WHICH FACTORS PREDICT SHOULDER ASYMMETRY IN PATIENTS WITH LENKE TYPE 1 AND 3 CURVES FOLLOWING PEDICLE SCREW INSTRUMENTATION?

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Relationships Disclosed
No Relationship
No Relationship
No Relationship
DepuySynthes (a)
Medtronic (b)
No Relationship
Medtronic (b); DePuy Synthes Spine (a,b)
Medtronic(b)

(a) Grants/Research Support
(b) Consultant
(c) Stock/Shareholder
(d) Royalties
(e) Other Financial Support
Shoulder asymmetry has been reported to be a frequent (39%) problem after fusion of the main thoracic curve in patients with non-structural proximal thoracic curves (Lenke type 1 and 3).

The purpose of this study was to analyse factors related to shoulder asymmetry and efficacy of traction x-ray under general anesthesia (TrUGA) in predicting postop shoulder asymmetry.
MATERIAL & METHODS

✓ 137 (128F,9M) consecutive patients with Lenke Type 1 and 3 curves and preop right shoulder elevation (RSE) with (-) T1 Tilt with >2y (average 5.21y (2-12)) were included.

✓ The average age was 13.96 (11-17).

✓ Radiographic analysis included preop, postop and f/up A-P standing, supine bending and traction x-ray under general anesthesia (TrUGA).

✓ Magnitudes of curves, T1 tilt, clavicle angle, shoulder height, first rib angle (FRA) and second rib angles (SRA) were measured as shoulder asymmetry parameters.

✓ Left or right shoulder elevation > 1cm is accepted as shoulder imbalance.

✓ Preop and f/up SRS-22r and shoulder balance questionnaires were also analyzed.
RESULTS

✓ 107 pts had upper instrumented vertebra (UIV) at T2, 17 pts had UIV at T3 and 13 had UIV at T4.

✓ Average correction rates were 69.12% for PT curve, 82.4% for MT curve and 73.5% for TL/L curve.

✓ 101 patients (73%) had balanced shoulder while 17 patients had left shoulder elevation (LSE) and 20 patients had right shoulder elevation (RSE).
RESULTS

✓ Incidence of LSE was 8.4% (9 patients) for UIV at T2, 29.4% (5 patients) for UIV at T3 and 23.1% (3 patients) UIV at T4.

✓ Higher %MT correction was correlated with LSE (P=0.043).

✓ There were no significant differences in Shoulder height, Clavicula angle, T1 tilt, First Rib Angle, Second Rib Angle between TrUGA and f/up X-rays (p<0.05).

Table 1. Correlation of T1 Tilt, First and Second Rib angles, Clavicula angle and Shoulder height in TrUGA and Follow/up visit.

<table>
<thead>
<tr>
<th></th>
<th>F/up T1 Tilt</th>
<th>F/up First Rib Angle</th>
<th>F/up Second Rib Angle</th>
<th>F/up Cla. Angle</th>
<th>F/up Shoulder H.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TrUGA T1 Tilt</td>
<td>0.498**</td>
<td>0.397**</td>
<td>0.334**</td>
<td>-</td>
<td>-</td>
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<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TrUGA First Rib Angle</td>
<td>0.364**</td>
<td>0.411**</td>
<td>0.205*</td>
<td>-</td>
<td>-</td>
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<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.047)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TrUGA Second Rib Angle</td>
<td>0.496**</td>
<td>0.418</td>
<td>0.436**</td>
<td>-</td>
<td>-</td>
</tr>
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<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TrUGA Cla. Angle</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.192*</td>
<td>0.175*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.024)</td>
<td>(0.040)</td>
</tr>
<tr>
<td>TrUGA Shoulder H.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.231**</td>
<td>0.214*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.07)</td>
<td>(0.012)</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).
✓ Preoperatively, 83% of patients and at final follow-up 7.8% of patients thought they had shoulder asymmetry.

✓ Average SRS-22r score was 4.32 (2.96-5) and was similar in patients who had shoulder asymmetry (4.36) vs. no asymmetry (4.29).
IA, 12Y, F

Standing AP

L-Bending

TrUGA

Post-op
CC, 12y, F

Standing AP

L Bending

TrUGA

Post-op
CONCLUSION

✓ Risk factors for shoulder asymmetry include:
  higher correction % of MT curves and extention of instrumentation up to T3.

✓ Extension of fusion up to T2 did not always prevent shoulder asymmetry in patients with non-structural PT curves.

✓ Shoulder asymmetry parameters in TrUGA is helpful in predicting postop shoulder asymmetry.

✓ HRQL scores are similar in patients with shoulder asymmetry vs. without shoulder asymmetry.
REFERENCES


