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Case Report

Exteriorizing the Outer Cuff to Treat Intractable Exit Site Infection and Tunnel Infection in Peritoneal Dialysis Cases: A Single Institute Experience

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ABSTRACT

Peritoneal dialysis (PD) is an important treatment method for patients with end stage renal disease. Since its introduction in 1975, clinical studies have shown that PD can improve patient survival, retain residual renal function, and lower the risk of infection. It can also reduce financial stress in the growing population with end stage renal disease. However, PD has limitations, mainly technique failures. Of these, catheter-related infection is a major cause of catheter failure in PD. We reviewed the medical records of 986 PD patients from 2008 to 2018 at our hospital. The patients with intractable tunnel and exit site infection received exteriorization of the outer cuff and cuff shaving. The favourable outcomes observed recommend this treatment for PD patients whose catheter infection is not well controlled.

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Introduction

The majority of patients with end stage renal disease (ESRD) rely on dialysis for treatment. Peritoneal dialysis (PD) is a renal replacement therapy that has evolved over the past 30 years. Despite improvements in techniques, however, mechanical complications, dialysis inadequacy, and ultrafiltration failure still result in treatment failure. The most common cause of failure remains PD-related infection [1, 2]. PD catheter exit site infection (ESI) and tunnel infection (TI) can lead to peritonitis and subsequent morbidity and mortality. For this reason, prophylaxis of the exit site with topical antibiotics is recommended [1, 3, 4]. Even after appropriate antibiotics treatment, ESIs still develop, some of which may be resistant to medical treatment and expose the patient to the risk of peritonitis [6].

Several methods are proposed to treat catheter-related infection, to decrease the incidence of catheter removal (catheter loss) due to intractable ESI and TI. These include catheter revision with curettage of the infected outer cuff and creation of a new exit with simultaneous

resection of the infected cuff [7, 8]. We analyzed the patients undergoing PD in our hospital with intractable ESI and TI for whom we performed exteriorizing then shaving of the cuff as treatment before catheter removal. We evaluate and report the outcomes of this treatment.

Methods

From July 2008 to November 2018, 896 cases of PD at our hospital were reviewed. Patients with simultaneous symptoms and signs of peritonitis were excluded and treated for peritonitis as indicated. For cases with ESI and TI, the clinical course was divided into two groups: group A: cases with rapid onset of infection with severe local erythematous swelling noted and prompt treatment needed; and group B, chronic purulent discharge at that exit site that is refractory to at least two weeks of antibiotics treatment. Patients in both groups fit the inclusion criteria for this study and a total of 16 patients received the procedure. The hospital Institutional Review Board approved this study, which was carried out in accordance with The Code of Ethics of the World Medical Association

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(Declaration of Helsinki), and all patients provided written, informed consent to participate.

We performed a small incision at the exit site after local anesthesia was given. The outer cuff was dissected free and pulled out of the tunnel, then debrided and shaved. The catheter outside the body was fixed to the abdominal wall with tape to avoid traction and migration of the intraabdominal part of catheter (Figure 1).



Figure 1: cuff exteriorization and catheter fixation.

After the procedure, patients were educated on proper wound care. Patients were followed for a minimum of one year and additional procedures performed when necessary. We recorded the patient outcomes of catheter salvage rate and infection control rate of the procedure.

Results

Among the 896 patients, outer cuff exteriorization was required and performed in 16 patients. The overall catheter survival rate was 75% at one year. Excluding one case who chose to shift to hemodialysis and another who received kidney transplantation, the catheter survival rate was 85.7% (12/14) at one year and 50% (7/14) at four years.

In this study, the mean catheter survival time was 41 months. During this period, the mean number of episodes of peritonitis was 1.62/patient (0.04/ patient-months). All ESI and TI were resolved within 3 months. No tunnel site erythematous swelling or purulent discharge was observed. Only oral antibiotics were needed after the procedure and the average treatment period was about 2 weeks. Without the help of the fixation function of the outer cuff, one case of catheter migration occurred early in our experience. After that, with additional catheter fixation education, none of the remaining cases had the problem of catheter migration or impaired dialysis function.

Discussion

Before organ transplantation can meet the need of the increasing population of dialysis patients, the majority of ESRD patients rely on dialysis therapy to stay alive [6]. PD is an important dialysis modality with a favorable initial survival advantage in the first 2 years of dialysis therapy [7, 8]. However, some conditions may cause technique failure in PD patients such as peritonitis, ESI, inadequate clearance, ultrafiltration failure, and catheter dysfunction. Among these, catheter-related infectious complications such as peritonitis and ESI are the main causes of catheter loss. They remain a problem in this population.

Several methods have been proposed to treat refractory ESI and TI [9, 10]. These include de-roofing of the tunnel, exteriorization of the external cuff and cuff shaving, with reported catheter salvage rates of 40-100% [11]. Also, some reports have proposed a partial transplantation of the infected catheter to treat ESI and TI [11]. In our series, we chose outer cuff exteriorization with shaving to treat intractable ESI and TI. The advantages of this procedure are that it is both simple and efficient. With local anesthesia, the outer cuff is exteriorized and shaved, making control of the infection much easier. The infected tunnel is easy to treat because the peri-catheter space serves as a good drainage system and a space in which trace turbid fluid can accumulate. Before the cuff is exteriorized, the outer cuff is an obstacle for adequate drainage of pus, which increases the need to rely on antibiotics. This reliance on antibiotics is one of the reasons that some cases of ESI and TI are difficult to resolve. In our experience, another advantage of our procedure is that de-roofing of the tunnel and cuff shaving are not mandatory, because we found the continuous drainage to be more efficient than topical debridement.

At first, we performed simultaneous PD tube removal with implantation of a new catheter and partial replacement of the infected catheter. We later abandoned this practice because it is difficult to demarcate the infected part from the clear part of the catheter using this technique; others have also described this weakness of simultaneous removal and implantation [12]. In other studies, the catheter survival rate at one year after revision was 89%, which was not superior to our result. The outer cuff of the catheter serves not only as a barrier to infection, but also as fixation for the catheter. Before we exteriorize the cuff, we fully explain to the patient the need for additional fixation with a strap or tape to prevent migration of the intraperitoneal part of catheter.

In addition, we educate patients on careful aseptic care of the exit site. By using this method, pus in the tunnel can freely drain out and infection of the outer cuff no longer presents a problem. With outer cuff exteriorization, the course of antibiotics therapy can be minimized to less than 2 weeks. Throughout the course of TI/ESI treatment, patients can continue PD without interruption. One patient in our series experienced migration of the catheter even though he was educated on how to take care of the catheter after the procedure. Migration happened after an abrupt pull of the catheter; a laparoscopic revision was needed to rescue the function.

Conclusion

Exteriorizing the outer cuff to treat intractable ESI and TI in patients with peritoneal dialysis is a simple and efficient procedure with a non-inferior catheter survival rate compared to other procedures. We suggest this procedure as a choice while facing cases of intractable TI and outer cuff infection.

Conflicts of Interest

None.

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