


## ORIGINAL ARTICLE

## Percutaneous and Open Surgical Techniques for Peritoneal Catheter Placement- A Comparative Study

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**Background:** Success in carrying out peritoneal dialysis (PD) requires a functioning catheter and the ability of the patient to master the PD technique. The present study compared the PDC insertion by conventional surgical technique and percutaneously. **Materials & Methods:** Group I included 140 patients in which PDC was inserted conventional surgical technique and group II had 140 patients in which catheters were inserted percutaneously. Complications and survival rate was compared in both groups. **Results:** The mean age in group I was 52±10.2 years and in group II was 51±12.4 years. Each group had 46 females. Patients above 70 years of age were 30 in group I and 24 in group II. Ethnic minority was seen in 10 patients in group I and 2 in group II. The difference was non- significant (P>0.05). Diabetic nephropathy was observed in 18 in group I and 22 in group II. Polycystic kidney disease was seen in 28 in group I and 7 in group II. The difference was non- significant (P<0.05). Previous abdominal surgery was performed in 72 in group I and 14 in group II. The difference was non- significant (P<0.05). Previous PD catheter was inserted in 37 and 8 patients in group I and group II respectively. The difference was non- significant (P= 0.00). Complications like primary failure in group II (3), poor initial drainage in group I (18) and group II (14), PD related peritonitis in both groups as 1. Other was exit leak in group I (12) and group II (34), scrotal leak in group I (5) and group II (13). The difference was highly significant (P<0.001), pleural leak in group I (10) and group II (4). The difference was significant (P<0.01), secondary drainage failure in group I (21) and group II (13). At 3 month both groups had 130 catheter, which at 12 months, the survival rate decreased to 102 in group I and 110 in group II. The difference was non- significant (P>0.05). **Conclusion:** Percutaneous PDC placement compares favorably with the open surgical technique in terms of technical survival and overall complication rates.

**Key words:** Diabetic nephropathy, Percutaneous, Peritonitis**Corresponding author:** Dr. Prithviraj L. Jadhav, Assistant professor, Department of Radio diagnosis, Dr. D. Y. Patil Medical College, Hospital & Research Institute, Kadamwadi, Kolhapur, Maharashtra, India**This article may be cited as:** Jadhav PL, Patil PS. Percutaneous and Open Surgical Techniques for Peritoneal Catheter Placement- A Comparative Study. J Adv Med Dent Scie Res 2017;5(11):104-107.

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**I**NTRODUCTION

Interventional radiology (IR), sometimes known as vascular and interventional radiology (VIR), is a medical specialty which provides minimally invasive image-guided diagnosis and treatment of disease. Although the range of procedures performed by interventional radiologists is broad, the unifying concept behind these procedures is the application of image guidance and minimally invasive techniques in order to minimize risk to the patient.<sup>1</sup>

Success in carrying out peritoneal dialysis (PD) requires a functioning catheter and the ability of the patient to master the PD technique. Several methods for peritoneal dialysis catheter (PDC) insertion have evolved, including an open

surgical procedure; laparoscopic insertion; and the percutaneous Seldinger, peritoneoscopic, and fluoroscopic placement techniques. The percutaneous Seldinger method is the least invasive technique, and yet it is not commonly practiced. The advantages of percutaneous PDC insertion include avoidance of general anesthesia (GA) and the delays imposed by wait-listing for surgery and for theater time allocation; potentially less post-procedure pain, with faster recovery and ambulation; and efficient use of resources. Recent studies have shown favorable outcomes with percutaneous PDC placement, demonstrating the efficacy and safety of the technique.<sup>2</sup>

Contraindications to percutaneous catheter insertion were open abdominal surgery other than appendectomy or

cesarean section, a bleeding tendency, and pre-existing hernia requiring simultaneous repair. Otherwise, the chosen method of insertion depended largely on the caring physician's preference and operator availability.<sup>3</sup> Access to timely insertion of a PDC is a crucial factor for improving PD utilization and avoiding urgent hemodialysis. Since the development of the Tenckhoff catheter in the mid-1960s, and after the introduction of continuous ambulatory PD (CAPD) in the 1970s, PDC placement techniques have continually been advanced, with myriad experiences being reported by various centers.<sup>4</sup> The present compared compared the PDC insertion by conventional surgical technique and percutaneously.

**MATERIALS & METHODS**

The present study was conducted in the department of Radiology. It included 280 patients requiring dialysis. All were informed regarding the study and written consent was taken. Ethical clearance was obtained from institutional ethical committee. They were divided into 2 groups. Group I included 140 patients in which PDC was inserted conventional surgical technique and group II had 140 patients in which catheters were inserted percutaneously.

Symptoms such as abdominal pain, fever, nausea, diarrhea and abdominal tenderness were recorded. Dialysate white cell count exceeding 100/mm<sup>3</sup>, or a positive effluent culture, or both were also recorded. Positive swab cultures from patients with suspected exit-site infection were identified from the laboratory database. We defined poor initial drainage as significant drainage failure within 48 hours of commencing PD exchanges, necessitating either catheter manipulation or replacement or discontinuation of PD. We defined secondary drainage failure as catheter blockage or dysfunction occurring more than 48 hours after successful initial drainage and resulting in catheter manipulation or replacement or discontinuation of PD. We differentiated between catheter removal for mechanical or infectious complications of the PDC and non-catheter-related reasons for discontinuation of PD, including death, transplantation, recovery of renal function, and transfer to hemodialysis because of ultrafiltration failure, poor clearance, or patient choice. Primary outcomes were recorded retrospectively at 3 and 12 months after insertion of the PDC. Results were tabulated and subjected to statistical analysis using chi-square test. P value <0.05 was considered significant.

**RESULTS**

**Table I** Baseline characteristic

Variable	Total	Group I	Group II	P value
Mean age		52±10.2	51±12.4	0.2
Sex (women)	92	46	46	0.1
Age >70 years	74	30	24	0.3
Ethnic minority	12	10	2	0.01
Diabetic nephropathy	40	18	22	0.12
Polycystic kidney disease	35	28	7	0.02
Previous abdominal surgery	86	72	14	0.0
Previous PD catheter	45	37	8	0.0
Duration of follow up				
Median		12	15	0.6
Range		5-22	4-23	

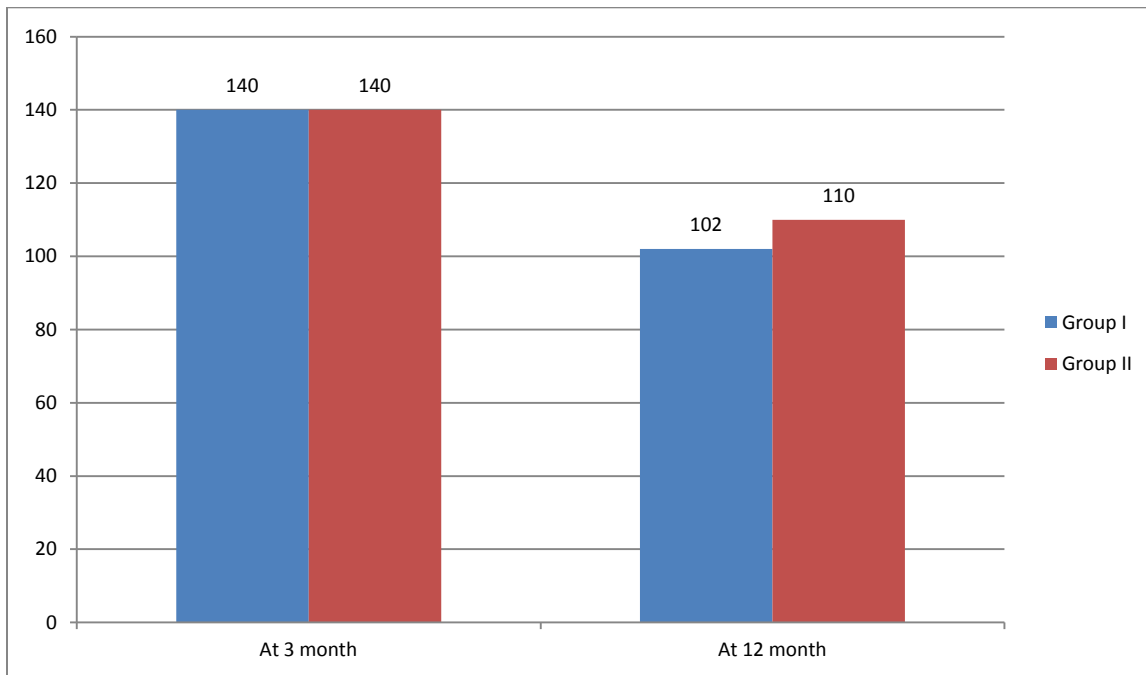
Table I shows that mean age in group I was 52±10.2 years and in group II was 51±12.4 years. Each group had 46 females. Patients above 70 years of age were 30 in group I and 24 in group II. Ethnic minority was seen in 10 patients in group I and 2 in group II. The difference was non-significant (P>0.05). Diabetic nephropathy was observed in 18 in group I and 22 in group II. Polycystic kidney disease was seen in 28 in group I and 7 in group II. The difference was non-significant (P<0.05). Previous abdominal surgery was performed in 72 in group I and 14 in group II. The difference was non-significant (P<0.05). Previous PD catheter was inserted in 37 and 8 patients in group I and group II respectively. The difference was non-significant (P= 0.00).

**Table II** Complications after Peritoneal Dialysis (PD) Catheter Insertion in both groups

Complication	Group I	Group II	P value
Primary failure	0	3	0.01
Poor initial drainage	18	14	0.2
PD related peritonitis	1	1	1
Exit-site leak	12	34	0.01
Scrotal leak	5	13	0.001
Pleural leak	10	4	0.01
Secondary drainage failure	21	13	0.2

Table II shows complications like primary failure in group II (3), poor initial drainage in group I (18) and group II (14), PD related peritonitis in both groups as 1. Other was exit leak in group I (12) and group II (34), scrotal leak in group I (5) and group II (13). The difference was highly significant (P=0.001), pleural leak in group I (10) and group II (4). The difference was significant (P=0.01), secondary drainage failure in group I (21) and group II (13).

**Graph I** Peritoneal Dialysis Catheter Survival in both groups



Graph I shows that at 3 month both groups had 140 catheter, which at 12 months, the survival rate decreased to 102 in group I and 110 in group II. The difference was non- significant (P>0.05).

**DISCUSSION**

The diversity of those experiences reflects the importance of operator skills and local facilities in determining practices and outcomes of PDC insertion. Evidence as to which of the insertion methods produces the best clinical outcomes is still lacking. However, it is generally accepted that open surgical or laparoscopic techniques are recommended for patients in whom abdominal adhesions are suspected or for times when a blind technique is considered less safe—as in very obese patients and those with a bleeding disorder. Surgical insertion of PDCs by nephrologists has also been described.<sup>5</sup>

We found that the mean age in both groups was comparable. Patients above 70 years of age were 30 in group I and 24 in group II. Ethnic minority was seen in 10 patients in group I and 2 in group II. Diabetic nephropathy was observed in group I (18) and in group II (22). Polycystic kidney disease was seen in group I (28) and in group II (7). Previous abdominal surgery was performed in 72 in group I and 14 in group II. Previous PD catheter was inserted in 37 and 8 patients in group I and group II respectively. This is in agreement to Weber et al.<sup>6</sup>

We found that complications like primary failure, poor initial drainage, PD related peritonitis, exit leak, scrotal leak, pleural leak and secondary drainage. Similar complications were seen in the study by Eklund B.<sup>7</sup> They reported PD related peritonitis as main complication followed by pleural leak. We compare the survival rate at month 3 and month 12. In group I, it was seen in 102 and in group II (110). Thus group ii showed higher survival rate as compared to group I. This is in agreement to Ethimioudu A et al.<sup>8</sup>

Recently, the interest in percutaneous PDC placement has been growing. Although this technique has traditionally been reserved for patients unfit for GA, it is now increasingly being adopted as a front-line approach in younger and healthier patients. As a result, outcomes comparisons of percutaneous insertions with conventional surgical insertions in broadly similar groups of patients have become possible. Our results emphasize this trend toward avoiding unnecessary GA and the constraints arising from the need to coordinate theater time and surgeon availability.<sup>9</sup> The simplicity and relative inexpensiveness of the percutaneous technique may be of particular interest in the setting of limited health care

resources, addressing not only accessibility in developing countries, but also resource allocation and cost-effectiveness in the developed world. The percutaneous PDC insertion technique maintains its advantageous safety profile and applicability in patients who are not candidates for GA or invasive surgery. On the other hand, surgical and laparoscopic techniques retain their utility, particularly for insertions considered high-risk because of suspected abdominal adhesions or complex underlying anatomy.<sup>10</sup>

## CONCLUSION

Percutaneous PDC placement compares favorably with the open surgical technique in terms of technical survival and overall complication rates.

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