Clinical: Deformity

Surgical Treatment of Adolescent Idiopathic Scoliosis in Patients with Congenital Heart Disease: Comparison of Three Different Types of Constructs

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The incidence of scoliosis in patients with congenital heart disease has been reported to range between 4% in those patients who have not undergone operative treatment and 11% in children who have undergone cardiac surgery. These curves usually develop quite early and are very severe, requiring surgical treatment. Between 2006 and 2010 we provided corrective surgery for idiopathic scoliosis in four patients (3F, 1M, mean age 15 years, ASA 2) previously undergoing cardiac surgery, respectively for correction of tetralogy of Fallot (TOF, two cases) and heart transplantation for end-stage cardiac failure (two cases). The patients affected by TOF presented an high-grade thoracic curve (Lenke type 1, mean pre-operative Cobb angle: 95°), while the two patients undergoing heart transplantation presented a double-major curves (Lenke type 3, mean pre-operative Cobb angle: 70° for thoracic curves and 40° for lumbar curves). In all cases we provided a posterior instrumentation, but using 3 types of constructs: hybrid construct in three cases (lumbar pedicle screws plus thoracic Universal Clamps in two cases, lumbar pedicle screws plus thoracic hooks in one case) and all-screws construct in one case. In heart transplanted patients a continous Midazolam and Remifentanil infusion was performed in anesthesia procedure. The average percentage of correction was about 70%, with mean operative time of 240±30 minutes and mean blood loss of 800±200 ml. No neurological complications or wound infection occurred. In high-grade thoracic scoliosis we reported a pleural effusion. No reintervention or anterior surgery was performed. Patients with congenital heart disease undergoing general surgical procedures have a significant rate of perioperative complications. The most important operative aspect is therefore the reduction of blood loss that could become very dangerous. In particular, in heart transplanted patients the denervated heart lacks the ability to respond acutely to hypovolemia or hypotension with reflex tachycardia. Moreover, the immunosuppressed state increases the heart transplanted patients susceptibility to infections, altering the response to surgical stress and delay healing. However, orthopaedic elective procedures are not categorically contraindicated, but require special precautions. In our series we performed three types of posterior spinal instrumentation, with similar results and without major complications. However, among these systems, the hybrid construct using lumbar pedicle screws and thoracic Universal Clamps provided a satisfactory correction of the deformity, with an excellent sagittal control, and reduced operative time, radiation exposure and blood loss respect to all-screws constructs. In this study we have demonstrated the efficacy and safety of various types of spinal fixation in corrective surgery for idiopathic scoliosis in children undergoing cardiac surgery for congenital heart disease.