

Introduction:

Surgical treatment options for neuromuscular scoliosis (NMS) have traditionally been characterized by high intraoperative bleeding and complication rates. A mini-invasive bipolar construct was introduced by Miladi in 2018 to help reduce perioperative risks by decreasing bleeding and operative times while maintaining acceptable curve correction. However, there is a lack of comparative studies confronting fusionless surgery (FLS) and single posterior fusion (SPF) surgery in neuromuscular scoliosis. It is the aim of this study to help shed some light on this controversial matter. Materials and

Methods:

All patients who underwent FLS for NMS at a paediatric orthopaedic unit since August 2019 were included in our study and paired with SPF patients. Preoperative and postoperative records were retrospectively reviewed and clinical, surgical and radiographic variables were analyzed and compared. Complications according with the modified Clavien-Dindo-Sinko Classification and return to operating room (ROR) rates were also reviewed.

Results:

A total of 24 NMS patients were included in the study (12 on the FLS group and 12 on the SPF group). Most common diagnoses included spinal muscular amyotrophy (SMA) type 2 (n=6) and muscular dystrophy (n=5). Mean age at apex surgery was significantly lower in the FLS group (12.3 years) compared to the SPF group (14.7 years, $p=0.016$). Magnitude of curve (50.4 vs 49.3%, $p=0.89$) and pelvic obliquity correction (44.3 vs 62.5%, $p=0.08$) was similar between the FLS group and the SPF group. Estimated blood loss (181.5 vs 376 cc, $p=0.0026$), complication rate (1/12 vs 7/12, $p=0.027$) and severity of complications ($p=0.009$) were significantly lower in the FLS group. No significant differences were found in ROR rates between the FLS and SPF groups (2/12 vs 5/12, $p=0.37$). Conclusions: FLS may be a safer and less invasive option for NMS treatment resulting in similar curve corrections and duration of surgery while significantly decreasing the number and severity of complications and intraoperative blood loss when confronted with SPF.

