CHALLENGES OF PERITONEAL DIALYSIS IN OBESE PATIENTS

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INTRODUCTION

.Chronic renal failure(CKD) is a global problem.

.CKD patients reaching end-stage renal disease(ESRD), lack of pre-existing arteriovenous fistula(AVF) is a frequent concern when deciding between the modalities of renal dialysis

.Immediate haemodialysis(HD) requires placement of a temporary vascular access catheter

.Complications of a temporary vascular catheter includes: infection, malfunction, bleeding, injury to major vessels, pneumothorax, and long-term vascular problems

.Peritoneal dialysis(PD) obviates the need for a temporary vascular access, but a high BMI has been viewed as a relative contraindication. PD offers patients the option of an effective home modality of renal replacement therapy, encourages self-autonomy, and supports optimal quality of life

.Patients with a high BMI would have inadequate solute clearance, especially when anuric

.Recently, the use of higher exchange volumes and more frequent use of a cycler have allowed better solute clearance in obese patients

.Factors associated with PD failure include: worsening obesity, inadequate solute clearance, abdominal hernias, catheter infection and peritonitis

STUDIES

.Most studies have reported a survival advantage for PD in obese patients

A recent systematic review and meta-analysis of more than 150 000 patients seemed to have confirmed at least neutrality for a high BMI with respect to survival, even over a long-term.

The survival advantages in these patients are seen mostly because of better preservation of residual renal function(RKF), haemoglobin stability, and lesser risk of blood-borne infections

.A study by McDonald et al found that obesity is associated with worse PD outcomes in the Australia and New Zealand populations

INDICATIONS

.Vascular access failure

.Intolerance of HD

.CCF

.Children

.Distance from HD centre

.Patient preference

CONTRAINDICATIONS

.Severe IBD .Active diverticulitis .Abdominal abscess .Active ischaemic disease .Marked intellectual disability .Severe active psychotic disorder .Multiple abdominal adhesions .Homelessness .Poor personal hygiene .Women starting third trimester in pregnancy

ADVANTAGES OF PD

- .Maintains residual kidney function
- .Lower mortality
- .Quality of life is better than HD
- .Patient mobility and independence is better

DISADVANTAGES

.Challenging technique and technique failure .Complications

.Inadequate solute clearance

THE SURGERY

1. PRE-OP PREPARATION

.Pre-operative marking of the abdomen is vey critical

.This is done with the patient in standing position(this helps in identifying the belt line, skin folds and scars)

The skin incision for entry into the abdominal cavity is paramedian and is marked in such a way that the tip of the catheter will end-up at the pubic symphysis

.The exit site should be either above or below the belt line and away from scars

.It should be directed laterally and downward when using a swan-neck catheter or laterally when using a catheter that does not have a pre-formed bend

.It should never be directed in an upward direction because this will increase the risk of exit site infection

.The exit site should be clearly visible to the patient

2. THE CATHETER

.Peritoneal dialysis catheter- come in various shapes(straight, pigtail curved, swan-neck), lengths and a number of Dacron cuffs

.The Dacron cuffs induce a local inflammatory response with subsequent fibrosis that anchors the catheter

.With the double cuffs PD catheter, the proximal cuff is sutured to the posterior sheath and is positioned in the preperitoneal space and the distal cuff is buried in the subcutaneous tissue about 2cm from the exit site

.The proximal cuff holds the catheter in place and the distal catheter prevents tunnel sepsis

.The PD catheter is composed of a flexible silicone tube with open-end port and several holes to provide drainage and absorption of dialysate

.Silicone catheter is less irritating to the peritoneum. Cruz polyurethane catheters are stronger allowing catheter to be thin walled with larger lumen. However, they have a tendency to break if alcohol is applied to the catheter. The glue holding the cuff to the polyurethane catheter may fail within 2 years. Know what the catheter that is used in your centre is made of. Avoid Cruz polyurethane catheters(These were withdrawn in August 2010 in the USA)

.It has 3 components: the intra-peritoneal, the tunnelled and extra-peritoneal segments

The intra-peritoneal component has been designed to diminish outflow obstruction either by preventing the peritoneal surfaces from occluding the side holes (coiled Tenckhoff) or by preventing omental entrapment, tip migration and outward migration of the catheter. The coiled catheters cause less discomfort by minimizing the jet effect caused by rapid inflow of dialysate. Studies seem to suggest that coiled catheters do better than straight catheters in terms of minimizing tip migration and have better catheter survival

ANAESTHESIA

.May be performed percutaneously, laparoscopically or via open surgery

The anaesthesia will vary depending on the method selected

.Percutaneous placement can be performed at the bedside with local anaesthesia whereas laparoscopic and open route require general anaesthesia

THE SURGICAL TECHNIQUE

.Paramedian incision at the level of the umbilicus

.Subcutaneous tissue is divided

.Anterior sheath is incised

.Fibres of rectus abdominis muscle are separated

.Posterior sheath is incised

.The peritoneum is incised and peritoneal cavity is entered

-The operating table is placed in Trendelenburg position

.The stylet is introduced into the catheter which would have been lubricated with fluid for ease of removal

The catheter-stylet is introduced into the peritoneal cavity and directed towards the pubic bone. Once it reaches the pelvis, the stylet is slowly withdrawn and the catheter is further advanced into the deep pelvis

.The inferior edge of the proximal cuff is sutured to the peritoneum and posterior sheath in a continuous fashion in order to form a water tight seal

The anterior sheath is closed and the catheter is tunnelled in the subcutaneous tissue in lateral direction.

.The distal cuff should be buried at least 2cm from the exit site on the skin

.Lastly the skin is sutured and the catheter checked again for free flow of dialysate and easy withdrawal







COMPLICATIONS

1.EARLY (<30 DAYS)

 Bowel perforations. The incidence is <1%. It usually occurs during entry into the abdominal cavity or when the catheter and stylet are advanced into the pelvis

- Bleeding. This is rarely a problem. When it occurs, it is usually the exit site
- Wound infection. This is uncommon
- Outflow failure. This is due to clots or fibrin in the the catheter, a kink in the subcutaneous tunnel, placement catheter in the omentum, occlusion from omentum or adhesions
- Leakage of dailysate
- Peritonitis

2.LATE (>30 DAYS)

- . Exit site infection
- . Tunnel infection
- . Cuff extrusion
- . Outflow failure
- . Dialysate leak
- . Hernias



TWO MAIN CHALLENGES IN OBESE PATIENTS

- 1. Inadequate solute clearance- of interest to nephrologists
- 2. The surgical technique and its accompanying complications- of interest to surgeons

THE SURGICAL TECHNIQUE

.**Preoperative marking of the patient**. This is done in order to avoid the belt line. The exit site should be above or below the belt line and away from scars. The exit site should be directed laterally and downward when using a swan-neck catheter and laterally when using a catheter without a pre-formed bend. The exit site should avoid the pannus region and be clearly visible to the patient in order to perform daily exit site care. The site should be positioned higher up or on the lateral aspect of the abdominal wall in obese patients. It should be marked with the patient upright rather than in supine position. The exit site should be above the umbilicus if the belt line is below the umbilicus and vice versa

.The exit site

- -No staples or sutures because they prevent complete wound healing and increase risk for infections
- -Should not be patulous

.After placement of PD catheter

- -Wait for 2 weeks from the time of placement before starting PD
- -Periodic flushing before PD may be necessary
- -The waiting period before PD may be longer in patients with poor wound healing as in patients on immunosuppressive medication following failed transplant

Where Is It Relative to the Belt-Line? Need to Determine Before Patient Sedated



Above the Umblicus: Exit site below the umbilicus

Below the Umblicus: Exit site above the umbilicus

Alternative approaches in obese patients

- 1. Upper abdominal wall exit site(this may require the use of extended catheters)
 - 2. Pre-sternal placement

• Picture





Upper chest exit site location

.Should be at least 3cm off the midline

.Catheter tubing should not cross the midline of the chest in the event that cardiac surgery becomes necessary

.It should be clear of the collar area, bra strap and fleshy part of the breast

INCONCLUSION

.PD is feasible in obese patients(published studies)

.It offers patients effective home modality of renal replacement therapy, encourages self-autonomy and therefore offers improved quality of life

.Because the procedure preserves residual renal function, its outcome is better

.Conversion to HD can be easily done when total loss of residual renal function occurs

The surgical technique in obese patients is a bit challenging but attention to detail in the catheter insertion technique usually ensures that the procedure is successful

Thank you for listening

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POSSIBLE SOLUTIONS

1. Sepsis

- Use of pre-sternal catheters if needed
- Avoiding the pannus as the exit site
- Using a paramedian incision
- Pre-operative marking before surgery
- The exit site must be visible to the patient

2. Solute clearance

- Large fill volumes
- Use of CCPD
- Monitor RKF often and consider planning for transition to HD when RKF is lost