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Prevention of Adhesion after Removal of Lumbosacral Lipoma with Tethered Cord by Using Interposition Silastic Sheet : A Case Report

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Abstract **A 13-year-old boy was admitted to Thammasat University Hospital, Pathumthani, Thailand in January 2000 with a history of 10-year progressive pain, paraparesis and urinary incontinence. At birth, he has had a soft tissue lump over the spine in the lumbosacral area with no associated cutaneous anomalies. The MR images demonstrated a transitional lumbosacral lipoma. The lipoma was surgically removed and the lateral spinal cord and filum terminale were released from dural adhesions. A silastic sheet was inserted to interpose at the excision site for prevention of cord adhesion. The postoperative results were extremely gratified by the disappearance of pain from tethered spinal cord with gradual recovery of muscular atrophy and urinary incontinence within 8 months following surgery. This report showed a simple and safe application of silastic sheet to prevent postoperative adhesion after removal of a congenital lumbosacral lipoma.**

Index words : **Lumbosacral lipoma, Silastic sheet, Tethered cord.**

Spinal cord lipomas have been classified by Chapman[1,2] into 3 types: dorsal, transitional, and caudal. Both dorsal and transitional lipomas have an intradural part that blends with the substance of the spinal cord and an extramedullary part in the form of a fibrofatty stalk that fuses with the subcutaneous adipose layer through a dorsal midline defect in the dura, lumbodorsal fascia, and neural arches. Almost all spinal cord lipomas are associated with a low-lying conus medullarlis. This fact has given rise to the precept that lipomas produce symptoms by tethering the cord. The goals of the surgical procedure are release the cord tethering, preservation of neural element, lipoma debulking, and water-sealed tight dural reconstruction. An important problem of surgical treatment is retethering of spinal cord from postoperative adhesions of fibrous scar that is difficult to prevent.

The effects of adhesions in retethering of neural elements after surgery of spinal dysraphism has led to refinements in the technique of closure of the neural

tube. Silastic material, because of its relative inert property, has been used for prevention of postoperative adhesion in many surgical procedures. The author herein presents a technical application of silastic sheet to prevent postoperative retethering of the spinal cord in a case of Thai boy with a transitional lumbosacral lipoma.

Case Report

A 13-year-old boy was admitted to Thammasat University Hospital, Pathumthani, Thailand in January 2000 with the clinical presentation of pain, progressive paraparesis and urinary incontinence. At birth, he had an eccentric soft tissue lump over the spine in the lumbosacral area with no associated cutaneous anomalies. The lump was fully skin-covered and soft in consistency. After 3 years of age, he presented with tethered spinal cord syndrome that included pain, mild scoliosis, wide-based gait and postural deformity, and progressive neurogenic bladder. He has been treated with symptomatic management. He had more progressive weakness and advancing urinary incontinence in the last 2 years. The initial presentation at the hospital revealed the midline soft tissue lump measuring 4×8 cm at the lumbosacral area. The neurological examination showed muscular atrophy of buttocks, calves, and the hollows of the feet. The motor weakness of the right leg was more progressive than on the left. The deep tendon reflexes were absent on the right. The plain spine films demonstrated spina bifida with a widened canal and associated sacral dysgenesis. The T1-weighted images in magnetic resonance (MR) imaging demonstrated a large transitional lipoma arising from the conus medullaris. The lipoma mass attached in the cephalad direction to the dorsal spinal cord. Its fibrofatty stalk adhered to the dorsal spinal cord and the low-lying conus medullaris along a broad interface. A thicken filum terminale was also demonstrated in the MR images. On the axial plane, the T1-weighted images showed the spinal cord was more involved on the right side by the fatty attachment and the caudal end of the lipoma was confined in the distal thecal sac.

Surgical technique

A midline skin incision was made at the lumbosacral area from above to below the grossly seen lipoma mass. Then subcutaneous tissue cephalad to the lipoma was divided with electrocautery until intact lumbosacral fascia was exposed. The cephalad pole of the lipoma was gently elevated until the fascial defect and fatty stalk were well visualized. The caudal pole was found to blend with the superficial fibers of gluteus muscles. The lipoma was identified and freed circumferentially. Dissection was made in the subperiosteal plane along the paraspinal muscles from the first intact spinous process and the lamina cephalad to the lipoma (Figure 1). Partial laminectomy was performed at the first intact lamina to identify the normal dura. Then the fibrous epidural bands that notched the spinal cord and dura were identified and sharply divided.

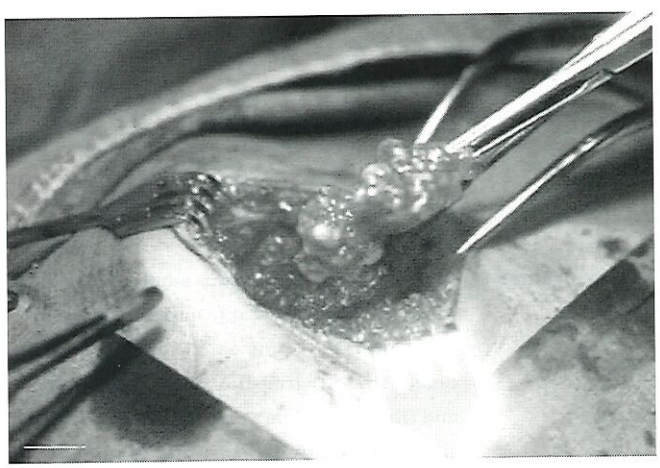

Fig. 1 The lumbosacral lipoma was mobilized circumferentially with nerve roots preservation.

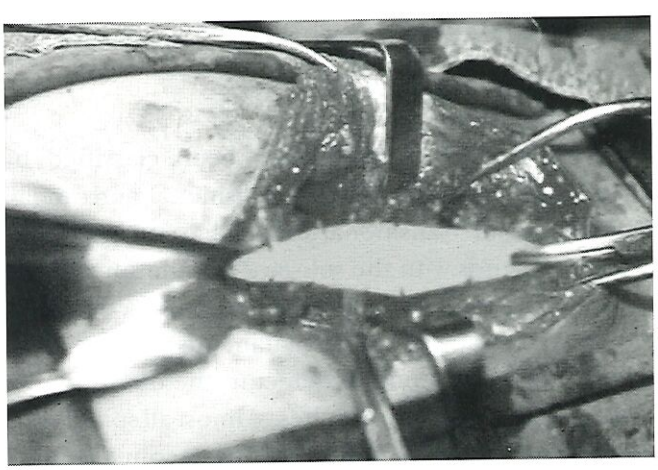

Fig. 2 A silastic sheet was placed and sutured to fix with the surrounding tissues as interposing membrane to prevent adhesion of scar tissue to dura and nerve root.

The dura was opened to identify the normal spinal cord. Debulking of the lipoma mass was performed with careful preservation of the neural elements until the lateral spinal cord was freed from dural adhesions. The filum terminale was also sectioned to release the adhesion at the caudal end that allowed it to migrate in cephalad direction for as much as 2 cm before it was snuggled in the spinal canal. Dural repair was made as usual to prevent cerebrospinal fluid leakage.

A silastic sheet was trimmed to fit the size of the excised defect. It was inserted as an interposing membrane to prevent adhesion of scar tissue to the dura and the nerve roots. The silastic sheet was transfixed to the surrounding tissues by sutures (Figure 2). Simple closure of the incision was then made with a vacuum drainage.

Postoperative results

The immediate postoperative course was uneventful. At two weeks postoperatively, there was improved ambulation and perineal sensation. The patient was able to walk more comfortably and began to have urinary voiding control. One month later, the pain was eradicated and the urination was well controlled. On last follow-up visit at 8 months postoperatively, the muscular atrophy of buttock and lower extremities had shown gradual improvement. The urinary incontinence had completely recovered. He was able to walk freely with only minimal spasticity

Discussion

Silastic sheet has been used in many surgical operations for the prevention of adhesion or reconstruction of tissue defects. The effects of adhesion in the retethering of the spinal cord after surgical operation of congenital spinal diseases has brought about many technical development and refinements in surgical closure of the neural tube. Silastic, due to its relative inert property, has been satisfactorily used for duraplasty and as an interposed membrane in prevention of postoperative adhesions.[3-4]

Shintani (1980)[3] studied on prevention of adhesion of tissue surrounding dura and morphological changes in the spinal cord following laminectomy. They reported an experiment in which 6 different types of interposed membranes were used following laminectomy to suppress fibrotic proliferation between the excised ends of the arch and the nerve root. The results showed that fibrotic growth along the dorsal aspect toward the lateral wall of the dura mater was inhibited. In addition, at 4 months after surgery, inhibition of scar tissue formation was noted in the dorsal aspect of the nerve root.

Boop and Chadduck (1991)[4] reported a series of 33 pediatric patients with 8 spinal diseases, in whom silastic dural grafts were used to prevent the adherence of neural structures to the overlying tissues. Their patients have been observed for up to 6 years. Only one case became infected. This patient was treated with antibiotics without graft removal, and had remained without sequelae for over 3 years. One patient had an incidental pseudomeningocele noted on follow-up magnetic resonance imaging scan but was not clinically apparent. There have been no hemorrhages, leakage of cerebrospinal fluid, nor other complications from using the silastic sheet.

Ohe and his colleague (2000)[5] reported 32 cases with spinal dysraphism in the lumbosacral region with secondary tethered cord syndrome following initial repair for spinal dysraphism. They stressed from their experience that early untethering for secondary tethered cord syndrome is essential. In addition, since the complications of silastic duraplasty at untethering were all minor and the operative outcome was satisfactory, they recommended the use of silicone sheeting as dural substitute to prevent adhesion of the spinal cord.

Encouraged by the aforementioned reports, the authors used a silastic sheet for interposition of the defect resulted from removal of a lumbosacral lipoma to prevent postoperative retethering of spinal cord in a Thai patient. The surgical result was quite satisfactory. Our experience in this single case is an additional data that supports the use of silastic sheet to prevent retethering of neural tissues in spinal lesions.

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