Timing of commencement of peritoneal dialysis following catheter insertion

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GUIDELINES

No recommendation possible based on Level I or II evidence

SUGGESTIONS FOR CLINICAL CARE
(Suggestions are based on level III and IV sources)

- Commencement of peritoneal dialysis should preferably be delayed until 14 days after catheter placement. This is to reduce the risk of dialysate leakage, subsequent infections as well as mechanical complications.

- Early initiation of peritoneal dialysis had no demonstrable impact on infection risk in various trials. It is also possible to initiate peritoneal dialysis early in the presence of uraemia to avoid bridge haemodialysis and emergency use of central venous catheters. If an early start is attempted, then small dialysate dwell volumes should be used, preferably using a cycler in the recumbent position.

IMPLEMENTATION AND AUDIT

All peritoneal dialysis (PD) units should maintain data on the date of catheter insertion and time of commencement of dialysis and its modality. In addition, all PD-related problems including exit-site infections, tunnel infections, peritonitis, catheter malfunction rates and catheter survival times should be recorded. This data should be submitted to the ANZDATA registry.

BACKGROUND

The technique of PD is now accepted as first line renal replacement therapy along with its haemodialysis counterpart in the absence of a pre-emptive transplant. A break-in period of 2 weeks is generally recommended regardless of the type of PD catheter used or its mode of insertion. This is thought to ensure adequate wound healing and reduce the risk of catheter leakage and malfunction as well as infections. Pericatheter leakage is thought to increase the risk of infection. However, in overtly uraemic patients an earlier initiation of dialysis may be needed and may necessitate bridge haemodialysis in patients whose preferred modality of choice is PD. Different insertion techniques or the use of automated peritoneal dialysis (APD) together with smaller dwell volumes may allow earlier or even immediate start of PD. The aim of this guideline was to assess whether the timing of commencement of PD in relation to PD catheter insertion impacts on the rates of PD catheter infection and pericatheter leakage.
SEARCH STRATEGY

**Databases searched:** MeSH terms and text words for peritoneal dialysis were combined with MeSH terms and text words for catheter and MeSH terms and text words for commencement and timing. The searches were carried out in Medline (1950 – September Week 2, 2010). The Cochrane Renal Group Trials Register was also searched for trials not indexed in Medline.

**Date of searches:** 8 August 2012; update search 14 October 2010.

**WHAT IS THE EVIDENCE?**

**Randomised prospective studies**

No randomised controlled trials (RCTs) are available to address this issue.

**Non-randomised studies**

In a prospective, observational cohort of 51 consecutive patients, Jo et al assessed catheter complication rates with immediate start of PD [1]. A modified percutaneous placement method was used under local anaesthesia. In the first 30 days after insertion, pericatheter leakage developed in only one patient (2%). Exit site infections developed in two patients and peritonitis developed in two patients (4%). They concluded that the complication rate was low with immediate start of PD.

Povlsen and Ivarsen retrospectively compared 52 patients who were started on APD less than 24 hours after catheter insertion with 52 other patients started on continuous ambulatory peritoneal dialysis (CAPD) more than 12 days after catheter insertion [2]. The catheters were inserted surgically under local anaesthesia. No antibiotic prophylaxis was used. There were significantly more mechanical complications, mainly in the form of leakage, in the acutely dialysed group (P < 0.05). This resulted in an increased need for surgical replacement of catheters (P < 0.02). There was no difference in peritonitis rates between the two groups.

In a retrospective study of 48 patients undergoing catheter insertion by a modified technique using tighter PD catheter securing, Sharma et al demonstrated that a shorter break-in period of 7 days or less may be possible [3]. There was more leakage in the standard break-in group of patients compared with the shorter break-in group (2/22 vs 0/26). There were also more peritonitis episodes in the standard break-in arm when compared with the shorter break-in period arm (3/22 vs 0/26).

Yang et al compared 226 mostly historical early start (within 2 days) patients with a group of 84 late starters [4]. The study ran from January 2003 to October 2007. The catheters were inserted by an open surgical technique using a U-shaped, subcutaneous tunnel technique with a purse string suture applied to the posterior rectus sheath and lateral placement of the catheter in relation to the rectus muscle. There was no significant difference between the groups as regards total pericatheter infections (1.35% [early starters] vs 0% [late starters]). The peritonitis rate was 4% in early starters and 2.4% in late starters. The overall catheter complication rate was not significantly different (14.6% [early starter group] vs 13.1% [late starter group]; P = 0.74). In the early dialysis start group, they used small dwell volumes and gradually increased them over a 12-day period.

**Paediatric non-randomised studies**

Rahim et al conducted a retrospective review of 90 children who received 127 catheters over a decade from 1990-2000 [5]. There was a significant risk of dialysate leak when PD
catheters were used ≤ 14 days post-placement when compared with catheters used ≥ 14 days after placement (23.5% vs 7.9%). There was no difference in infection rates. History of dialysis before catheter placement as well as the presence of a gastrostomy tube were both associated with increased infection risk ($P = 0.006$ and $P < 0.001$, respectively). However, this did not correlate with the timing of catheter use.

A retrospective evaluation of 72 catheters placed in 53 children using different techniques (trocar, laparotomy and laparoscopy) was conducted by Dönmez et al. Early catheter use (≤ 7 days after insertion) was compared with delayed use [6]. The same number of patients in each group experienced dialysate leakage. They found the peritonitis risk was higher in the early use group, but not significantly so (55% vs 45%; $P > 0.05$).

**SUMMARY OF THE EVIDENCE**

There is no randomised trial evidence that can conclusively show that early commencement of dialysis post-PD catheter insertion can be undertaken without increased risk of dialysate leakage and peritoneal infections. However, there are a number of retrospective and case series carried out in both adults and children, using a variety of techniques, that are reassuring. The risk of dialysate leakage seems to be low with immediate or early start of dialysis in selected patients. Dialysate leakage may be associated with increased risk of catheter infections and peritonitis. In none of the non-randomised studies examined was there a significant risk of catheter infection. It may be possible to initiate dialysis early if using percutaneous and Y-TEC® techniques for catheter insertion (please refer to the ‘Technique of insertion of PD catheter’ part of this guideline).

**WHAT DO THE OTHER GUIDELINES SAY?**

**Kidney Disease Outcomes Quality Initiative:** No recommendations.
**UK Renal Association:** [7] Catheter insertion should be performed at least 2 weeks before starting peritoneal dialysis. Small dialysate volumes in the supine position can be used if dialysis is required earlier.
**Canadian Society of Nephrology:** No recommendations.
**European Renal Best Practice Guidelines:** [8] EDT-ERA. Whenever possible the implantation should be at least 2 weeks before starting peritoneal dialysis. Small dialysate volumes in the supine position can be used when this is impossible (Evidence C).
**International Guidelines:** [9] International Society for Peritoneal Dialysis 2010. Catheter insertion should be performed at least 2 weeks before starting PD. Small dialysate volumes in the supine position can be used if dialysis is required earlier (Evidence 2B).

**SUGGESTIONS FOR FUTURE RESEARCH**

1. The Timely PD Study is underway. This is a RCT determining the appropriate time to initiate PD after insertion of catheters to minimise complications. Patients are divided into three groups starting at 1, 2 and 4 weeks [10].
2. Different catheter types and different modes of insertion could be compared in well-conducted preferably multicentre RCTs.
3. Perform well-conducted RCTs to assess the risk of immediate dialysis start with low fluid volumes.
CONFLICT OF INTEREST

Maha Yehia has no relevant financial affiliations that would cause a conflict of interest according to the conflict of interest statement set down by CARI.

REFERENCES


2. Povlsen JV and Ivarsen P. How to start the late referred ESRD patient urgently on chronic APD. *Nephrol Dial Transplant* 2006; 21(Suppl 2): i56-i59.


