Single vs two attending senior surgeons: assessment of intra-operative blood loss at different surgical stages of posterior spinal fusion surgery in Lenke 1 and 2 adolescent idiopathic scoliosis

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Received: 1 June 2016/Revised: 6 September 2016/Accepted: 30 September 2016/Published online: 12 October 2016
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Abstract

Purpose To assess the pattern of intra-operative blood loss at various surgical stages comparing between single and two surgeons.

Methods Lenke 1 and 2 adolescent idiopathic scoliosis (AIS) patients who underwent instrumented posterior spinal fusion (PSF) surgery from two centres between June 2014 and December 2015 were prospectively recruited into this study. The patients were grouped into Group 1 (single surgeon) and Group 2 (two surgeons). One to one matching using ‘prospective propensity score-matched cohort patient sampling method’ was done. The surgery was divided into six stages: stage 1—exposure, stage 2—screw insertion, stage 3—release, stage 4—correction, stage 5—costotomies and bone grafting and stage 6—closure.

Results A total of 116 patients were recruited. Of 86 patients who were operated by the two surgeons, 30 patients were matched with 30 patients that were operated by a single surgeon. Operation duration was significantly longer in Group 1 (257.3 ± 51.4 min) compared to Group 2 (164.0 ± 25.7 min). The total blood loss was significantly higher in Group 1 (1254.7 ± 521.5 mL) compared to Group 2 (893.7 ± 518.4 mL). Total blood loss/level fused was significantly higher in Group 1 (117.5 ± 42.8 mL/level) compared to Group 2 (82.6 ± 39.4 mL/level). Group 1 had significantly higher blood loss and blood loss/level fused for stages 1, 2 and 3. Group 2 had lower incidence of allogeneic blood transfusion.

Conclusions In PSF surgery for AIS patients, two-surgeon strategy was associated with shorter operation duration, lesser blood loss and lower incidence of allogenic blood transfusion.

Keywords Adolescent idiopathic scoliosis · Posterior spinal fusion surgery · Intra-operative blood loss · Complications · Spine surgery

Introduction

Significant blood loss in posterior spinal fusion (PSF) surgery for adolescent idiopathic scoliosis (AIS) can cause haemodynamic complications and increases the incidence of allogeneic blood transfusion [1]. The increased risk intra-operative bleeding may be caused by long incision, extensive soft tissue dissection, decortication of bony surfaces and prolonged operative time. Several blood conservation strategies had been used to reduce intra-operative blood loss which includes autologous blood transfusion [2, 3], cell salvage [4], and the use of various pharmacological agents, i.e. esmolol [5], tranexamic acid [6], amicar [7], aprotinin [6] and epsilon aminocaproic acid [6].

Recently, several studies had explored the feasibility of having two senior surgeons instead of a single surgeon to reduce operative time and blood loss for major deformity surgeries [8–10]. However, none of these studies specifically looked into AIS Lenke 1 or 2 curve types. Furthermore, the pattern of blood loss (comparing single- versus two-surgeon strategy) at various surgical stages has not been fully investigated. The objective of this study is to...