Delayed complications following Tenckhoff catheter removal

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Abstract

Background. Tenckhoff catheter placement is well established to facilitate continuous ambulatory peritoneal dialysis (CAPD) in the treatment of end-stage renal failure. Complications of these catheters while in situ are well documented. However, little information is available concerning post-removal complications. Many centres, including our own, remove these catheters by traction, usually resulting in retention of either the peritoneal or subcutaneous dacron cuffs, rather than by formal dissection. We have evaluated the outcome of such removal over a 2-year period.

Methods. Sixty-two patients underwent Tenckhoff catheter removal by traction over a 2-year period at our unit. Patients were evaluated retrospectively using case notes and operation records.

Results. The catheters were sited for a mean of 23 months and were most commonly removed because of persistent peritonitis (48.4%). Sixty-one per cent of all patients had experienced at least one episode of CAPD peritonitis while the catheter was in situ, but this did not correlate with those who developed local sepsis. Fifteen patients (24.2%) subsequently developed local infective complications after a mean of 5.7 months (range 1–17 months). The subcutaneous cuff was involved in all cases and the peritoneal cuff was involved in six cases. Thirty patients were identified as being immunosuppressed, but this was not a risk factor in the development of retained cuff infections.

Conclusions. There is a significant risk of local sepsis with retained cuffs resulting from removal by traction and our data suggests that these catheters should be removed by dissection and excision of both cuffs.

Key words: catheter; complications; dialysis; surgery; Tenckhoff

Introduction

Complications associated with Tenckhoff catheters while in situ are well reported in the literature. Most authors describe exit site infections [1–3]. Many centres remove these catheters by traction, usually resulting in retention of either the peritoneal or subcutaneous dacron cuff or both. Clinical observation and medical audit of our patients led us to assume the hypothesis that retained catheter cuffs cause delayed local infective problems. In order to test this hypothesis we retrospectively analysed our data over a 2-year period.

Subjects and methods

From November 1995 to October 1997, 62 patients underwent Tenckhoff catheter removal. Patients were evaluated retrospectively using their case notes and operation records. Inclusion criteria for the study were that the Tenckhoff catheter must have been in situ for at least 1 month and continuous ambulatory peritoneal dialysis (CAPD) must have occurred prior to removal. In addition, the catheter must have been removed by traction, resulting in the retention of one or both cuffs. Any complication must have occurred at least 2 weeks following removal with no evidence of local sepsis at that time.

All catheters had two cuffs surgically placed, just outside the peritoneum and subcutaneously, using a well-described technique [4]. Closure of the incision was achieved using absorbable sutures. Catheters were removed for a variety of reasons including transfer to haemodialysis, following a successful renal transplant, CAPD peritonitis, leakage, blockage or displacement.

The catheters were removed under sterile conditions in the operating theatre. General anaesthesia was administered and the catheters removed by continuous traction, resulting in one or both surrounding dacron cuffs being retained.

The data were reviewed and analysed in conjunction with our department of medical statistics. Analysis was performed using χ² or Mann-Whitney U-tests. Multivariate analysis of the means was performed using the Kruskal-Wallis H-test.

Results

Of the 62 patients, 30 (48.4%) were male and 32 (51.6%) female. The mean age was 51 years (median 54, range 22–78 years). Patients performed CAPD for a mean time of 17 months (range 1–96 months). The median follow-up period after catheter removal was 24 months (range 13–37 months). The indications for catheter removal are shown in Table 1. Thirty patients...
were at increased risk of infection or were taking immunosuppressive medication.

Of the 62 patients, 15 developed local sepsis following catheter removal (24.2%). This presented as cellulitis, an abscess or a discharging sinus. The mean age of these groups is shown in Figure 1. Cellulitis predominated in older patients, abscesses in the middle-aged and sinus formation in young patients (mean ages 70, 56 and 24 years respectively). Multivariate analysis of these means was statistically significant ($P = 0.0222$).

The mean time to complication following catheter removal was 5.7 months (range 1–17 months).

Thirty-eight patients (61%) had experienced at least one episode of CAPD peritonitis while the catheter was in situ, including the 30 patients who eventually had their catheter removed for this reason. Of the 15 patients who developed delayed infective complications, 10 had experienced peritonitis previously. Eight of these patients had persistent peritonitis necessitating Tenckhoff catheter removal. A trend was seen in those eight patients to present with an abscess and a higher incidence of deep cuff infections: four patients in this group had an abscess related to the deep cuff in addition to the superficial cuff infection. A further three patients had superficial cuff infections only, and one patient presented with cellulitis only. Patients in this group developed a local septic complication after a shorter mean time of 3.1 months ($P = 0.178$). There was no correlation between those patients who had previously developed or had their catheter removed for CAPD peritonitis and subsequent local sepsis. Of the 15 patients who had retained cuff infections, seven were immunosuppressed. These patients were therefore no more at risk for the development of a local septic complication.

All 15 patients who developed an infective complica-

Discussion

The study has identified a high incidence (24.2%) of local infective complications from retained catheter cuffs. The severity of presentation of these complications correlates with patient age, those developing a sinus, abscess or cellulitis with increasing mean ages (24, 56 and 70 years respectively). This is presumably because older patients are more susceptible to more severe infections. Immunosuppression, however, was not a risk factor for the development of these infective complications.

Almost two-thirds of patients had experienced at least one episode of peritonitis during the period of CAPD, and the majority of catheters were removed because of persistent peritonitis. However, these infections did not correlate with the development of subsequent cuff infections although trends were seen in an increased proportion of deep cuff infections and a higher proportion of frank abscesses in these groups. There was a mean delay of 5.7 months prior to presentation of these complications. Patients who had their catheters removed for persistent peritonitis experienced a higher incidence of deep cuff infections that occurred with a shorter mean time of 3.1 months. Review of the literature has shown only one paper relating to post-removal complications [5]. These authors retrospectively reviewed 278 patients who had their catheters removed either by dissection or traction. The proportion is, however, not stated and thus the proportion of retained cuffs that presented as a local infection is not known. Twelve patients developed 14 infective episodes and an infected retained cuff was found in 4/7 patients (57%) who had their catheters removed by traction (the cuff status post-removal is not stated). It is suggested that immunocompromised patients had a high risk of the development of these complications although whether this observation was statistically significant is not stated and is not supported by our own study.

Removal of these catheters by traction was originally
described using local anaesthesia [6]. The paper describes 17 catheters which were removed using this technique. Follow-up of these patients is not stated. The advantages of traction removal include a short anaesthetic time and the avoidance of reopening the original scar.

In a study of eight patients whose catheters, including both cuffs, were surgically removed, the surrounding tissue was examined and was found microscopically to have an inflammatory infiltrate around the dacron material in six cases. In four patients who had relapsing peritonitis, microabscesses were found [7]. This suggests the possibility of a latent infection within the dacron tissue, present at the time of removal, which may become clinically significant after a delayed period. Our study shows a trend between deep cuff infections and previous episodes or active peritonitis at the time of catheter removal. Superficial cuff infections are likely to originate either from the old exit site or via the granulated deep track.

Our data suggests an unacceptably high post-removal infection rate and we believe the practice of removal by traction should be abandoned. This conclusion is validated by our control data in the subsequent group of 28 patients who did not develop any delayed local sepsis.

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**References**


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