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Is peritoneal dialysis feasible after laparotomy in children? A case-control series to compare outcomes

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Summary

Objectives
Peritoneal dialysis (PD) is the modality of choice for children with end-stage renal disease (ESRD) awaiting renal transplant; however, this option is sometimes avoided for those with previous laparotomy. The goal of this study was to compare the outcomes of PD in patients with and without previous laparotomy.

Patients and methods
Twenty-four patients who had been started on peritoneal dialysis were retrospectively analysed. Group LAP consisted of six patients with previous laparotomy, and Group NO-LAP of 18 controls with either retroperitoneal or no abdominal surgery. The percentage of theoretical maximum volume of infusion, time to reach it, complications (infection and drainage difficulties), and number of catheters needed to finish therapy were analysed.

Results
The characteristics of patients and technique of insertion are presented in Table. The percentage of maximum theoretical volume of infusion was similar in both groups. Median of catheter survival was similar in both groups. Complications were divided into malfunction (slow drainage, obstruction or leak) and infection. Incidence of complications per catheter and per month of dialysis was ten times lower in Group NO-LAP. Peritoneal dialysis failed in one patient with recurrent intraperitoneal adhesions after adhesiolysis in Group LAP.

Conclusion
Despite a higher incidence of complications (malfunction and infections), PD remains an acceptable option after laparotomy. In this series, it was sufficient in achieving adequate filtration in five patients.

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Table Characteristics of patients, details of catheter use and complications, and overall efficacy of PD in both groups.

Total 24 patients	Median age (m) at insertion	Median weight (kg) at insertion	Technique of insertion: laparoscopic	Median delay before 1st use (d)	Median percentage of maximum theoretical volume		Complications		Median of catheter survival (m	Efficacy
					1400 ml/m^2 if >2 y 800 ml/m^2 if <2 y	40 ml/kg	Malfunction	Infection		
LAP (n = 6)	114 (5.5 m–15 y)	24.6 (3.8–37.5)	4 patients	1.5 (1–3)	86%	83%	1 per 23 months of dialysis 0.01 per catheter per month	1 per 17 months of dialysis 0.01 per catheter per month	12 m (1 w–2 y)	5 of 6 patients
NO-LAP (n = 18)	133.5 (1 w–16.5 y)	33.1 (4–41.8)	14 patients	1 (1–45)	77%	86%	1 per 31 months of dialysis 0.001 per catheter per month	1 per 27 months of dialysis 0.001 per catheter per month	11.5 m (2 w–3 y)	18 of 18 patients

Introduction

The incidence of end-stage renal disease (ESRD) in children in 2008, having steadily increased over recent decades, reached a worldwide median of 9 per million of age-related population in those aged <20 years [1]. Offering the best quality of life, renal transplantation remains the optimal form of renal replacement therapy in children. When dialysis has to be started before this, ambulatory peritoneal dialysis (PD) is the best choice, as it gives the child better school attendance and fewer dietary restrictions [2]. Additionally, compared to haemodialysis, growth rate is improved with PD [3]. However, in some centres, a history of laparotomy is considered an absolute contraindication to PD [4] and the child is commenced on haemodialysis. Although one study demonstrated the feasibility of PD after laparotomy in adults [4], it is believed that not much data exist for children. The objective of this study was to review the feasibility and efficacy of PD after laparotomy in children.

Patients and methods

Patients

A retrospective case-control study was conducted in two centres between 2009 and 2015. The medical records of 24 patients with PD were reviewed. Group LAP consisted of six patients with a history of laparotomy and Group NO-LAP included 18 controls on PD during 2014–2015 with previous retroperitoneal surgery or no abdominal surgery. Groups were matched to have the same proportion of infants <1 year of age. Age and weight at catheter insertion, indication for PD, surgical method of insertion, number and survival of catheters required to finish therapy, reason for end of PD therapy and complications (malfunction and infections) were evaluated. Malfunction included slow drainage, slow infusion, obstruction and leak. Infections were divided into infection of the exit site and peritoneal infection. The latter was defined as a peritoneal fluid white cell count >500/mm^3 with at least 50% of polymorphonuclear leukocytes and a positive peritoneal culture. The maximum volume of infusion was compared to the maximum theoretical volume calculated according to body weight (40 ml/kg) or body surface area. For the latter, theoretical volume of infusion was expected to reach 1400 ml/m^2 in children >2 years of age and 800 ml/m^2 in younger patients. Patients with an isolated gastrostomy were not included as patients with previous laparotomy.

Surgical technique

One PD catheter was placed during the initial laparotomy (transperitoneal resection of bilateral Wilms' tumour). The remainder were placed by either open or laparoscopic technique according to the surgeon's preference (Fig. 1).

For open insertion, a peri-umbilical incision was performed and the tip of the catheter was directed towards the pelvis. The catheter was tunnelled to appropriately place the cuffs, and the exit site was directed downwards,

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