Coiled Tenckhoff Catheter Insertion For CAPD Using Open Dissection Technique By Nephrologists - A Single Center Experience

*** H.O.D & Prof, **Associate Prof,* D.M Nephro (post graduate) students, Department of Nephrology, Post Graduate Institute of Medical Education and Research & Dr. Ram Manohar Lohia Hospital, New Delhi.

Abstract: A successful PD program is dependent on the proper placement of the permanent PD catheters, knowledge of the placement techniques and complications. Study outcomes of 81 Coiled CAPD consecutive Tenckhoff catheter insertions by our nephrologists using the open dissection surgical technique were reported. The major cause of catheter technique failure was infectious complications secondary to peritonitis 9.8%. Perioperative complications 3.7% bleeding, no bowel injury were observed. Mechanical Complications like 1.23% drainage failure, 2.4% catheter migration, 2.4% fluid leak were observed. Infective complications like 1.23% wound site, 1.23% exit site, no tunnel, and no peritonitis were observed immediate post operative. But 27 episodes of peritonitis with periods of 17.4 ± 1.6 months peritonitis were observed. Catheter survival rates at 6 months, 1 and 2 years were 94.3% (66/71), 90.7% (59/65) and 82% (41/50) respectively. Catheter insertion by trained nephrologists is dramatically increases penetration for Peritoneal dialysis. We reported an encouraging outcome for coiled Tenckhoff catheters inserted by experienced nephrologists in an open surgical manner, with less peri-operative, mechanical, bleeding complications with 100% technical success of placement comparable to trained surgeon and a good catheter survival rate.

Keywords: CAPD, PDC, Mechanical Complications, Peritonitis

Introduction

A successful PD program is dependent on the proper placement of the permanent PD catheters, knowledge of the placement techniques and complications. Peritoneal dialysis catheter (PDC) for continuous ambulatory peritoneal dialysis is inserted into the abdominal cavity either by a surgeon, interventional radiologist or nephrologists. The practice of catheter insertion by nephrologists is by open method remains uncommon in most countries. So, we studied

the safety and efficacy of coiled Tenckhoff catheter insertion by nephrologists using the open surgical technique

Patients and Methods

In this study, we report outcomes for 81 Coiled CAPD consecutive Tenckhoff catheter insertions by nephrologists between January 2010 and December 2011. All Tenckhoff catheters were inserted by nephrologists in our unit using the open dissection surgical technique, after informed consent. Patients with previous uncomplicated abdominal operations—such as cholecystectomy, hysterectomy, caesarean section, previous Tenckhoff catheter removal—were not excluded. The procedure was carried out in an operation theater.

Intravenous cefazolin (or) cephrampzone was routinely used as prophylactic antibiotic, except in patients with a penicillin or cephalosporin allergy. All catheter insertions were preceded by emptying of the urinary bladder. Patient is placed in the supine position. Skin preparation for the operation used povidone iodine and standard draping. Under local anaesthesia, a vertical incision of 3 cm is made in the paramedian, 2–3 cm lateral to umbilicus. The subcutaneous layer is dissected, till the sheath of the rectal abdominal muscle is reached. The anterior rectus sheath is opened and the muscle fibres are retracted laterally. After reaching the posterior rectus sheath (PRS), purse string suture was made over that. By holding the PRS using two artery forceps, posterior sheath was then cut, and the peritoneal cavity was opened after peritoneum dissection. Once the peritoneal cavity was

Address for Correspondence
Prof. Sham Sundar
HOD, Nephrology
PGIMER & Dr. RML Hospital, New Delhi
Email: shamsunderrml@rediffmail.com
confirmed under direct vision, coiled catheter is placed over a malleable stylet and advanced into the peritoneal cavity. The intraperitoneal segment is slid off the stylet and the cuff is advanced to the preperitoneal space. Deep cuff was anchored over posterior rectus and subcutaneous tunnel was made, so that superficial cuff was 2 cm from exit site. The exit site is usually lateral and caudal to the entrance site. The functioning of the catheter is tested by filling the abdomen with 100 cc saline and the entrance site is checked for leakage. Once again flushing done on 2nd post operative day to check the flow. CAPD will be started on 10th post operative day.

We studied the demographic, baseline character, technical success of placement, catheter survival and complications in the form of peri-operative (bowel injury), mechanical (drainage failure, catheter migration, fluid leak) and infection (wound site, exit site, tunnel, and peritonitis). Survival was determined by Kaplan–Meier analysis; data were censored at the time of transplantation, death with a functioning dialysis catheter, or end of the study observation period.

**Results**

Between January 2010 and December 2011, 81 (52-males, 29-females) peritoneal catheters were inserted by nephrologists, with average patient age of 50.8 yrs ± 9.2 (range 23-80yrs). 49.3% (no.40) were type 2 diabetes and 96.3% were hypertensive (Table 1). 4 patients were hepatitis C and one patient was Hepatitis B reactive. Technical success of placement was 100%. Primary catheter failure (defined as a catheter that fails to function within 1 month after insertion) occurred in 3.7% of cases. The major cause of catheter technique failure was infectious complications secondary to peritonitis 9.8% (8 pat.). Peri operative complications: - no bowel injury, bleeding-3.7% (no.3), were observed (fig-1).

Regarding Mechanical Complications drainage failure-1.23% (no.1), catheter migration-2.4% (no.2), fluid leak-2.4% (no.2), were observed (fig-2). Infective complications:wound site

**Table 1: Patients Demographics and Clinical characteristics**

<table>
<thead>
<tr>
<th>CHARACTERISTIC</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catheters inserted (n)</td>
<td>81</td>
</tr>
<tr>
<td>Sex (male: female)</td>
<td>52:29</td>
</tr>
<tr>
<td>Mean Age (years)</td>
<td>50.8 yrs ± 9.2</td>
</tr>
<tr>
<td>With Diabetes mellitus</td>
<td>49.3% (no. 40)</td>
</tr>
<tr>
<td>With Hypertension</td>
<td>96.3% (no.78)</td>
</tr>
<tr>
<td>With hepatitis B surface antigen</td>
<td>1.24%(no:1)</td>
</tr>
<tr>
<td>With hepatitis C virus</td>
<td>4.9%(no:4)</td>
</tr>
<tr>
<td>Operative time</td>
<td>55±10 mins</td>
</tr>
<tr>
<td>Duration of post op stay in days</td>
<td>3±1</td>
</tr>
</tbody>
</table>

( no. 2) 1.23%, exit site 1.23%, no tunnel, and no peritonitis were observed immediate post operative (fig-3). But 27 episode of peritonitis with period of 17.4 ± 1.6 months
peritonitis were observed. Catheter survival rates at 6 months, 1 and 2 years were 94.3% (66/71), 90.7% (59/65) and 82% (41/50) respectively (censoring patients died with functioning catheter) (fig-a). Operative time was 55±10 minutes. Duration of post operative stay was 3±1 days.

Figure 3: Infectious Complications

<table>
<thead>
<tr>
<th>Number of episodes</th>
<th>Wound site</th>
<th>Exit site</th>
<th>Tunnel</th>
<th>Episode of Peritonitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Types of infectious complications

Figure 4: Catheter Survival Rate

Catheter survival rate in percentage:

- 6 months: 94.3%
- 12 months: 90.7%
- 24 months: 82%

Catheter survival rate

Discussion

We evaluated the outcome of PD catheter insertions by nephrologists in a single dialysis unit. Our analysis indicates an encouraging outcome with a 2-year catheter survival of 82.0% and a good safety profile. Percutaneous insertion have showed a high incidence of leakages and early mechanical complications and the potential risk of bowel perforation since this technique is a ‘blind’ procedure without direct visualization of the peritoneum.¹⁰⁻¹²

A recent study reported the outcomes of 283 catheters inserted percutaneously by nephrologists in the United Kingdom using a Seldinger technique; the authors reported a 6-month catheter survival rate of only 83% as compared with the 1-year all-cause catheter survival of 90.7%.¹⁴ Our finding of a 1.23% technique failure rate secondary to flow dysfunction is encouraging; this superior result is even similar to the results reported with laparoscopic insertion methods ranging from 0.5% to 6.9%.⁵ Among the percutaneously placed PDCs, early leakage varied from 2.6% to 22%.⁶⁻⁷ Moreiras et al. reported that 15.3% of their mechanical complications were related to the insertion and 6% to early leakage.⁶⁻⁷ In the study conducted by Smith et al., the most common early complication was leakage (13%).⁸ Allon et al. reported that 19 of the 154 percutaneously placed catheters demonstrated early complications, and early leakage was observed in 2.6%.⁷ Swartz et al.⁹ and sampathkumar et al.¹⁰ reported early leakage as high as 21.6% and 12% compare to only 2.4% patient developed fluid leakage in our study.

One recent study from kai Ming chow (¹¹) et al. reported 9 (3.6%) peritonitis, and 11 (4.4%) exit-site infections compare to wound site 1.23%, exit site 1.23%, no tunnel, no peritonitis observed immediate post operative in our study. Less infectious complications may be due to catheter insertion in Operation Theater in our center.

Coiled catheters were found to have advantages of better flow, less inflow pain, less propensity for catheter migration and omental wrapping, and fewer traumas to the viscera than straight catheters. These advantages may have resulted in fewer catheter related infections, and longer survival of coiled peritoneal catheters in patients.¹²

Nielsen et al found that, straight catheter had a reduced catheter survival at 12 months (36% vs 77%, p < 0.01) compared to curled catheter, primarily due to catheter tip migration.¹³ In our study, less catheter migration and good long term survival may be due to coiled double cuffed catheter insertion.

The main benefit is to provide timely and effective catheter insertion without an unduly long wait time or delay, during which potential candidates for PD might lose interest in the PD modality. Furthermore, other lines of evidence suggest that catheter insertion by nephrologists is paralleled by a dramatically increased penetration ratio for PD as compared with hemodialysis.¹⁴
Conclusions

We reported an encouraging outcome for coiled Tenckhoff catheters inserted by experienced nephrologists in an open surgical manner, with less peri-operative, mechanical, bleeding complications with 100% technical success of placement comparable to trained surgeon and a good catheter survival rate.

References


