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Technical Article

Primary reconstruction of pelvic floor defects following sacrectomy using Permacol™ graft

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Abstract

Aims: The large pelvic floor defect following sacrectomy for sacral masses leaves the challenging problem of primary closure and herniation. We present the outcome of primary repair using Permacol™, a biomaterial made of acellular porcine cross-linked dermal collagen and with similar tensile strength to polypropylene mesh. It is non-allergenic and possibly less likely than synthetic mesh to cause inflammation leading to small bowel adherence; fistula formation and graft extrusion. Following implantation, Permacol is colonized by host cells and resists degradation by host enzymes.
Methods: Three patients had sacrectomy with primary repair of pelvic floor defects between March 2004 and August 2005. Two had excision of sacral chordomas and one excision of a sacrococcygeal teratoma. Repair of the defect was carried out using the Permacol graft, suturing to the sacrum, anococcygeal raphe and ischial spines. Two suction drains were placed superficial to the mesh.
Results: All patients had gross en-bloc tumour resections and over a median follow-up period of 1 year (range 8–25 months), there were no complications related to primary repair.
Conclusion: Primary closure of a large defect following sacrectomy using a Permacol graft, in our early experience seems to be convenient and safe without the development of herniation.

Keywords: Sacrectomy; Sacral chordoma; Pelvic floor; Primary reconstruction

Introduction

Sacrectomy is used in the management of low-grade malignant neoplasms, such as chordomas; benign tumours or for advanced pelvic tumours.[1–3] Sacroperineal hernia is an uncommon but important complication following sacrectomy.[4] Other common complications of sacrectomy include haemorrhage, infection, prolonged drainage, delayed wound healing, inevitable neurological deficits affecting bowel, bladder or lower limb function and weakening of pelvic girdle impairing weight bearing and mobilisation.[5,6] We report our recent experience of primary reconstruction following sacrectomy in three cases using a Permacol™ graft, a biomaterial made of acellular porcine cross-linked dermal collagen.

Patients and methods

Case 1

A 48-year-old man presented with a history of low back pain and three episodes of acute urinary retention leading to catheterisation. His past medical history was insignificant. Radiological investigations including CT and MRI of the pelvis demonstrated a large homogeneous soft tissue presacral mass displacing bladder and rectum. Fluid aspirated from the mass showed the presence of leucocytes with no bacterial growth. Subsequent to one dose of Cefuroxime 1.5 g and Metronidazole 500 mg intravenously at induction, the patient underwent laparotomy, where midline incision

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revealed the retro rectal dermoid cyst displacing most of the tissues anteriorly. This was freed from the mesorectum with preservation of the two major trunks of the pre sacral nerves. The mass was adherent at the lower sacrum and coccyx; after mobilisation and completion of abdominal closure, the patient was placed in the prone jack-knife position to perform the sacrectomy and completion of excision. The defect was repaired using Permacol™ graft suturing ('O' PDS) to the sacrum, anococcygeal raphe and ischial spines followed by closure in layers. The muscle layer was closed using O Vicryl suture in an interrupted fashion. The subcutaneous layer was reapproximated using the 3-O Vicryl in an interrupted manner and finally the skin was closed using 3-O Vicryl Rapide subcuticular sutures. Suction drains were placed superficially. Initial urinary retention resolved after removal of the catheter 8 days post-operatively. Adequate healing of the wound was observed without any systemic septic sequelae. Pathology showed a midline sacrococcygeal cyst (teratoma) with no evidence of malignant change. No complications related to the primary repair or recurrence was seen at 1 year.

Case 2

A 63-year-old man presented as an emergency with an 8-day history of constipation and severe rectal discomfort with a 1-year history of intermittent constipation, tenesmus and incontinence as well as constant sacrococcygeal pain. He had suffered with increasing pain on defecation. Past medical history was insignificant. MRI of the pelvis showed a large pre-sacral mass with soft tissue invasion extending from the sacrum. Core biopsy of the mass confirmed features consistent with chordoma. En-bloc resection with excision of the pre-sacral mass was performed. A single dose of Cefuroxime 1.5 g and Metronidazole 500 mg was administered intravenously at induction. In the prone position, a tri-radiate incision was made to expose the large pre-sacral mass extending up to S2/S3. The incision was deepened down to S2 superiorly; the coccyx inferiorly and the ischiorectal fossae laterally. The anococcygeal raphe, the gluteal muscles and sacrospinous ligaments were divided. The sacrum was transected at S2 preserving the S2 nerve root. After ligation of the filum terminale, the tumour was cleared from the mesorectum. The defect was repaired using Permacol graft suturing ('O' PDS) to the sacrum, anococcygeal raphe and ischial spines. The wound was closed in layers in a similar fashion to case 1. Suction drains were placed superficially. He was discharged 15 days post-operatively with an indwelling catheter and regular enemata to aid rectal evacuation. The wound healed adequately without any systemic septic sequelae. Pathology confirmed complete excision of the chordoma. The patient was given radiotherapy for 5 weeks. No complications related to primary repair, herniation or recurrence were observed at 8 months. He still requires long-term catheter and regular enemas for bowel evacuation.

Case 3

A 61-year-old woman presented with a 15-year history of anal and coccygeal pain which had become more severe over the last year. Past medical history included hypertension and rheumatoid arthritis. MRI scan of the pelvis and lower lumbar spine revealed a large sacrococcygeal mass with a heterogeneous appearance. Posteriorly, the mass was seen to be infiltrating the lower sacral neural foramina bilaterally with sparing of the right S2 neural foramen and both S1 foramina. Axial scans also demonstrated infiltration through the sacro-sciatic notch, particularly on the right, and extension through the full thickness of the sacrum subcutaneously. Clinically she had a large retro-rectal mass extending laterally on both sides. Trucut biopsy of the mass revealed appearances consistent with chordoma. Subsequent to intravenous antibiotic prophylaxis at induction as in cases above, the patient underwent sacrectomy with the excision of the mass. A tri-radiate incision was made with the patient in the prone jack-knife position. Lateral extension involved resection of both gluteus maximi. Mobilisation was carried out after identification of the pudendal nerves at ischial spines with preservation of the rectum. Sacral laminectomy and ligation of the filum terminale preserving the S2 root prior to division at S1/2, was followed by excision of the tumour. The defect was repaired using a Permacol graft, suturing ('O' PDS) it to the sacrum, anococcygeal raphe and ischial spines. The wound was repaired in layers in a similar fashion as described in the two cases above. Suction drains were placed superficially. She was discharged after training in intermittent self-catheterisation following a failed trial without catheter. There was satisfactory wound healing with no septic complications. Histology confirmed a completely excised chordoma. She later had radiotherapy. After 25 months this patient has not developed any herniation or complications associated with the repair. There are no signs of tumour recurrence and her need for self-catheterisation and enemas has stopped.

Discussion

Sacroperineal hernia is an uncommon, however an important complication following sacrectomy.[2,4] Few cases of sacral hernia repair have been reported.[2,5,7,8] The exact incidence is unknown; however, the incidence of symptomatic hernia occurring in the perineal region following abdominoperineal excisions of the rectum and pelvic exenterations has been reported as 1% and 3%, respectively.[9] In the senior author's (A.C.V.M.) personal observation over 17 years, 2 out of 19 cases developed sacroperineal hernia following sacrectomy.

Current evidence necessitates the need for curative resection for patients with sacral chordomas.[6,10] Local recurrence is the most important predictor of mortality in patients with chordomas and the local recurrence is clearly