arm method according to the pocket size. Finally, the skin was sutured appropriately while avoiding pricking the catheter**.**

Description of site of central insertion for pectoral placement

Following local anesthesia, the internal jugular vein was accessed using the percutaneous technique with micro puncture needle. Subsequently, the wire was introduced and confirmed that it is in the correct position under fluoroscopic guidance **.**Following preparation of the port pocket in the chest, a tunneling was used to cross the distance between the pocket and the initial puncture site subcutaneously. The peel-away sheath was placed in the internal jugular vein. The catheter tip was inserted via the sheath under fluoroscopic guidance and placed centrally with the tip aiming at the vertebral body below the SVC confluence. After tunneling the distance between the initial vascular access site and the pocket, the catheter was transected to adequate length and connected to the port chamber. Correct and central placement of the catheter tip as well as the loop-free run of the catheter in the tunneled area was documented by fluoroscopy**.**

The port was fixed to the pectoral muscle fascia by proline suture 4\0. The pocket was closed with one layer of suture, as the vascular access site was closed with a single cutaneous stitch. At the end of all procedures, all TIVAP was accessed with a non-coring puncture needle. Before needle removal, the catheter was flushed with a heparinized saline solution. Following pectoral implantation, pneumothorax was ruled out by chest X-ray after expiration **.** Intraoperative data, such as operating time, type of anesthesia, access route changes, and intraoperative complications were recorded for further evaluation. Patients was instructed to keep applying sterile occlusive dressings for 3 days after the procedure. In case of need for immediate use of the device, the first puncture was performed in the surgical room **[Figures 1, 2].**

Follow-up:

Patients selected for inclusion in the sample should have clinical evaluation at specific time points, namely 10 and 30 days, 3 months, and six months following the procedure. Additionally, evaluation should be conducted after chemotherapy or at any other designated study time in the event of any catheter-related intercurrent events. Further diagnostic procedures, such as X-ray or Doppler ultra-sonography, should be considered solely in cases when the patient presents with symptoms associated with the catheter, such as malfunction, edema, or alterations in the surgical incision.

Outcomes of the study

The main objective of this study is to evaluate the early postoperative complications, which are defined as events that occur within 30 days after implantation and are perceived by the patient as late. This questionnaire collected data on the patient's recognition of the need for the device, their comfort levels, anxieties related to the device, interference with daily activities, as well as their satisfaction with the device's appearance and overall quality as indicated by the patient's recommendation grade. The participants were queried regarding their level of agreement or disagreement with statements pertaining to the various dimensions of satisfaction that were examined, and the outcomes of the questionnaire were subsequently compared.

Statistical Analysis

The tabulation and statistical analysis of results should be conducted using a widely recognized computer application, MICROSOFT EXCEL 2019, and the SPSS V.25 program for MICROSOFT WINDOWS 10. The data description method employed in this study involved calculating the mean [±] standard deviation for quantitative data, and frequency and percentage for qualitative data. The mean is calculated by dividing the sum of all observations by the total number of observations. The standard deviation quantifies the extent to which individual varieties deviate from their respective means. The statistical tests employed in this study included the chi-squared test [X^2], the Standard student-t test [*t*], Fisher's exact test [FE], and the Mann-Whitney test [U]. A p-value of 0.05 is typically regarded as a significant level.

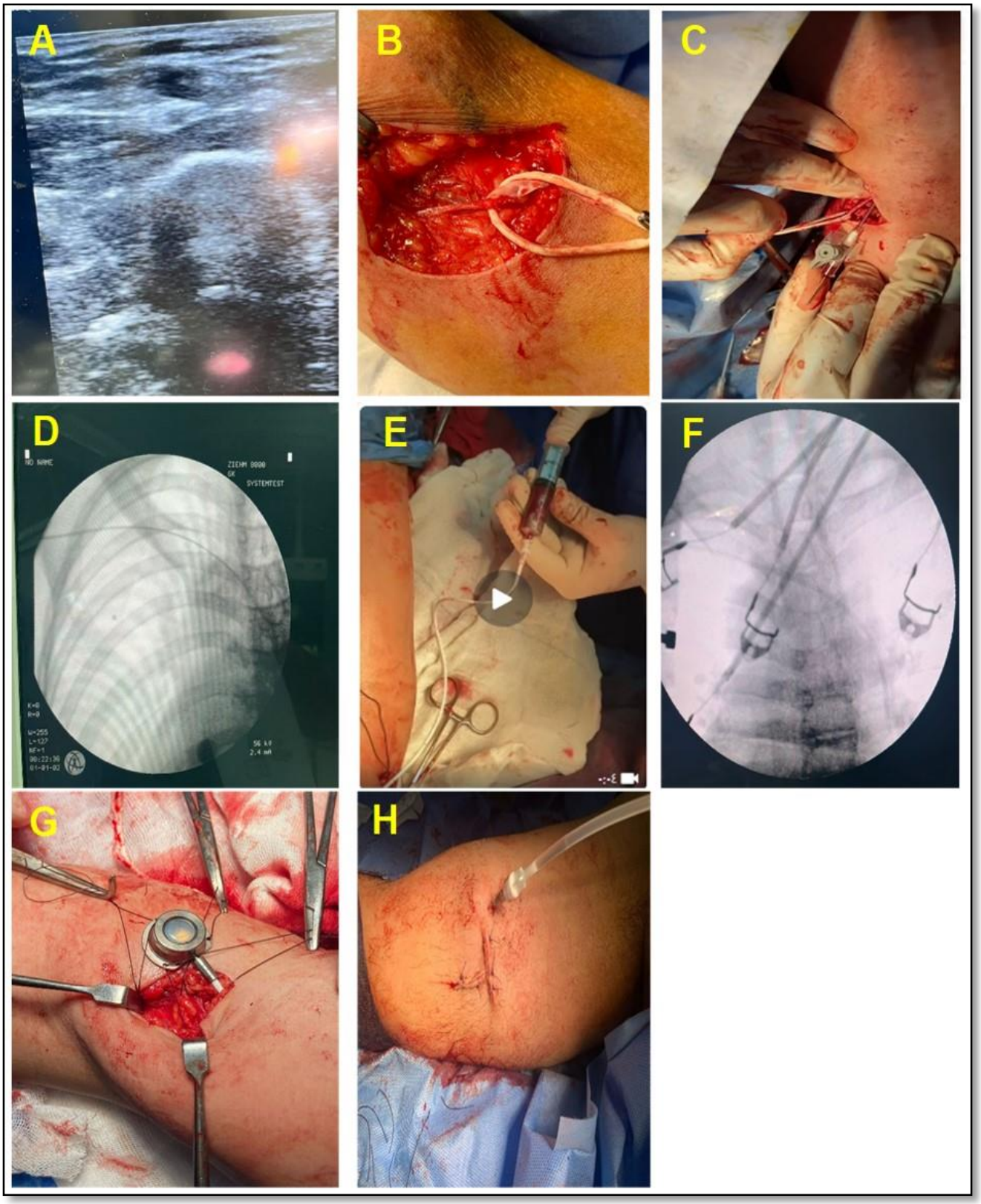

Figure [1]. The peripheral inserted catheter procedure, **Case 1 a]** US detecting the site of basilic vein, **b]** basilic vein, **c]** puncture of basilic vein, **d]** wire insertion, **e]** insertion of port tube and blood aspiration, **f]** port tube reaching SVC, **g]** port fixation, **h]** flush with heparinized saline post skin closure.

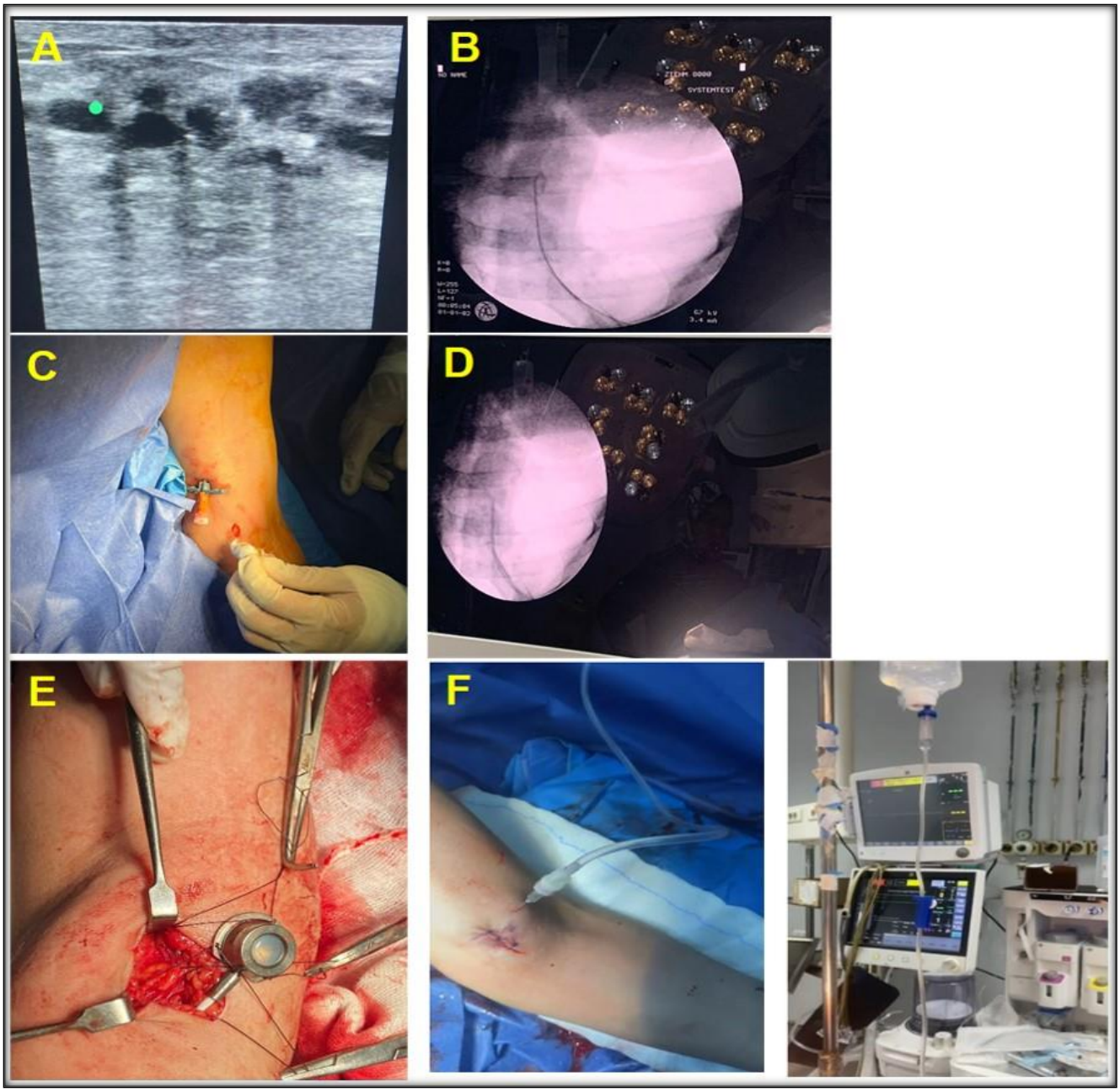

Figure [2]: The peripheral inserted catheter procedure, **Case 2 a]** us showing basilic vein, **b]** port wire reaching SVC, **c]** sheath insertion at the basilic vein, **d]** tube of port positioning at SVC, **e]** position of the port at arm, **f]** closure of skin and flush with heparinized saline.

RESULTS

A substantial statistical difference was seen between group A and group B in relation to DM [p<0.05]. In contrast, the analysis revealed that there was no statistically significant disparity seen between group A and group B in terms of sex, age, BMI, hypertension, deep venous thrombosis, and type of treatment [p>0.05] [**Table 1].** Further analysis revealed a statistically significant disparity between group A and group B in terms of anesthetic type [p<0.05]. In contrast, the analysis revealed no statistically significant disparity between Group A and Group B in terms of access route modifications and intraoperative problems [p>0.05] [**Table 2].**

Furthermore, the analysis revealed that there was no statistically significant disparity observed between group A and group B in terms of hemoglobin level, red blood cell count, white blood cell count, platelet count, platelet-to-thrombin time, INR, and prothrombin activity [p>0.05], [**Table 3]**.

Furthermore, a statistically significant disparity was seen between group A and group B in terms of local infection, skin response, and wound healing [p<0.05]. Furthermore, in relation to alterations connected to catheters, it was seen that none of the patients included in the study exhibited any instances of catheter-associated venous thrombosis, intraluminal thrombosis, or catheter tip rupture. All patients included in the study exhibited normal X-rays and free Doppler results [**Table 4].** Also, a statistically significant disparity was observed between group A and group B in terms of hematoma severity at the access site, artery puncture, comfort levels, device-induced worries, interference in daily activities, and overall satisfaction score [p<0.05], [**Table 5]**.

Table [1]: Demographic data of studied groups [n=60].

	Variable	Group A [n=30]	Group B [n=30]	Test	*P-value*
Sex [n, %]	Male	15 [50.0%]	11 [36.7%]	$\chi 2$=1.09	0.297
	Female	15 [50.0%]	19 [63.3%]		
Age [Years]	Mean ±SD	51.77 ±12.60	50.63 ±6.13	t=0.44	0.660
	Range	28-70	35-65		
BMI [Kg/m^2]	Mean ±SD	26.20 ±3.64	24.73 ±2.66	t=1.78	0.081
	Range	20-35	20-30		
DM		12 [40.0%]	3 [10.0%]	FE	**0.007***
Hypertension		13 [43.3%]	8 [26.7%]	FE	0.176
DVT		2 [6.7%]	0 [0.0%]	FE	0.492
Type of treatment	Curative	25 [83.3%]	30 [100.0%]	FE	0.052
	Palliative	5 [16.7%]	0 [0.0%]		

*: Statistically significant, NS: Non-significant, SD: Standard deviation, $\chi 2$: Chi-squared test, t: Student t test, FE: Fisher exact test, BMI: Body Mass Index, DM: Diabetes mellitus, DVT: Deep venous thrombosis Group A: Central Portacath inserted through internal jugular veins using Pac 8:10 f Group B: Peripheral Portacath inserted through Basilic veins using port-a-cath 3:5 f

Table [2]: Intraoperative data of studied groups [n=60]

	Variable	Group A [n=30]	Group B [n=30]	Test of significance	*P-value*
Pneumothorax		0 [0.0%]	0 [0.0%]	--------	-------
Operation time [minutes, %]	Mean ±SD	20.80 ±2.16	22.10 ±0.55	t=1.20	0.200
	Range	15-29	22-25		
Type of anaesthesia [n, %]	General	24 [80.0%]	0 [0.0%]	FE	**<0.001***
Access route changes [n, %]	1	2 [6.7%]	0 [0.0%]	FE	
Intraoperative complications [n, %]	Present	3 [10.0%]	0 [0.0%]	FE	0.237

*: Statistically significant, NS: Non-significant, SD: Standard deviation, t: Student t test, FE: Fisher exact test, Group A: Central Portacath inserted through internal jugular veins using Pac 8:10 f Group B: Peripheral Portacath inserted through basilic veins using port-a-cath 3:5 f

Table [3]: Laboratory data of studied groups [n=60]

	Variable	Group A [n=30]	Group B [n=30]	Test of significance	p-value
Haemoglobin [mg/dl]	Mean ±SD	11.83 ±1.21	11.97 ±0.18	t=0.60	0.554
	Range	10-15	11-12		
RBCs [X 10^6/µL]	Mean ±SD	5.00 ±0.33	5.00 ±0.00	U=0.00	1.000
	Range	4-6	5-5		
WBCs [X 10^3/mm^3]	Mean ±SD	10.80 ±4.69	10.03 ±0.18	U=1.31	0.189
	Range	7-26	10-11		
Platelets [X 10^3/mm^3]	Mean ±SD	206.00 ±63.93	194.67 ±8.99	U=0.96	0.340
	Range	120-400	180-200		
PTT [Seconds]	Mean ±SD	14.33 ±0.55	14.37 ±0.56	t=0.23	0.816
	Range	14-16	14-16		
INR	Mean ±SD	0.97 ±0.08	0.98 ±0.06	t=0.72	0.724
	Range	0.7-1	0.7-1		
Prothrombin activity	Mean ±SD	91.87 ±8.57	90.00 ±0.00	t=1.19	0.242
	Range	70-99	90-90		

NS: Non-significant, SD: Standard deviation, t: Student t test, U: Mann-Whitney U test, RBCs: Red blood cells, WBCs: White blood cells, PTT: Partial thromboplastin time, INR: International normalized ratio, Group A: Central Portacath inserted through internal jugular veins using Pac 8:10 f Group B: Peripheral Portacath inserted through Basilic veins using port-a-cath 3:5 f

Table [4]: Post-operative complications and Catheter-related changes in studied groups [n=60]

Variable	Group A [n=30]	Group B [n=30]	Test of significance	*P-value*
Non-thrombotic dysfunction [n, %]	4 [13.3%]	0 [0.0%]	FE	0.112
Local infection [n, %]	8 [26.7%]	0 [0.0%]	FE	**0.026***
Systemic infection [n, %]	1 [3.3%]	0 [0.0%]	FE	1.000
Thrombotic dysfunction [n, %]	0 [0.0%]	1 [3.3%]	FE	1.000
Skin dehiscence [n, %]	6 [20.0%]	0 [0.0%]	FE	**0.024***
Wound dehiscence [n, %]	6 [20.0%]	0 [0.0%]	FE	**0.024***
Pain [n, %]	6 [20.0%]	4 [13.3%]	FE	0.488
Swelling/ edema [n, %]	2 [6.7%]	1 [3.3%]	FE	1.000
Thrombophlebitis [n, %]	0 [0.0%]	1 [3.3%]	FE	1.000
Catheter-related venous thrombosis [n, %]	0 [0.0%]	0 [0.0%]	----	-----
Intraluminal thrombosis [n, %]	0 [0.0%]	0 [0.0%]	----	-----
Catheter tip thrombosis [n, %]	0 [0.0%]	0 [0.0%]	----	-----
X-ray [Normal] [n, %]	30 [100.0%]	30 [100.0%]	------	-------
Doppler [Free] [n, %]	30 [100.0%]	30 [100.0%]	-----	------

*: Statistically significant, NS: Non-significant, FE: Fisher exact test, Group A: Central Portacath will be inserted through internal jugular veins using Pac 8:10 f Group B: Peripheral Portacath will be inserted through Basilic veins using port-a-cath 3:5 f

Table [5]: Results of follow-up and satisfaction among studied groups [n=60]

Variable		Group A [n=30]	Group B [n=30]	Test of significance	*P-value*
Patency rate of catheter		30 [100.0%]	30 [100.0%]	-----	----
Hematoma at access site		6 [20.0%]	0 [0.0%]	FE	**0.024***
Arterial puncture		7 [23.3%]	0 [0.0%]	FE	**0.011***
Restenosis by angiography		0 [0.0%]	0 [0.0%]	----	----
Restenosis by Doppler		0 [0.0%]	0 [0.0%]	----	----
Fate	Alive Dead	29 [96.7%] 1 [3.3%]	30 [100.0%] 0 [0.0%]	FE	1.000
Recognition for need of device		30 [100.0%]	30 [100.0%]	-----	----
Aspects of comfort	Poor Fair Good	2 [6.7%] 2 [6.7%] 26 [86.7%]	1 [3.3%] 10 [33.3%] 19 [63.3%]	$\chi 2$=6.76	**0.029***
Anxieties generated using the device		2 [6.7%]	14 [46.7%]	FE	**<0.001***
Interference in daily activities		2 [6.7%]	12 [40.0%]	FE	**0.002***
Overall satisfaction	Mean ±SD Range	7.80 ±0.66 5-8	6.50 ±0.51 6-7	t=8.51	**<0.001***

*: Statistically significant, NS: Non-significant, FE: Fisher exact test, $\chi 2$: Chi-squared test, t: Student t test, Group A: Central Portacath inserted through internal jugular veins using Pac 8:10 f Group B: Peripheral Portacath inserted through Basilic veins using port-a-cath 3:5 f

DISCUSSION

The findings of this investigation indicate a statistically significant disparity in DM levels between group A and group B. Furthermore, no statistically significant distinction was observed between group A and group B in terms of variables such as sex, age, BMI, hypertension, deep venous thrombosis, and type of treatment. In a similar vein, the study conducted by **Abdulfattah *et al.*** [11] revealed that there were no statistically significant disparities observed between the Jugular and Basilic groups in terms of age, BMI, sex, and other characteristics.

This finding aligns with the research conducted by **Narducci *et al.*** [12] which similarly concluded that BMI does not serve as a patient mortality risk factor. Nevertheless, **Ignatov *et al.*** [13] documented that a BMI exceeding 28.75 exerted a noteworthy impact on the incidence of problems. The researchers further asserted that patient-related risk factors for complications did not include age, cancer type, or the existence of metastases. Furthermore, the study conducted by **Ruchan *et al.*** [14] revealed no statistically significant disparity in gender across the various groups.

In a separate investigation conducted by **Savader *et al.*** [15], it was shown that the incidence of symptomatic deep venous thrombosis in the upper extremities, as observed in most surgical studies employing the subclavian technique for port placement, is a minimum of 0.4 per 1,000 days.

Nevertheless, alternative research has failed to observe any instances of upper deep vein thrombosis that are clinically apparent in individuals who have undergone catheter insertion through the right internal jugular vein. Furthermore, **Carde *et al.*** [16] documented a notable incidence of asymptomatic thrombosis after the implantation of a catheter. Furthermore, there is a greater prevalence of deep vein thrombosis [DVT] diagnosis in the initial stages, particularly during the second week following insertion. Approximately 80% of all DVT cases are observed within the first 14 days.

In a separate investigation conducted by **Paauw *et al.*** [17], it was observed that PICCs exhibited a greater incidence of DVT compared to CVCs.

The retrospective study conducted by **Allen *et al.*** [18] examined the occurrence of DVT based on the insertion site of 354 peripheral intracoronal catheters [PICCs] in 119 patients, with a basilic rate of 14%.

The study conducted by **Paauw *et al.*** [17] revealed a greater incidence in the basilic vein compared to the findings of **Allen *et al.*** [18], with a twofold elevated risk observed in the left basilic vein.

The findings of our study indicate a statistically significant disparity between group A and group B in terms of both operation duration and anesthetic type. Furthermore, it is worth noting that there was no statistically significant disparity observed between group A and group B in terms of access route modifications and intraoperative problems.

Consistent with the findings of our investigation, **Abdulfattah *et al.*** [11] documented that the utilization of the external jugular vein for implantation was correlated with a reduced duration of the surgical procedure. Furthermore, the study conducted by **Nabil *et al.*** [19] revealed that a total of 47 patients [94%] did not experience any intraoperative difficulties. Specifically, 25 patients [100%] underwent the peripheral approach, while 22 patients [88%] completed the central approach. Furthermore, it was determined that none of the patients experienced pneumothorax or hemothorax. In addition, the study conducted by **Kim *et al.*** [20] revealed the absence of any peri-procedural complications, such as pneumothorax.

Furthermore, the study conducted by **Fonseca *et al.*** [21] revealed that brachial insertion ports can be deployed in peripheral veins, particularly the basilic vein, with little maintenance requirements and a low incidence of adverse outcomes. This is evidenced by the absence of serious perioperative problems such as puncture, pneumothorax, and hemothorax, which were reported at rates of zero.

Comitalo[22] established that there is no documented occurrence of pneumothorax as a complication associated with the insertion of peripheral ports.

The study conducted by **Goltz *et al.*** [23] revealed that most of the patients experienced a sense of comfort throughout the implantation procedure. However, it is worth noting that no patients in our sample were administered sedation. This finding is consistent with a study conducted by **Maurer *et al.*** [24], wherein the administration of sedation was not employed during the implantation of pectoral ports.

Conversely, a subset of patients surveyed by **Goltz *et al.*** [23] expressed a preference for general anesthetic over local anesthesia. This assertion suggests that a more extensive utilization of conscious sedation during IVAP implantation could have potentially enhanced the level of comfort experienced during the procedure.

In the present investigation, no statistically significant disparity was seen between group A and group B in terms of hemoglobin level, red blood cell count, white blood cell count, platelet count, platelet-to-thrombin time, INR, and prothrombin activity.

Consistent with the findings of our research, **Abdulfattah *et al.*** [11] observed no statistically significant disparities in laboratory parameters between the Jugular and Basilic groups. This aligns with the results of **Seok *et al.*** [25], who similarly reported no statistically significant association between laboratory findings, history of chemotherapy, and the incidence of severe complications.

When considering WBC counts as a patient-related factor, **Gutierrez and Gollin** [26] observed that the exclusion of children with neutropenia [0.5 x 10^9 /L] from the central venous access port leads to a considerable reduction in the occurrence of problems. However, the study conducted by **Seok *et al.*** [25] did not include any patients with neutropenia, and the white blood cell count did not demonstrate a significant risk factor.

The findings of this study indicate a statistically significant disparity between group A and group B in terms of local infection, skin response, and wound healing. In contrast to the findings of our investigation, **Abdulfattah *et al.*** [11] demonstrated that there was no statistically significant disparity observed between the two groups in relation to local infection.

In contrast, a separate investigation carried out by **Moureau *et al.*** [27] documented a rate of infection complications of 0.30 per 1000 catheter days in a sample of 8156 CVP implantations.

In their study, **Lee *et al.*** [28] proposed that the prevalence of skin erosion was estimated to be 1%. The study conducted by **Kim *et al.*** [20] reported a skin erosion incidence rate of 0.7%.

The findings of a separate investigation conducted by **Nabil *et al.*** [19] indicated that a total of seven patients [14%], with four [16%] located in the central region and three [12%] in the peripheral region, exhibited wound infection characterized by wound sutures and inflammation.

Furthermore, the study conducted by **Dariushnia *et al.*** [29] revealed that wound dehiscence is an infrequent consequence, occurring in approximately 1-3% of cases, which might lead to wound infection and need the removal of the port catheter. In general, this phenomenon arises due to insufficient suturing technique and compromised wound healing conditions resulting from chemo-therapy.

It is noteworthy that **Teichgräber *et al.*** [30] observed a rather high prevalence of thrombotic dysfunctions, which tend to manifest at a later stage compared to the absence of thrombotic dysfunction.

Our study's findings indicate no instances of catheter-related venous thrombosis, intraluminal thrombosis, or catheter tip thrombosis observed among the patients included in our analysis. All individuals included in the study exhibited normal X-rays and free Doppler evaluations. Nevertheless, **Ahn *et al.*** [31] demonstrated that venous thrombosis ranks as the second most significant hazard associated with intravenous anticoagulants, resulting in a mean hospitalization duration of 4.8 days.

The study conducted by **Biffi *et al.*** [32] revealed the occurrence of venous thrombosis has been recorded at an incidence rate ranging from 0.3% to 11.7% or 0.04 to 0.105 per 1000 catheter days. This incidence is influenced by factors such as the placement of the catheter tip, the site of insertion, and the duration of wear.

In their study, **Ahn *et al.*** [31] observed a total of six venous thromboses in the internal jugular vein, superior vena cava, and right atrium. Notably, two of these thromboses were found to be linked to abnormal positioning of the catheter. Furthermore, **Biffi *et al.*** [32] shown that the occurrence of catheter-associated thrombosis ranges from 0.3% to 28.3% among research studies.

The study conducted by **Kim *et al.*** [20] reported a catheter-associated thrombosis incidence rate of 0.5%. In the study conducted by **Schutz *et al.*** [33], it was observed that catheter tips exhibited a cephalad migration of around 20 mm when in the erect posture. Furthermore, proper insertion of the catheter tip deep into the upper region of the right atrium was found to reduce the likelihood of catheter malfunction.

Luciani *et al.* [34] assert that inadequate positioning of the catheter heightens the likelihood of venous thrombosis or results in a retracted catheter's kink.

The present investigation demonstrated a statistically significant disparity between group A and group B concerning the occurrence of hematoma at the access site and arterial puncture.

Following the findings of **Nabil *et al.*** [19], observed that out of the 37 patients who underwent surgery, most [74%] did not experience any postoperative complications. Specifically, 18 patients [72%] underwent a central approach, while 19 [76%] underwent a peripheral approach. Additionally, four patients [8%] experienced hematoma, with 3 patients [12%] undergoing the central approach and 1 patient [4%] undergoing the peripheral approach. In contrast, the study conducted by **Kreidieh *et al.*** [35] uncovered no statistically significant disparities in the likelihood of hematoma.

In conclusion, the utilization of central vein Portacath and basilica vein Portacath techniques has proven to be a secure and efficient method for central venous catheterization in the context of chemotherapy. Port catheters offer an optimal vascular access solution for cancer patients, enhancing their overall quality of life. Notwithstanding these advantages, port catheters are linked to a range of problems.

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