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OUTCOMES OF TUNNELLED HEMODIALYSIS CATHETER INSERTION WITHOUT FLUOROSCOPIC GUIDANCE IN A RESOURCE LIMITED SETTING – A CASE SERIES

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ABSTRACT **Background:** Renal replacement therapy is crucial for patients with end-stage renal disease (ESRD), a condition that is significantly on the rise. Permanent Vascular access in these patients is of the utmost importance which is achieved by AV fistulas or grafts . This can also be achieved by cuffed tunnelled catheters. In the patients with end-stage renal disease, the current study aims to evaluate Outcomes of tunnelled HD catheter insertion without fluoroscopic guidance in a resource limited setting. **Materials And Methods:** Prospective observational study ,we enrolled all patients presenting to our hospital requiring HD who underwent tunnelled catheter insertion along with details of follow-up from June 1st, 2021 till may 31st, 2022. **Results:** Among 10 patients, the mean age of the patient was 49 years with with female predominance (70%). The site of insertion was right internal jugular vein of 9(90%) and right femoral vein in 1 (10%) patient . Indication for the insertion was multiple access failure (60%) , severe cardiac failure (30%) and failed maturation (10%). Immediate bleeding from the exit site was seen in one patient which resolved after six hours.Long term complication with one patient had catheter related blood stream infection responded to systemic antibiotic and lock. Two(20%) expired due to severe cardiac failure with functioning catheter with duration of 6 months. AV fistula was created in two (20%) patients and AV graft created in one(10%) patient with catheter duration of 7 months remaining 5 (50%)continued to be on catheter with maximum patency of 12 months. **Conclusion:** An arteriovenous fistula can be replaced with a cuffed tunnelled catheter because of its good patency even in resource limited settings.

KEYWORDS : End-stage renal disease, Hemodialysis, Tunnelled catheters

INTRODUCTION-

Vascular access forms the major part of haemodialysis patients .Vascular access and its creation continues to be a challenge due to scarcity of skilled surgeons and patient related factors . There are currently three modalities of vascular access for hemodialysis: temporary jugular catheter, permanent catheters and the creation of an arteriovenous fistula[1]. Each modality has benefits and drawbacks of its own. Due to its long-term use and minimal degree of complications, arteriovenous fistula is currently regarded as the best method for hemodialysis access[2]. However, it has its own drawbacks, including the need for more than six weeks for maturation, failure to mature, and potential unsuitability for patients with heart failure and sclerotic arteries.[3]. Compared to temporary catheters, if the patient needs this access for more than a month, tunnelled catheters are chosen because they greatly reduce the rates of malfunction, infection, and thrombosis [4]. Permanent tunnelled catheters have its own set of risks, including central venous stenosis, thrombosis, and infection, as well as acute complications such arterial puncture and bleeding[5]. Fluoroscopy and ultrasound guidance are needed to prevent these problems, however in underdeveloped nations access to these techniques is difficult due to budgetary constraints and a lack of resources in government run setup.As a result, in this study we looked for outcomes of tunnelled HD catheter insertion without fluoroscopic guidance in a resource limited setting.

MATERIALS AND METHODS

A Prospective observational study was conducted on patients presenting to our Kilpauk medical college and hospital requiring HD who underwent tunnelled catheter insertion June 1st, 2021 till May 31st, 2022. Data for Indications, procedure complications, infections and patency was collected and analysed .Procedure was performed by Nephrologist. Palindrome tunnelled dialysis catheter for right internal jugular vein with size of 19 cm tip to cuff and for right femoral vein of size of 43cms tip to cuff was used .Proper aseptic technique as per institute policy was followed. Determined the placement of tip of catheter by using 2nd ICS as landmark .Followed by cuff and exit site was positioned .Venous puncture done using USG Guided then guidewire passed .Tunnelling done and catheter placed without fluoroscopic guidance and post procedure flow was noted . At the end of the procedure also concentrated heparin of the required amount was flushed in each port of the catheter. Position was confirmed using X-ray with immediate post procedure complications was noted. Catheter position was considered correct if tip was positioned in the right upper atrium in right IJV and right femoral vein –position the tip of the catheter in the inferior vena cava which was confirmed with the help anatomical landmarks on X-ray.

RESULTS-

Total of 10 patients underwent tunnelled hemodialysis catheter insertion. The average mean age was 49 years and 30% of the patients were male and 70% were female patients. The site of insertion was right internal jugular vein in 9(90%) and right femoral vein in 1 (10%) patient . Indication for the insertion was multiple access failure (60%), severe cardiac failure (30%) and failed maturation (10%). In the case where a catheter was placed in the right femoral vein, it was initially tried in the right internal jugular vein but the guidewire could not be negotiated hence the insertion site was changed.

The mean months of follow-up of the patients in which the catheter was inserted were 9.1 months (range 5 months–12 months). During the follow up immediate bleeding from the exit site was seen in one patient which resolved with local compression after six hours. Long term complication with one patient had catheter related blood stream infection responded to systemic antibiotic and lock. Two(20%) expired due to severe cardiac failure with functioning catheter with duration of 6 months. AV fistula was created in two (20%) patients and AV graft created in one(10%) patient with catheter insitu with duration of 7 months .Remaining 5 (50%)continued to be on catheter with patency of 12 months . Technique successful rate achieved in 9 (90%) patients and one patient where a catheter was placed in the right femoral vein, it was initially tried in the right internal jugular vein but the guidewire could not be negotiated hence the insertion site was changed. As all the cases were done without under fluoroscopy guidance yet none of the cases had arterial puncture, pneumothorax and malposition of the catheters.

The summary of the findings of the study is mentioned in Table 1.

Average Age-	49 years
Gender Distribution [n-(%)]	

Male	3 (30%)
Female	7(70%)
Site of insertion of catheters [n (%)]	
Right Internal Jugular	9 (90%)
Right Femoral vein	1 (10%)
Immediate Complications [n (%)]	
Bleeding	1 (10%.)
Late Complications [n (%)]	
CRBSI	1(21.87)
Patency [n (%)]	
Number of catheter patent until alternative access	3 (30%)
Number of catheter patent until patient's death	2(20%)
Number of catheter patent until follow up	5(50%)

Following pictures chest X-ray post catheter insertion (fig.1) and fig.2 has consolidated pictures of few X-rays post procedure .

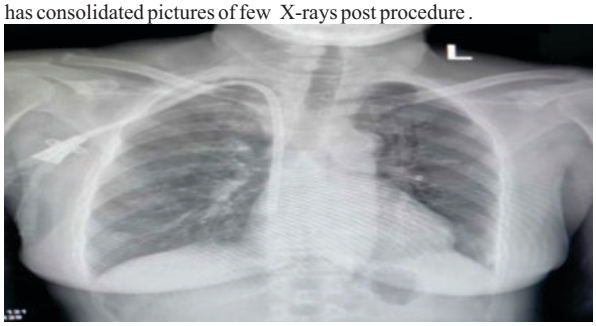

Fig-1

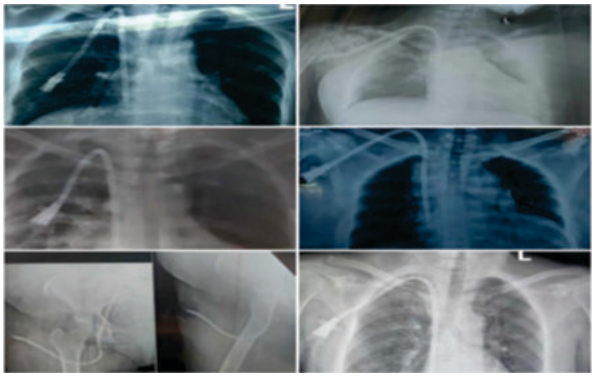

Fig-2

DISCUSSION –

The most effective option of renal replacement therapy to date is renal transplant followed by haemodialysis .AV fistula first is the most important part of patients with ERSD.A tunnelled catheter has emerged as one of the finest options available to patients in whom arteriovenous fistulas cannot be created for hemodialysis.

In total of 10 patients the average age of the patients was 49 years.in Nepal a similar study in which patients who underwent catheter placement with average of 50.25 [6]. Female patients were more than males with 70% were female patients and 30% of the patients were male .Similarly study conducted in Nepal noted females of 62.5% compared to males of 37.5% [6]. Our most common indication for the insertion was multiple access failure (60%).Regarding the site of the catheter placement, the common site was right IJV and followed by right femoral .Because of the risk of stenosis and AVF failure, subclavian vein placement was avoided per the recommendations in the guidelines. Similar to this, KDOQI recommendations suggested inserting catheters in the right internal jugular vein first, then the left, and finally the femoral vein.[7].Left internal jugular vein was not used because of lack of fluoroscopy guidance. As in our patients catheter patency was up to 100%.Similarly in another study done in 1994 suggested one-year patency ranged from 91% to 93% [8].Manipulation was not done any of the cases post procedure. Two patients expired (20%) due to cardiovascular co-morbidities with functioning catheter .Three patients (30%) were switched to alternative access i.e AVF/graft. On immediate complication, bleeding was found in one patient (10%) and on long term complications, one (10%) patient had CRBSIs which responded to antibiotics. No thrombotic events was noted. To the best of our knowledge, all of the literature that is currently available is based on fluoroscopic guidance, unlike our study, which was conducted without it with good outcome. The limitations was lesser sample size.

CONCLUSIONS -

Tunnelled dialysis catheters has own its usefulness and will always play an important role as bridge to AVF creation or early renal transplant. With proper selected patient, tunnelled catheter insertion can be successfully done without fluoroscopic guidance by nephrologists. Here in our setup with limited experience and resource constraints ,we had a satisfactory outcome with TDC's insertion without fluoroscopic guidance.

Conflict Of Interest-None.

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