Sacropelvic fixation in adult spinal deformity (ASD)
A very high rate of mechanical failure

Emre Acaroglu – Ankara Spine Center
Onur Yaman – Ankara Spine Center
Umit O Guler – Ankara Spine Center
Ferran Pellise - Hospital Universitari Vall Hebron
Alba Villa Casademut - Hospital Universitari Vall Hebron
Montse Domingo Sabat - Hospital Universitari Vall Hebron
Ahmet Alanay – Acibadem Maslak Hospital
Francesco Sanchez Perez-Grueso – Hospital La Paz
European Spine Study Group

Background& Aim

- Sacropelvic fixation (SPF) is an integral part of ASD surgery.
- Literature suggests that the combination of S1 and iliac screws may be associated with lowest rate of complications.

- To analyze
  - the mechanical failure rate of SPF and,
  - potential factors associated with failure
  - Residual sagittal imbalance
  - Type of SPF
  - Age

Patients

- 504 patients with adult spinal deformity in a prospective international database
  - coronal deformity > 20^0,
  - sagittal vertical axis > 5 cm,
  - pelvic tilt > 25^0,
  - thoracic kyphosis > 60^0
- 239 treated conservatively, 265 surgically
- 45 patients with SPF and > 6 months of f-up

- Average age 63 +/- 14
- Diagnoses:
  - Degenerative: 20 patients
  - Failed back: 11 patients
  - Other: 14 patients
- Gender: 40 females, 5 males
- Average length of instrumentation: 11.6 levels
- Type of SPF:
  - S2Alar(S2Al): 20 patients
  - Iliac w/L connector: 25 patients

HRQoL

	Pre-op	6 months	F_up
ODI	57 +/- 22	43 +/- 22	45 +/- 22
SF36 v2 MCS	40 +/- 12	41 +/- 12	41 +/- 13
SF36 v2 PCS	30 +/- 8	35 +/- 9	38 +/- 9
SRS 22 subtotal	3 +/- 1	3 +/- 1	3 +/- 1

Sagittal balance

	Pre-op	Post-op
SVA (mm)	66 +/- 68	44 +/- 53
T1 Sagittal tilt (°)	1 +/- 8	-2 +/- 5
Global tilt (°)	32 +/- 17	26 +/- 14
L-Gap (°)	25 +/- 19	15 +/- 15

Results
Implant related complications

- 17 patients (37.7%) (8 had to be revised)
  - 10 w/ disintegration of the SPF (22.2%) (5 had to be revised)
  - 4 w/ rod fractures (8.9%)
  - 2 w/ sacral and/or iliac screw loosening
  - 1 w/ painful prominent iliac screw
- Time to failure
  - Average: 267.9 days (8 to 709)
  - Median: 125 days

Disintegration of SPF

- 7 cases of S2Al screws
  - 3 screw head breakages (all w/ same brand)
  - 5 set screw dislodgements (4/5 w/ same brand)
- 3 cases of IwL
  - 1 set screw dislodgement
  - 2 rod-connector dislodgements
- Failure rate by brand of screws:
  - P value: 0.42

Type of SPF

N (%)	S2AI	IwL	Total
Failed	7 (35)	3 (12)	10
Not failed	13 (65)	22 (88)	35
Total	20 (100)	25(100)	45

P-value: 0.07

Age, balance, diagnosis

SPF failure	Age	SVA post op	T1 sagit. tilt post op	Global tilt post op	L-Gap post op
Present	70 +/- 11	67 +/- 56	0 +/- 6	31 +/- 11	19 +/- 16
Absent	61 +/- 14	37 +/- 51	-2 +/- 5	23 +/- 14	14 +/- 15
P value	0.05	0.16	0.38	0.12	0.46

N (%)	Degenerative	Other	Total
Failed	7 (35)	3 (12)	10
Not failed	13 (65)	22 (88)	35
Total	20 (100)	25(100)	45

P-value: 0.07

Effect on HRQoL @ 1 and 2 years

SPF failure / 1 year	ODI	SF36 v2 MCS	SF36 v2 PCS	SRS 22 subtotal
Present	52 +/- 14	36 +/- 7	38 +/- 10	3 +/- 1
Absent	42 +/- 24	43 +/- 15	39 +/- 9	3 +/- 1
P value	0.18	0.18	0.89	0.36

SPF failure / 2 years	ODI	SF36 v2 MCS	SF36 v2 PCS	SRS 22 subtotal
Present	52 +/- 15	45 +/- 12	26 +/- 3	3 +/- 0
Absent	38 +/- 24	43 +/- 14	37 +/- 10	3 +/- 1
P value	0.15	0.82	0.013	0.30

Conclusions

- Implant related complications of SPF in ASD is found to be 37.7 %
- Mechanical failure rate of SPF in ASD may be much higher than previously reported
  - 22.2 % vs. ≈ 10 %
- Risk factors for failure include:
  - Age
  - Diagnosis
  - Type of fixation (S2AI screws)
- Failure of SPF appears affect the HRQoL inversely especially in longer follow up

Disclosures

Acaroglu E:

grants/research support*: Fondation Cotrel, Depuy Spine
consultant*: Medtronic, Biomet, AOSpine, AOFoundation
stock/shareholder*: IncredX

Onur Yaman:

grants/research support*: Medtronic

Guler U.O:

None

Pellise F:

grants/research support*: Depuy Spine, K2M
consultant*: Depuy Spine

Casademut A. V:

grants/research support*: Depuy Spine

Domingo-Sàbat M:

grants/research support*: Depuy Spine

Alanay A:

grants/research support*: Depuy Spine, Synthes
consultant*: Depuy Spine, Synthes

Perez-Grueso F.S:

ESSG