Simple Technique of Inserting Modified Double-Cuffed Peritoneal Dialysis Catheter That Allows the Placement of Inner Cuff within the Rectus Muscle without Laparotomy

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Sir,

I read with interest both the paper on nonsurgical placement of chronic peritoneal catheter by Allon et al. [1] and the letter on comparison of surgical and nonsurgical insertions of chronic peritoneal catheters by Maher et al. [2]. The high incidence of dialysate leakage reported by Maher et al. and previously by Updike et al. [3] following the placement of peritoneal dialysis (PD) catheter using guidewire dilator/sheath procedure prompted me to describe a technique of inserting modified double-cuffed PD catheter that would allow the placement of an inner cuff within the rectus muscle without laparotomy. The technique is simple and by virtue of placing the inner cuff within the rectus muscle this may prevent or reduce short -and long-term catheter-related problems.

The inner cuff of a standard catheter is replaced by a conical Dacron cuff of 3 cm in length that tapers towards the perforated end of the catheter; the widest portion has a circumference of 3 cm (fig. 1). The inner tip of the catheter is also tapered but without altering the size of the inner lumen. This catheter can be inserted at the bedside or preferably in a minor operating theater under local anesthetic and with strict aseptic precaution. Two liters of PD fluid are instilled intraperitoneally through an 18-gauge needle while the operator gets ready. The anterior rectus muscle sheath is revealed through a 5-cm paraumbilical skin incision and the wound is kept open by a self-retaining retractor. A syringe with an 18-gauge needle and filled with saline is introduced into the rectus muscle slightly closer to its lateral border moving intraperitoneally at a 45 ° angle and laterally to the junction between the medial 3rd and the lateral ¾rd of the inguinal ligament. A guidewire (J-shaped; 0.96 mm in diameter) is introduced followed by dilator/sheath of 16 F (available

in Pull-Apart™ introducer set). The sheath is peeled off after the introduction of the modified PD catheter. The proximally tapered conical cuff is pushed into the rectus muscle using untoothed forceps until it is completely buried (fig. 1). The catheter is tunnelled out as usual and dialysis is started straight away with 0.5–1 liter of fluid for 24 h and if necessary with a larger volume thereafter.

The method described has the dual advantages of placing a catheter by guidewire dilator/sheath technique and, at the same time, of embedding the inner cuff within the rectus muscle.

Embedding the inner cuff within the rectus muscle during surgical placement of catheter is known to reduce the incidence of dialysate leakage, tunnel infection, external cuff erosion and pericatheter hernias [4–6] and advocated as the best technique for implantation of PD catheters

[7]. Moreover, due to the conical shape and bigger size of the inner cuff, it fits tightly into the rectus muscle. And this can prevent early dialysate leakage and can tampon any bleeding vessels within the rectus muscle sheath. Once the conical cuff is completely buried in the rectus muscle sheath, the anterior rectal sheath closes onto the catheter. This makes spontaneous extrusion of the cuff difficult and so obviates the need for a suture.

Tangential positioning of the catheter through the rectus muscle may retard upward migration of the catheter. Tissue grows easily into the conical cuff from the highly vascular rectus muscle and embeds it firmly in the muscle. This can prevent late dialysate leakage and hernias at the peritoneal entrance site. Catheter modifications described here can be applied to certain other catheters, e.g. swan neck, curled catheters.

Being a blind procedure, injury to epigastric vessels by the introducing needle is a potential risk. This can be minimized by using only introducer needles of small size,

PD Catheter Placement according to Salahudeen

135

Fig. 1. The technique of inserting the modified PD catheter is shown diagrammatically. a 1 = Subcutaneous tissue; 2 = anterior rectum sheath; 3 = rectus muscle; 4 = posterior rectus sheath; 5 = guide wire and dilator-sheath in position, b 6 = Modified PD catheter in position; 7 = cone-shaped proximal cuff in position under the rectus sheath.

e.g. 18-gauge, and following the above-recommended route of introduction of the needle, suggested on the basis of the anatomy of inferior epigastric artery (Grant's Atlas of Anatomy).

Preliminary experience with this catheter is limited to 12 cases, in all of whom insertion was successful. Burial of the inner cuff was difficult in 3 cases due to the lack of fine tapering of the proximal cuff. There were no dialysate leakage and blood-stained effluent was seen only in 2 cases. Five catheters were removed after an average of 2 months as peritoneal dialysis was discontinued and two catheters were removed within 4 weeks due to malfunction from omental plugging. At surgery, the inner cuffs of

all seven catheters were still within the rectus muscle and well taken in by tissue growth.

Further experience is necessary, however, to confirm the advantages and uncover disadvantages, if any, of this method.

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