The Effectiveness of OP-1 (rhBMP-7) in Promoting in situ Fusion in Children Affected by Symptomatic Grade I Isthmic Spondylolisthesis: A 3-years Follow-up Study

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Osteogenic protein-1 (rhBMP-7) is a member of the transforming growth factor-beta superfamily of extracellular proteins involved in bone growth and formation. Long bone repair and spinal fusion studies have demonstrated the efficacy and safety of OP-1 in adults. This is the first report on use of OP-1 in paediatric spinal surgery. The trial was approved by the local Ethical Committee. Between 2004 and 2006 14 patients (mean age 13 years, range 8-16) affected by symptomatic grade I isthmic spondylolisthesis were treated by intertrasversary in situ fusion (Wiltse approach). All patients gave written informed consent. A mixture of small bone chips obtained from in situ decortication, OP-1 (eptotermin alfa, 3.5 mg) and autologous stem cells taken from iliac bone was used in all procedures. A TLSO brace was used in the postoperative time for two months. Results were evaluated by X-rays and CT at 1, 3, 6, 12 months and yearly thereafter. Mean follow-up was 36 months (range 30-60). Mean operative time was 120 minutes (range 90-150) with mean blood loss of 300 ml. Overall complete fusion was observed at one-month X-rays control in all but 2 patients (85%) presenting with unilateral fusion. These results were confirmed at following X-rays and CT controls. At 3-months follow-up 3 seromas were recorded (21%); complete recovery was achieved by steroid therapy in 1 case and reintervention in 2 cases. This is the first experience on OP-1 (rhMBP-7) use in paediatric spinal surgery. Many studies have reported the safety and efficacy of OP-1 as a replacement for iliac crest autograft in posterolateral lumbar fusion in adults. In children OP-1 has recently proven to be effective in healing of persistent nonunion with no major adverse event recorded. In the present study spinal arthrodesis was achieved in 85% of paediatric patients by a short operative time, low bleeding and reduced postoperative pain, with a mild incidence of seroma at 3-month follow-up (21%). Further studies are needed to better understand the efficacy and benefit of this technique in pediatric patients.