Surgical methods

Preoperative measures

All patients should receive prophylactic antibiotic before the operation. One dose preoperatively is our recommendation but if the operation takes more than 4 hours to complete a second dose should be given within 24 hours from the first dose[13, 14]. If a 2nd generation cephalosporine is used alone, 2 additional doses every 8 hours after the first dose should be used [15]. Antithrombotic prophylaxis should be given with low molecular weight heparin and it should be continued 28 days[16-20]. Enhanced recovery programs may be used in whole or partially but the program or routines chosen by a clinic should not change during the study period. The patient should be informed about the postoperative rehabilitation programme by the physiotherapist. One of two available rehabilitation programmes should be chosen and used for all patients during the whole study period. See postoperative rehabilitation programmes below.

First part of the operation

The following technique description is cited directly from the publication of Holm et al.[7] The abdominal part of the operation is performed as in conventional APR, with one important modification: the mesorectum is not dissected off the levator muscle. Thus the mobilization is stopped at the upper border of the coccyx posteriorly, just below the autonomic nerves laterally and anteriorly just below the vesicles in men or just below the cervix uteri in women. The divided left colon is brought out to form a colostomy and the abdomen is closed.

The patient is then turned into the prone jack-knife position with legs spread to enable the surgeon to stand between the legs with one assistant on each side. The anus is closed with a double purse-string suture. An incision is made around the anus and extended cranially to the lower part of the sacrum. The dissection continues in the subcutaneous fat, just outside the subcutaneous portion of the external anal sphincter. Following this plane the levator muscle is identified on both sides and the dissection is continued along the outer surface of the levator muscles proximally until the insertion on to the pelvic side wall. It is important to expose the levator muscles all around the circumference before entering the pelvis. The coccyx is then disarticulated from the sacrum and Waldeyer's fascia divided. This permits entry into the pelvic cavity at the point where the intra-abdominal dissection stopped. The levator muscles are divided laterally on both sides, from posterior to anterior. The specimen is gently brought out and dissected off the prostate or the posterior vaginal wall. In the case of an anterior tumour, a portion of the prostate or the posterior vaginal wall may be resected en bloc. Finally, the remaining pelvic floor muscle fibres are divided just posterior to the transverse perineal muscles and the specimen is excised.[7]

N.B. In this study excision of the coccyx is optional. Omentoplasty to fill the small pelvis can also be performed according to the surgeon's discretion. A suprapubic catheter to the urinary bladder should be placed during the laparotomy and kept until normal bladder emptying occurs. An intra-abdominal drain is positioned with the tip in the lesser pelvis and kept for 3-5 days but can be removed earlier if exudate volume is less than 50 ml/day.

Reconstruction of pelvic floor with acellular porcine collagen implant (APCI)

A 10x10 cm or a 10x5 cm piece of the APCI (1.5 mm thick) is cut in the corners to fit the defect created in the floor of lesser pelvis. The implant is sutured in place with 2-0 polypropylene thread using interrupted sutures. Sutures attach to edge of sacrum or coccyx posteriorly in the wound, laterally to remnants or cut edges of levator ani muscle and anteriorly to capsule of prostate in men and to vaginal wall in female. It might be preferable to fold the implant anteriorly to produce a larger area of contact with the prostate or the vaginal wall. The wound is drained in two layers with the deep drain adjacent to the implant and the second superficially below skin. The two deep layers of the wound are closed with resorbable 2-0 thread and the skin with 3-0 monofilament thread.

Vaginal wall defects should be closed with absorbable sutures.

Reconstruction of pelvic floor with gluteus maximus myocutaneous unilateral flap (GMF)

The following technique description is cited directly from the publication of Holm et al.[7]

The unilateral flap is usually based cranially with the length about 1·5: 1 in proportion to the base. At the lateral border of the base, a triangle of skin and fat is removed (Bürow's triangle) in order to shorten the outer skin edge and to get it matched to the inner edge during the rotation. The design of the flaps is shown in Fig. 1. The lines for skin incision are drawn after removal of the specimen. Local anaesthetic with adrenaline is used to reduce bleeding and postoperative pain. The skin and subcutaneous tissue are incised down to the gluteus maximus where the fascia is also incised along the whole length of the wound to add mobility to the flap. About one-third to half of the muscle is then divided at its medial border, away from the hip joint capsule which should not be exposed. It is important to be aware of and to avoid the sciatic nerve that runs under the muscle. At the sub muscular level the dissection is extended in cranial and medial directions. The tissue layers are kept intact to avoid interruption of the perforating vessels. Mobility is tested continuously; as soon as the muscle part of the flap reaches the muscle on the other side of the defect without tension, the dissection is terminated. One of the two main vessels supplying the flap may occasionally be divided to attain sufficient mobility. The flap is sutured in four layers with interrupted sutures: in the muscle, in Scarpa's fascia, in the deep dermis and in the skin. Two drains are placed and kept for 4–6 days, one deep to the muscle and one along the flap in the sub cutis. The wound is dressed with surgical tape.

Vaginal wall defects should be closed.

Figure 1. Design of unilateral myocutaneous flap. Figure from Holm et al. [7] with permission.