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Spondyloptosis and multiple-level spondylolysis

Received: 17 June 1998
Revised: 16 October 1998
Accepted: 26 October 1998

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Abstract An unusual case of a combination of multiple bilateral spondylolyses (L2, 3 and 4), spondylolisthesis at L3/4, spondyloptosis at L4/5 and sacralization of L5 in a teenage female is described. The patient had severely increasing lower back pain radiating to the left lower limb. Radiography identified the abnormalities and myelography revealed complete obstruction and compression of the thecal sac at the L4/5 level. The case was treated surgically by posterior decompression, corpectomy and fusion in a three-stage operation. The

follow-up was extended to 2 years with no complications. No similar case has previously been reported.

Key words Spondyloptosis · Multiple spondylolyses · Spondylolisthesis

Introduction

Spondylolysis is nowadays considered to be an acquired lesion originating in early childhood, and is not found in infants [1, 10, 12, 14, 15]. It affects the fourth and fifth lumbar vertebrae in more than 95% of cases [12]. Wiltse et al. classified spondylolistheses into four types [16], of which the isthmic variety is the most common, especially in children and adolescents, and is thought to be acquired in origin [15]. Spondyloptosis indicates any slip greater than 100% [5], and this has only ever been observed in the dysplastic type [6].

The association between spondylolysis and spondylolistheses is well known, but there has been no previous report, to the best of our knowledge, of as many multiple defects in one patient as the case we present here.

Case report

A 15-year-old female student presented with an 8-year history of chronic lower back pain, with radiation into the left lower limb

during the last 2 years. The pain was aggravated by activities and there was no history of precipitating events. The parents of the girl were close relatives.

The girl walked with a waddling gait. There was an obvious lumbar hyperlordosis with lumbosacral kyphosis. She had limitation of flexion of lumbar spine. Straight leg raising was limited to 70° bilaterally, which was due to hamstring muscle tightness. She had no neurological deficit. The mother was found to have isthmic spondylolisthesis of L5/S1.

Radiographs showed bilateral spondylolyses at L2, 3 and 4, with grade I isthmic spondylolisthesis at the L3/4 level. There was also a spondyloptosis at L4/5, with domed L5 and elongated pars interarticularis. L5 was sacralized with vertical sacrum below it (Fig. 1). (Sacralization of L5 was confirmed by radiographs taken of the chest and thoracic vertebrae). The myelogram revealed complete obstruction of the thecal sac with compression and narrowing of the thecal sac at the L4/5 level (Fig. 2).

The patient was managed surgically by a three-stage operation. The first stage was through a posterior approach, where posterior decompression and laminectomy at the L4/5 level was done. This included excision of the elongated pars down to the pedicles of L4. The second stage was a retroperitoneal corpectomy of L4, and was performed 1 week after the first. Through a flank incision, L4 was approached after mobilization of the vessels medially and ligation of the left ilio lumbar vessels. The discs above and below were completely excised, the lower one was in front of and above the domed L5. L4 was then excised using an osteotome and rongeurs.

Fig. 1 A, B Spondyloptosis and multiple-level spondylolysis. **A** Pre-operative anteroposterior radiograph. **B** Pre-operative lateral radiograph

Fig. 2 Pre-operative myelogram of the same case

Fig. 3 Follow-up radiograph, 1 year after surgery

The final stage, 2 weeks later, involved a posterolateral intertransverse fusion of L2 through L5 and fixation by a molded narrow compression plate and 6.5-mm cancellous screws (Fig. 3). Root redundancy was not observed by the surgeon during this last stage.

The patient had no postoperative complications and the treatment resulted in good pain relief and cosmetic effect, as well as progressive improvement of hamstring spasm as revealed by increased SLR. She continued to be symptom free at 2 years' follow-up.

Discussion

Spondylolysis and spondylolisthesis occur in 2–3% of the population [9, 10]. Multiple spondylolyses are uncommon, and are most frequently bilateral and in the lower lumbar vertebrae [1]. Isthmic spondylolisthesis, in which there is a defect at the pars interarticularis, is the most

common type below the age of 50 and in children and adolescents [7]. Spondyloptosis exists if the entire vertebral body of L5 is located on a vertical plane below the top of S1 [5].

This is the first report of multiple lyses in association with listhesis, sacralization of L5 and spondyloptosis of L4/5. This girl had a familial predisposition in that her mother was found to have spondylolisthesis of L5/S1 and her parents are closely related to one another. Wynne-Davies and Scott reported a higher incidence of congenital or spondylolytic spondylolisthesis among relatives of their patients, suggesting a common genetic pathway for dysplastic and isthmic groups [17].

The need to treat symptomatic spondylolisthesis surgically is universally accepted, but the choice of surgical procedure for patients who have severe spondylolisthesis with more than 50% slippage remains controversial [7]. The options range from fusion in situ with or without decompression [7, 12] to surgical reduction by a variety of methods [2, 11, 13]. A combination of anterior and posterior approaches has also been recommended [3, 4, 8].

Gaines and Nichols advised corpectomy of L5 and reduction of L4 onto S1 in cases of spondyloptosis [5], as we did.

The severity of the deformities in our case made us opt for a three-stage operation. The first stage was performed to decompress the nerve roots, which were under pressure as indicated clinically by radicular pain and obstruction of dye column on myelography between the posterior sacralized L5 and the anterior border of the fourth lumbar lamina (Fig. 2). Excision of the posterior element, as part of the vertebrectomy, also helped in reducing the slip. Corpectomy was done in the second stage to achieve good reduction and was followed by posterior fixation and fusion in the third stage.

We believe this method is preferable on grounds of neurological safety, despite the longer duration of treatment. The postoperative follow-up of this patient showed no neurological deficit and marked improvement of her symptoms as well as good cosmetic results. She continued to be asymptomatic at 2 years of follow up, as assessed by the treating surgeon and his team.

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