

**PROSTHETIC MESH REPAIR OF MULTIPLE RECURRENT  
AND LARGE ABDOMINAL HERNIAS IN CONTINUOUS AMBULATORY PERITONEAL DIALYSIS PATIENTS**

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*.Objective:* The aim of this study was to find out whether prosthetic mesh repair of recurrent and large abdominal hernias in continuous ambulatory peritoneal dialysis (CAPD) patients is effective in maintaining them on CAPD.

*.Design:* Retrospective analysis of case notes over a period of 5 years.

*.Setting:* Single renal unit of a university hospital. *.Patients:* Forty-six of 217 CAPD patients (16%) had their hernias repaired. Among them, 5 women in whom hemodialysis was not possible had multiple or large hernias repaired with polypropylene (PP) mesh.

*.Results:* Radical repair was achieved by a modified operation consisting of a conventional hernioplasty complemented by a supporting prosthetic overlay mesh, without discontinuation of CAPD. The patients continued CAPD for a mean period of 17.6 months without hernia recurrence. Two patients died in the twelfth and fifteenth postoperative month due to cardiac arrest and hepatic failure, respectively, and the remaining 3 are alive and have been doing well on CAPD for 13, 14, and 21 months.

*.Conclusions:* Prosthetic mesh repair of large recurrent hernias in CAPD patients with vascular access problems seems to be a valuable method to maintain them on this renal replacement therapy.

**KEY WORDS:** Hernias; surgical complications; prosthetic mesh repair .

**A** bdominal hernias are a common complication in continuous ambulatory peritoneal dialysis

(CAPD) (1-10). The main causative factors are muscle wasting due to malnutrition and increased intra-abdominal pressure caused by the presence of dialysate in the peritoneal cavity (1,4,5,9-11).

Repair of hernias usually prevents discontinuation of CAPD (1-10,12). However, CAPD patients are prone to recurrence of operated hernias (10,12) and this could seriously complicate the long-term technique performance requiring shift to hemodialysis. There is, nevertheless, a group of patients with recurrent or large abdominal hernias who cannot be transferred to hemodialysis due to lack of vascular access. This paper presents our experience with such patients who underwent surgical treatment with hernioplasty complemented by a prosthetic mesh while they continued on CAPD.

#### PATIENTS AND METHODS

Between January 1986 and December 1992, 217 patients (114 men, 103 women), mean age 53 years (range 7 -87 years), were trained in our CAPD program. The technique was carried out through a peritoneal catheter inserted surgically in 95% of the patients. Dialysate volumes and daily exchanges were adjusted to individual needs, and most patients were on 2-L exchanges four times per day. Mean duration of therapy was 27 months (range 1 -100 months).

Thirty-five of these patients (16%) had 46 hernias that were repaired. Twelve had epigastric hernias (26%), 9 inguinal hernias (19%), and 25 hernias at the site of catheter insertion (55%). All patients had a hernioplasty soon after the detection of the complication. Among them, 5 patients, all women, mean age 61 years (range 49-69 years), had a history of multiple operations for recurrent or large abdominal hernias (Table 1). At the time of admission, a large part of the abdominal wall was destroyed by multiple hernias, while in 4 of the 5 patients creation of A/V access was unsuccessful due to

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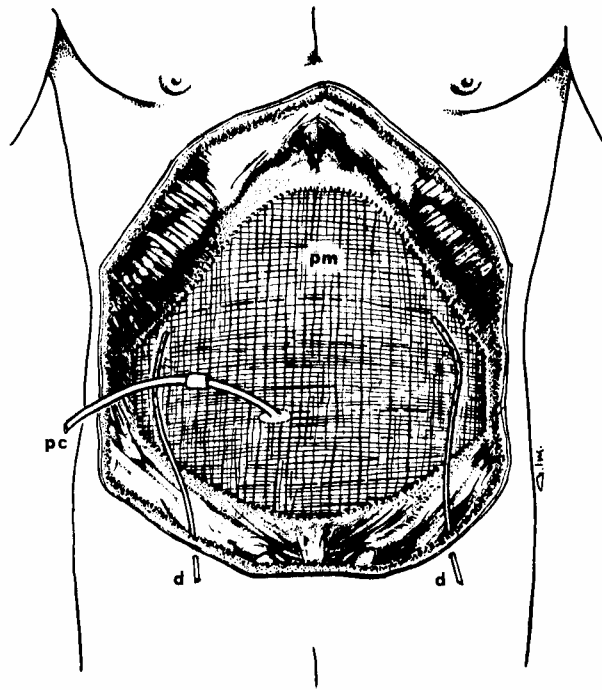


Figure 1 — Schematic view of completed operation; pm = prosthetic mesh; pc = peritoneal catheter; d = drain.

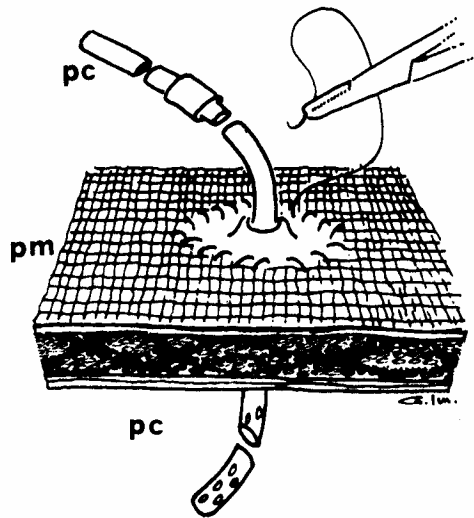


Figure 2 — The anchoring of the perimeter of the prosthetic mesh around the site of insertion of the peritoneal catheter; pc = peritoneal catheter; pm = prosthetic mesh; pc = peritoneal cavity.

## RESULTS

All patients but one had an uncomplicated postoperative course. One patient had dialysate leakage through the hernioplasty in the early postoperative period which was successfully managed by decreasing the volume of the peritoneal dialysate. In one patient the peritoneal catheter was obstructed at the third postoperative month, and a reinsertion was required without any further complication.

The postoperative ultrafiltration and biochemistry results were satisfactory with the exception of one patient, who required hemodialysis by a subclavian catheter once due to increased plasma potassium in the first postoperative day.

None of these patients had to discontinue CAPD, and recurrence of hernia was not observed in any of them. There was a marked decrease in the incidence of peritonitis after the mesh repair (Table I), while exit-site infection occurred in 2 patients and was treated successfully using routine conventional therapy. Two patients died during the twelfth and fifteenth postoperative months due to hepatic failure and cardiac arrest, respectively. The remaining 3 patients are alive and have been doing well on CAPD for 21, 14, and 13 months.

## DISCUSSION

It is well known that hernias in end-stage renal failure patients must be repaired either prior to the commencement of CAPD or soon after the hernia has been detected, while the patient is on CAPD (8,10,12). Although hernias are not an absolute contraindication for CAPD (9), when unrepaired they could complicate long-term performance (1,2,4,6,9, 10). Furthermore, they could lead to discontinuation of CAPD and transfer to hemodialysis.

There is a subgroup of CAPD patients who have extended and multiple abdominal hernias in whom CAPD cannot be performed and who cannot be treated by hemodialysis due to a lack of vascular access. These patients usually are old and obese or multiparous women, probably with scars from previous hernia repairs or other operations, who could generate higher intraperitoneal pressure on exertion (10). In these patients we modified the mesh repair technique of large abdominal hernias, which has been used in non-endstage renal failure patients, and adapted it to the needs of CAPD patients. The use of a prosthetic mesh in the repair of hernias is widely accepted in non-end-stage renal failure patients (13). Its use in CAPD patients has been suggested by some reports in the repair of inguinal

TABLE 2  
Postoperative CAPD Schedule

Day	Dialysate Volume (mL)	Exchanges/24 hour
1 – 3	300	24
4 – 7	500	12
8 – 14	750	8
15 – 21	1000	6
>21	1500	4 – 5

hernias (14), whereas the lack of reports in large or multiple abdominal hernias probably is due to the small proportion of CAPD patients requiring this process.

We performed the hernioplasty closing the hernia walls in two layers separately, and we applied fibrin glue on each layer to give additional security against dialysate leakage. Furthermore, the hernioplasty must be highlighted by meticulous hemostasis in order to avoid formation of a postoperative hematoma, which usually leads to failure of mesh repair. The extended coverage of nearly all the abdominal wall with the prosthetic mesh supports the weakened abdomen of these patients and prevents the increasing risk of herniation through a defect which is not yet detectable (10). The prosthetic mesh should be carefully and evenly attached to the abdominal wall, avoiding folding and preventing "dead space" formation. This is done with random interrupted sutures that anchor the mesh tightly on the abdominal wall. The use of drains prevents the subcutaneous accumulation of serous fluid or the formation of hematoma. This is further supported by a tight bandaging of the abdomen.

Using a gradual increase in peritoneal dialysate volume, the abdominal wall is adapted step wise to larger intra-abdominal pressures, and this prevents dialysate leak and recurrence of the hernia (8). In case of a perioperative leak the reduction of the dialysate for some days usually resolves the leak through the healing of the hernioplasty. However, in case of a persisting leak or inadequate dialysis, CAPD could be interrupted for some time, and the patient could be hemodialyzed using a subclavian line (4,13).

The existence of the prosthetic mesh is not a contraindication for reinsertion of the peritoneal catheter. In one of our patients who required a catheter replacement, we closed the old insertion site including the mesh, and we inserted the new catheter through the hole left by the removed piece of mesh at the new access site to the peritoneal cavity. The circled piece of mesh, which was removed around the site of the cath

eter insertion during the initial hernioplasty, is useful when replacement of the peritoneal catheter is required, because it makes catheter removal easier. No incisional hernia has occurred in this patient 11 months later.

The rate of peritonitis after the mesh repair was decreased in our patients. Exit-site infection did not appear to occur more often compared to the overall prevalence in our CAPD patients and was treated successfully using standard protocol care and chemotherapy. Tunnel infection, which could be a serious complication in this group of patients, was not observed in our cases.

Bacterial contamination is indeed a serious complication of all prosthetic materials used in hernia repair (15-21). In nonuremic patients the rate of infection is rather low (17) and is reported to be under 1% (18). Specifically for the monofilament polypropylene mesh (Marlex), it has been reported that it has a low reactivity and low ability to potentiate infection even in a heavily contaminated environment (19). In one of our patients who had infected hernia sac and was repaired with Marlex mesh, the postoperative course was uncomplicated. Recent clinical observations suggest that an infection does not mandate removal of the mesh in order to achieve resolution (17,20,21). Sometimes a partial resection of the prosthesis could be performed if laying flat is not enough to cure the infection (17). In the event of tunnel infection, therefore, in CAPD patients with concomitant spread of the bacterial contamination to the mesh, removal of the mesh might not be mandatory.

Care must be taken to keep the albumin of these patients at satisfactory levels to avoid poor healing of the hemioplasties. Meanwhile, all causes of increased intraperitoneal pressure, such as constipation or coughing, must be prevented.

Our patients continued their CAPD program for more than one year, without any hernia recurrence. Prosthetic mesh repair of large recurrent hernias in CAPD patients with vessel access problems seems to be a valuable method to maintain them on this renal replacement therapy.

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