An Unusual Case of Peritoneal Dialysis
Twisted Catheter in a Child

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Abstract

Objective: Mechanical complications of peritoneal dialysis (PD) may occur because of surgical complications when inserting a Tenckhoff catheter or non-surgical complications during chronic care of a PD catheter. We aim to highlight the latter by presenting a case report of twisted external catheter.

Method: We report an 11-year-old Indonesian girl with end-stage renal disease on continuous ambulatory PD at Cipto Mangunkusumo Hospital who was hospitalized due to repeat peritonitis.

Result: Upon examination, the external catheter seemed twisted without inflow, outflow, or ultrafiltration problems. Her exit score was 4 with gaping. Both abdominal X-ray and ultrasound showed that the catheter and its cuffs were properly placed. The patient frequently pulled and manipulated her PD catheter. Additionally, the catheter-site care procedure was frequently done by untrained caregivers and catheter fixation was also not performed. A retraining program for all involved caregivers was carried out. Peritonitis resolved after 14-day-treatment using intraperitoneal gentamicin. We determined that the twisted catheter and repeat peritonitis were due to a combination of mechanical trauma, poor chronic catheter-site care, and suboptimal PD catheter training.

Conclusion: Maintaining compliance for chronic PD catheter exit-site care by well-trained caregivers and by patients themselves, as well as the external catheter fixation are important.

Keywords: Renal replacement therapy, continuous ambulatory, malposition, chronic renal insufficiency.

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Kasus Kateter Dialisis Peritoneal yang Terpuntir pada Seorang Anak

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Abstrak
Tujuan: Komplikasi mekanik akibat dialisis peritoneal (DP) dapat terjadi karena komplikasi operasi insersi kateter Tenckhoff maupun komplikasi non-operatif, yaitu saat perawatan kateter dialisis jangka panjang. Laporan kasus ini bermaksud untuk menekankan komplikasi non-operasi pada DP dengan menyajikan laporan kasus terpuntirnya kateter eksternal.

Metode: Dilaporkan seorang anak perempuan berumur 11 tahun dengan gagal ginjal yang menjalani dialisis peritoneal mandiri berkesinambungan (DPMB) di Rumah Sakit Cipto Mangunkusumo dan mengalami peritonitis berulang.


Kesimpulan: Kepatuhan perawatan kronik kateter PD oleh pengasuh yang terlatih dengan melibatkan pasien, serta memfiksasi kateter eksternal penting untuk mencegah komplikasi non-operasi pada DP.

Kata Kunci: terapi pengganti ginjal, dialisis peritoneal mandiri berkesinambungan, malposisi, insufisiensi ginjal kronis

Introduction
Peritoneal dialysis (PD) has been preferred to hemodialysis (HD) because of its various advantages, such as less vascular access complications, ease of performance, and flexibility of diet. In our center, new cases of end-stage renal disease referred from other centers coming as “crash-landers” will be initiated on HD, which then will be converted to PD within the following few weeks. Despite the advantages, mechanical complication of PD may occur because of surgical complications when inserting a Tenckhoff catheter or non-surgical complications that arise during chronic care of a PD catheter.

Case Report
An 11-year-old Indonesian girl was hospitalized at Cipto Mangunkusumo Hospital with a diagnosis of repeated peritonitis. She had fever, vomiting, abdominal pain, and cloudy PD effluent with ultrafiltration failure, which began 1 day before admission. She had been diagnosed with end-stage renal disease due to polycystic kidney disease at the age of 10 years and had undergone continuous ambulatory PD (CAPD) for 5 months; peritonitis occurred within 3 months after CAPD initiation due to Acinetobacter baumanii infection. The infection was resolved using intraperitoneal (IP) gentamicin. She had an exit score of 4 with gaping (Figure 1A) and chronic irritant contact dermatitis due to friction with the PD catheter (Figure 1B). Laboratory findings suggested PD-associated peritonitis (Table 1); peritoneal effluent was sent for culture. Intraperitoneal gentamicin was administered as empirical therapy, and flucinolone acetonide was administered for treatment of irritant contact dermatitis. We cleaned the exit-site with 2% chlorhexidine, applied gentamicin cream, and kept the wound open by fixing an external catheter laterally with tape.

On the third day of hospitalization, the PD
external catheter was twisted; this became more obvious on the seventh day with the appearance of a granuloma (Figure 1C, D). There were no problems involving inflow and outflow, and ultrafiltration had returned to normal. Abdominal X-ray showed that the tip of the catheter was in the pelvic cavity (Figure 1E). Ultrasonography showed that the subcutaneous cuff was positioned 2.4 cm from the exit-site (Figure 1F), whereas the deep cuff was in the rectus muscle, and no tunnel infection was present.

When investigating the cause of repeat peritonitis, we found that the caregiver who performed daily exchange procedures for the patient was her elder sister, who had not received PD training; importantly, only the patient’s mother and elder brother had previously received training. Appropriate hand hygiene and mask usage were not implemented by caregivers during daily care; moreover, the patient frequently manipulated the external catheter by pulling.

A double-cuffed straight Tenckhoff catheter was used, which was inserted through laparoscopic omentopexy. The exit-site dressing was maintained for 1 week, followed by semi-occlusive dressing with daily dressing change. Three months later, because of irritant contact dermatitis caused by exposure to the semi-occlusive dressing, the caregivers applied a non-dressing protocol for exit-site care, as recommended by the PD nurse. The non-dressing protocol included daily exit-site cleansing, application of gentamicin cream, and external catheter immobilization with tape.

Table 1. Peritoneal Dialysis Fluid Analysis and Culture

<table>
<thead>
<tr>
<th>Fluid characteristics</th>
<th>Day 1 (cells/μL)</th>
<th>Day 5 (cells/μL)</th>
<th>Day 8 (cells/μL)</th>
<th>Day 14 (cells/μL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell count</td>
<td>17,620</td>
<td>643</td>
<td>110</td>
<td>42</td>
</tr>
<tr>
<td>Polymorphonuclear</td>
<td>16,265</td>
<td>433</td>
<td>17</td>
<td>2</td>
</tr>
<tr>
<td>Mononuclear</td>
<td>1,355</td>
<td>210</td>
<td>93</td>
<td>40</td>
</tr>
<tr>
<td>Culture result</td>
<td><em>Acinetobacter baumannii</em></td>
<td>No growth</td>
<td>Not available</td>
<td>Not available</td>
</tr>
</tbody>
</table>

Peritoneal fluid culture revealed growth of gentamicin-sensitive *A. baumannii*, and a 14 day course of IP gentamicin was continued with recovery after 2 weeks of treatment (Table 1), including exit-site healing (Figure 1G). Repositioning of the Tenckhoff catheter was not performed, but retraining was implemented for all three caregivers, and the patient was instructed to closely monitor catheter-site care.

Discussion

To the best of our knowledge, repeated peritonitis and twisted catheter in chronic CAPD has not been reported. The recent publications from our center displayed non-surgical complications of PD in Indonesia, consist of fluid overload, hydrocele, omental wrapping, pleuropertoneal fistula, malposition, and umbilical hernia; without any incidence of twisted PD catheter, suggesting its rarity.1,3 Twisted catheter is typically associated with surgical complications during catheter insertion.4 In our patient, the twisted catheter occurred during chronic catheter-site care. Ultrafiltration problems did not occur, and catheter malposition was ruled out by abdominal imaging.5,6
The twisted catheter likely occurred because of mechanical stress and poor chronic catheter-site care. Standard wound care after catheter placement had been performed, followed by use of semi-occlusive dressings; the wound healed completely, and both cuffs were located properly. A biological airtight seal was formed around the catheter, causing immobilization that prevented disruption of the seal. Regular dressings are ideal for chronic exit-site care, as they maintain a clean exit-site, support the catheter, and protect it from injury; however, our patient exhibited irritant contact dermatitis. A non-dressing protocol was then recommended, which is reportedly effective for prevention of PD-related infection.

Our patient showed formation of a granuloma, which indicated a proliferative reactive condition in response to severe chronic irritant contact dermatitis. It might have occurred because of chronic friction with the PD tube, as there was no fixation of the external catheter. Non-infectious exit-site lesions may contribute to exit-site secondary infection. Those conditions are best treated with removal of potential causes and application of topical steroids, zinc oxide cream, and barrier creams.

Our patient frequently manipulated the catheter, causing mechanical trauma; immobilization of a PD catheter is essential for injury prevention, as well as for epithelization and wound healing. In addition to the increasing risk of bacterial and other opportunistic infection, the area around the exit-site and subcutaneous tissue can become loose and cause a twisted catheter.

PD technique failure owing to peritonitis could be due to inadequate PD catheter training and absence of retraining. In this case, poor compliance with PD guidelines suggested that our PD training program was suboptimal. In addition, exit-site infection can lead to PD discontinuation and peritonitis can occur as early as 6.6 months since PD initiation, therefore, a 6-monthly retraining program is recommended. Training programs should be taught on an individual basis without concomitant training for two caregivers; a single trainer nurse must be present for an entire session to maintain consistency. Additionally, a home visit should be performed by PD nurses at least once per year.

Conclusion

In conclusion, caution is needed to prevent twisted catheter during chronic PD care, particularly in patients with poor compliance regarding catheter-site care. This report has emphasized the importance of a PD training program for caregivers and the importance of external catheter immobilization.

Consent For Publication

Written informed consent was obtained from the patient’s guardian for publication of this case report and accompanying images. A copy of the written consent is available for review by the editor of this journal.

Available of Data And Material

All data generated during this study are included in this published article.

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Conflict of Interests Disclosure

None to declare.

References

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