

# Use of the Deane prosthesis in patients on long-term peritoneal dialysis

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**Summary:** The Deane peritoneal prosthesis has been used successfully in the treatment of 21 patients with chronic renal failure who were maintained on peritoneal dialysis for periods of up to 20 months. All patients were dialyzed for 24 hours twice weekly. While the prosthesis was still in place, transplantation was carried out in seven patients and laparotomy in three. The prosthesis was also used temporarily whenever a permanent peritoneal catheter (Tenckhoff's) failed because of infection; it was used until the signs of infection disappeared, then the permanent catheter could be replaced safely. From a total of 1136 dialyses 36 positive cultures were reported. Clinical peritonitis was found on only four occasions.

**Résumé:** La prothèse péritonéale de Deane a été utilisée avec succès pour traiter 21 malades souffrant d'insuffisance rénale chronique et qui avaient été soumis à la dialyse péritonéale pendant une période allant jusqu'à 20 mois. Tous ces malades avaient subi des séances de dialyse pendant 24 heures deux fois par semaine. Alors que la prothèse était encore en place, il a été possible de pratiquer une transplantation chez sept malades et une laparotomie chez trois autres. Cette prothèse a été utilisée de façon temporaire dans les cas où le cathéter péritonéal permanent (de Tenckhoff) avait fait défaut par suite d'infection. La prothèse de Deane a été utilisée jusqu'à la disparition des signes d'infection, moment auquel il a été possible de remplacer le cathéter permanent en toute sécurité. Sur un total de 1136 dialyses, on a signalé 36 cultures positives. Par contre, une péritonite clinique n'a été découverte que quatre fois.

The satisfactory results of long-term peritoneal dialysis in patients with terminal renal failure have been previously described.<sup>1,2</sup>

A significant step in making this form of treatment more acceptable to both doctors and patients has been the introduction of a device by Jacob and Deane<sup>3</sup> which permits peritoneal dialysis by the catheter replacement method by establishing a permanent fistulous tract from the skin surface into the peritoneal cavity. Subsequent authors<sup>4</sup> have reported its successful use in patients requiring peritoneal dialysis for short periods of time. We are able to report our experience with the Deane prosthesis while carrying out peritoneal dialysis for long periods extending up to 20 months. During this time a number of these patients received a renal transplant and the prosthesis was used in the post-transplant period if indicated. Other patients had general abdominal surgical procedures performed while the prosthesis was in place.

## Patients

The study took place over a three-year period beginning in February 1970. Twenty-one patients, 9 men and 12 women, were included. Their ages ranged from 17 to 55 years, the average being 35.7 years. Peritoneal dialysis was performed for 24 hours twice weekly over periods ranging from 2 to 20 months, with an average of 6.9 months per patient. A total of 1136 dialyses were performed. The underlying diseases are listed in Table I.

## Method

The Deane prosthesis is made of Teflon or polyethylene (Fig. 1). It consists of a blunt-ended stem and a disc-shaped head. It is available in three different lengths, the shortest one for

use in children and the two longer lengths for adults. The length selected for a particular patient depends on the thickness of the abdominal wall.

The prosthesis maintains a permanent fistulous tract extending through the abdominal wall into the peritoneal cavity to allow easy catheter replacement. The stem of the prosthesis is flexible so that it can be bent to correspond to the direction of the fistulous tract, allowing the head to lie closely applied to the abdominal wall.

Dialysis is performed using a standard peritoneal dialysis catheter. At its

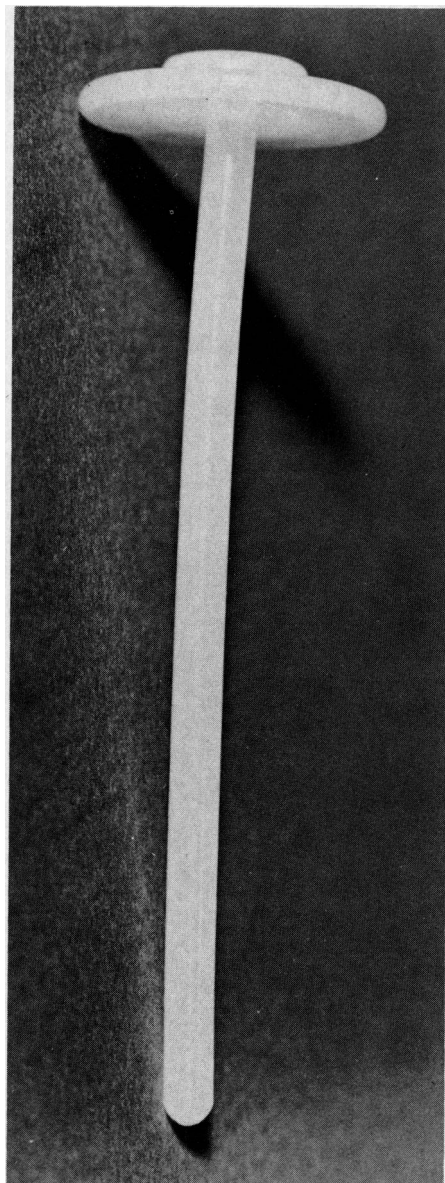


FIG. 1—The Deane peritoneal prosthesis

Table I—Underlying renal diseases

Glomerulonephritis	7
Pyelonephritis	6
Hereditary nephritis	2
Bilateral cortical necrosis	2
Polycystic kidney disease	1
Multiple myeloma	1
Gouty nephropathy	1
Diabetic nephropathy	1

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termination, using a sterile technique, the skin around the catheter is cleansed with antiseptic solution (alcoholic Hibitane 1:200). The catheter is then removed slowly and the site cleansed again. The prosthesis, grasped by the flat portion and stem, is bent to the angle of the fistulous tract and inserted immediately. It is important that the head of the prosthesis lie flat against the abdominal wall to ensure a good fit. The patient is instructed to keep his abdominal muscles relaxed before and during the insertion of the prosthesis, since any tightening may result in the loss of the fistulous tract. This procedure is painless unless there is local infection or the prosthesis is misdirected into the subcutaneous tissues. Antibiotics are not used to lubricate the stem or applied under the head of the prosthesis. The prosthesis is secured in place with two band-aids placed in a cross formation and a small waterproof dressing is applied over its head. Patients are instructed not to remove this while at home. This dressing allows the patients to bathe, shower and even swim between dialyses.

At the next dialysis, the dressing is removed and the antiseptic solution is applied generously to the band-aids and surrounding area. The band-aids are removed to allow partial withdrawal of the prosthesis so that the skin around the stem and under the head can be cleansed. After it has been removed entirely the opening of the fistulous tract is cleansed again. The peritoneal dialysis catheter, without the trocar, is then inserted through the tract into the peritoneal cavity. We have not found it necessary to use any analgesics during this procedure. A sample of predialysis ascitic fluid or the first effluent is routinely sent to the laboratory for culture and sensitivity testing.

## Results

From 1136 dialyses performed on patients using the Deane prosthesis, positive cultures of ascitic fluid or effluent were obtained on 36 occasions (3.17%). Clinical peritonitis manifested by abdominal pain, rebound tenderness, pyrexia, cloudy effluent and a positive culture occurred on only four occasions (0.35%). Table II lists the organisms identified in the positive cultures and the frequency with which they were isolated. The majority were staphylococci and micrococci, suggesting infection of exogenous origin.

The bowel was perforated on three occasions, in all of which the fistulous tract had closed, either because a prosthesis of inappropriate length was used or because the prosthesis was mis-

placed subcutaneously. As a result a trocar had to be used to reopen the fistulous tract. In two of these patients dialysis was resumed through another abdominal site and antibiotics were given both systemically and intraperitoneally. Following their recovery, peritoneal dialysis was continued with the prosthesis at the new site. The third patient was transferred to the hemodialysis program.

Seven patients received a renal transplant while the prosthesis was in place. Three required temporary dialysis after operation and the use of the prosthesis was continued. After transplant nephrectomy one of these patients returned to the long-term peritoneal dialysis program and the use of the prosthesis.

One patient underwent an appendectomy and dialysis was resumed one week later with the same prosthesis in place. Two patients required elective bilateral nephrectomies during the first months of dialysis; the prosthesis was left in place and dialysis resumed uneventfully after the operation. Neither patient developed peritonitis.

In four patients in whom the permanent Tenckhoff catheter had failed to be effective owing to infection or obstruction, we continued peritoneal dialysis employing the Deane prosthesis in another abdominal site until the device could be replaced with another permanent catheter at the optimal time.

## Discussion

Our technique differs from that originally described<sup>3</sup> in that we do not use antibiotic ointments on the stem of the prosthesis or around the abdominal opening. Nor do we use antibiotics in the dialysate fluid, or the "telfa dressing" suggested by Vidt, Somerville and Schultz.<sup>4</sup> Instead, we use a small waterproof dressing which allows the patient greater freedom.

The low incidence of infection among our patients proves that the use of antibiotics is not necessary and that strict aseptic technique is sufficient to prevent infection of the peritoneal cavity.

On only three occasions the bowel

**Table II—Organisms identified in positive cultures**

<i>Staphylococcus pyogenes</i>	10
Micrococcus	10
Enterococcus	4
Diphtheroid bacilli	3
<i>Enterobacter cloacae</i>	3
Serratia	2
Other	4

was perforated while trying to reopen a closed fistulous tract with the temporary catheter and trocar; a loop of bowel had probably adhered to the sealed distal end of the tract. This observation suggests that in similar cases it is better to select a new site.

Peritoneal dialysis can be continued as necessary in the postoperative period following renal transplantation. There was no peritonitis or other complications in our patients so treated, despite the use of immunosuppressive drugs.

Our experience with three other patients who underwent surgical procedures while on peritoneal dialysis utilizing the Deane prosthesis was equally good. Our use of intraperitoneal antibiotics for two weeks postoperatively may not have been necessary. Tzamaloukas, Garella and Chazan<sup>5</sup> have also reported that recent abdominal surgery is not a contraindication for peritoneal dialysis.

The availability of the Deane prosthesis is an advantage whenever long-term peritoneal dialysis with the permanent Tenckhoff catheter is carried out. Replacement of an obstructed catheter should be avoided if there is evidence of abdominal infection. In this situation, one can maintain the patient on peritoneal dialysis using the Deane prosthesis in another site until the signs of infection disappear.

We have observed that the prosthesis can be left in place without performing a dialysis for periods up to five weeks, without complications. It is our policy, however, to avoid periods longer than 10 days between dialyses.

Because of its simplicity, the prosthesis can be handled by trained nurses. It is inexpensive and can be used repeatedly after gas sterilization. So far, we have not used it for patients on home peritoneal dialysis. However, its many advantages make it a necessary item of equipment in carrying out any long-term peritoneal dialysis program.

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