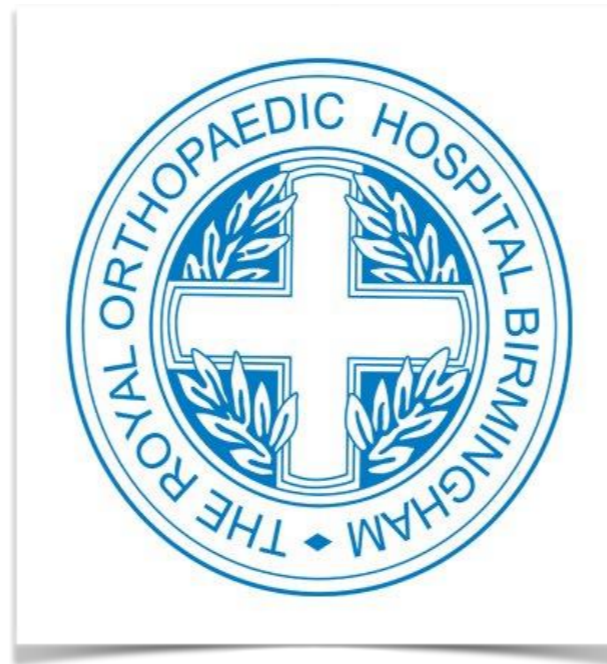


The impact of blood conservation techniques on transfusion requirements for posterior scoliosis corrections: Do we need a routine cross-match for the operation?



S Haleem, R Thimmaiah, N Nagrath, D Gowda, C
Bhimarasetty, J Mehta
Royal Orthopaedic Hospital, Birmingham, UK

Current practice

- Current practice- group and save at POAC(PreOpAssessmentCentre) and crossmatch prior to surgery.
- Current standard MSBOS (Maximum Surgical Blood Ordering Schedule) for scoliosis surgery
 - all patients to be crossmatched 2 units and availability confirmed before the start of surgery at WHO check list.

Purpose

- Various strategies are utilised to reduce blood loss and allogenic blood transfusion for posterior instrumented correction of Adolescent Idiopathic Scoliosis (AIS).
- The aim of this study was to evaluate post-operative blood transfusion requirements to determine whether routine cross matching of blood is essential.

Methods

- 84 patients - September 2016 to March 2018 underwent Posterior Correction for Adolescent Idiopathic Scoliosis (range 10 – 18 years)
- We reviewed demographic, operative, radiological data and transfusion requirements. Anterior and revision cases excluded
- Normal MRI, no bleeding disorders

Methods

- Results of transfusion requirements in 44 patients who underwent Ponte osteotomies (F:M=36:8; mean age 14.8 years) were compared with 40 patients (F:M=9:31; mean age 14.4 years) who did not and provided the control group.
- A transfusion trigger of 80 mg / dl with clinical caveats was utilised. Cross matching and procurement costs of allogenic blood/unit were ascertained.

Methods

Surgery related parameters:

- Number of levels
- Total anesthesia time
- Number of osteotomies
- Preop Cobb angle and Postop Cobb angle
- Correction Index ($\text{Preop Cobb} / (\text{Preop Cobb} - \text{Postop Cobb})$)

Methods

Blood transfusion related parameters:

- Blood Loss
- Blood replaced
- Pre-op Hb
- Lowest postop Hb
- Number of units cross matched
- Number of units and time of transfused

Anaesthetic protocol

- TIVA (Total intra-venous anaesthesia)
- Cell salvage
- Tranexamic acid:
 - 10 mg / kg bolus*
 - 10 mg / kg maintenance*
- Arterial line, Central line, Urinary catheter
- Multi-modal spinal cord monitoring: SSEP, TcMEP, MEP
- MAP (50 - 60); BIS monitoring (40 – 60); Normal temp

Surgical protocol

- 2 deformity surgeons
- Implant density variable (< 80%)
- Ponte osteotomies (surgeon preference)
- Standard surgical technique for posterior correction

Table 1 shows the mean (+SD) demographics, operative and post-operative comparison data of Osteotomy group (OG) and Non-Osteotomy group (NO) included in the study

	Non-Osteotomy (NO) (n=40)	Osteotomy (OG) (n=44)	P value
Age (years)(range)	14.4(10-18)	14.8 (12-18)	0.3473
F:M	9:31	36:8	
BMI (range)	24.5(12.9-34.6)	20.9(14.8-35.9)	0.7021
Pre-op Hb (range)	138.3(114-156)	139.1(120-157)	0.6894
Pre op Cobb angle (range)	54(32-92)	60 (30-87)	0.0166
EBL (mls)(range) [%EBV]	957.6 (120-2000) [28.7%]	1163.4(350-3000) [31.9%]	0.1125
Blood replaced (mls) (range)	380.5 (67-883)	459.4(139-1145)	0.0948
Post op Hb (range)	111.0(86-133)	107.2(76-133)	0.1402
Anaesthetic Time (minutes)(range)	301.5(180-480)	357.7(207-504)	0.0003
Number of levels fused (range)	11.9 (9-16)	11.6 (8-16)	0.3412
Number of osteotomies (range)	n/a	3.6 (2-7)	
Post op Cobb (range)	17 (6-36)	18 (9-31)	0.2426

Table shows the demographics, operative and post-operative comparison data of Transfused group(TG) and Non-Transfused group(NTG)

	Transfused group (TG)(n = 5)	Non-transfused group (NTG)(n=79)	p value
Age (years)(range)	14.6 (12-17)	14.6 (10-18)	0.9932
F:M	5:0	62:17	
BMI(range)	20.2 (13-32)	20.8 (14-36)	0.7855
Pre-op Hb(mg/dl)(range)	134 (123-140)	139 (114-157)	0.2283
EBL (mls)(range) [%EBV]	1280(700-2000) [39.8%]	1058(120-3000) [29.8%]	0.3865
Blood replaced (mls) (range)	419(250-648)	423.1(67-1145)	0.9672
Post op Hb(mg/dl) (range)	84.4(80-89)	99.7(75-126)	0.0084
Anaesthetic Time (minutes)(range)	348(240-420)	330.2(180-504)	0.5976
Number of levels fused (range)	13.2(12-16)	11.6(8-16)	0.0312
Preop Cobb angle(range)	59(45-82)	57(30-92)	0.7628
Postop Cobb angle(range)	16(8-19)	18(6-36)	0.5085

Blood transfusion requirements

- No patient required intra-operative homologous transfusion
- 5 patients required transfusions post-operatively
- All the transfusions were on days 2 or 3
- Transfusion trigger varied (clinical / 80)

Cross matching practices

- Day of surgery cross match: 195 units unused
- £154/unit = £30.030 loss

Conclusion

- Our study shows that routine crossmatching does not compromise patient safety for the standard AIS correction procedure.
- Our anaesthetic and blood conservation protocols obviated the need for transfusion on the day of the operation.
- This may have positive implications with avoiding transfusion complications and cost savings.

Conclusion

- No real necessity to cross match for the day of operation
- Results reproducible if same anesthetic and surgical techniques used
- If bleeding disorders, then will require intra-operative transfusion
- If catastrophic bleeding:
 - Cell saver transfusion.
 - Cross match available in 45 min
 - O—ve in refrigerator if desperate

Disclosures

- 1) S Haleem – PI for ROSA study – Grants to institution by Ceramysys.

None of the authors has any potential conflict of interest.