APC Injuries with Symphyseal Fixation: What Affects Outcome?

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Background/Purpose: Symphyseal separation is routinely treated operatively. Normal motion through the region leads to loosening of fixation and plate failure in up to 40% of cases, some of which allow for union with some separation. Additionally, the posterior ring may be rotationally or completely unstable. There is little known about the functional outcomes of patients with this injury after 2 years. The purpose of this study was to evaluate the influence of the position at union, hardware failure or loosening, ISS, and the type of posterior ring injury (type 2 or 3) on validated outcomes in a series of patients treated operatively for symphyseal separation.

Methods: We evaluated 54 patients (50 male, 4 female), average age 54 years (range, 23-80), ISS mean 17 (range, 8-50), with 35 APC (anterior-posterior compression) 2 and 19 APC3 injuries at minimum of 2 years after surgery (average 7 years; range, 2-14). All patients were stabilized with a 6-hole anterior plate. Type 2 injuries were not fixed posteriorly and type 3 injuries were treated with iliosacral screws in addition to the symphyseal plate. Patients were evaluated with EuroQol EQ5D, EQ health index, visual analog scale (VAS) pain, and Majeed pelvic scores. Hardware failure was defined as loosening or breakage of screws and / or plate. Separation of the symphysis at follow-up was measured as the maximal separation on the AP view looking at the superior one-half of the symphyseal bodies. Three patients had revision surgery and they are included based on hardware status and displacement at the time of final followup. Statistical analysis was performed using Fisher exact, t tests, and Pearson's correlation coefficient as appropriate.

Results: We found trends toward better outcomes for APC2 versus APC3 injuries for EQ5D and VAS pain only. There was no difference in Majeed score or reported health status. 15 patients had failure of fixation on their final films; this was not associated with a difference in EQ5D, VAS pain, or reported health and there was a trend towards a better Majeed score. Multiply injured patients (ISS >16) had worse reported health, Majeed, and VAS pain. All of these data is summarized in the table. There was no correlation of final symphyseal separation on EQ5D (Pearson correlation coefficient R = -0.1). In looking at major displacement defined as >15 mm, there was a difference or trend in EQ5D (P = 0.03), reported health (P <0.0001), and Majeed score (P = 0.06), but not in VAS (P = 0.4). No factor affected the need to change jobs for those who were employed. Final outcomes for the 3 patients who were revised were not different than those not revised (P values 0.26 -1 for all outcomes).

Conclusion: We followed 54 patients with APC2 or APC3 pelvic injuries for a minimum of 2 years (average 7 years) to evaluate the factors that influence outcomes. There was no difference seen in APC2 versus APC3 injuries, but overall injury severity resulted in lower scores and more pain. Outcomes were not affected by hardware loosening or breakage. There was no correlation of EQ5D with final displacements when evaluated continuously;

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however, displacements of >15 mm anteriorly did negatively impact outcomes. Minor loss of reduction <15 mm anteriorly does not seem to affect patient-based outcome, pain level, or work status. Finally, patients who had early failure and were revised to union in a good position did not suffer worse outcomes than those who healed uneventfully.

	EQ5D	EQ Health	Majeed	VAS Pain	Work Δ
APC2	82 ± 19	76 ± 19	77.4 ± 14	1.3 ± 1.8	39%
APC3	74 ± 21	72 ± 22	81.5 ± 20	2.4 ± 2.4	50%
P Value	**0.15**	**0.4**	**0.39**	**0.06**	**0.77**
ISS ≤ 16	81 ± 21	78 ± 18	79 ± 14	1.1 ± 1.6	36%
ISS > 16	71 ± 23	68 ± 22	70 ± 20	2.8 ± 2.6	57%
P Value	**0.38**	**0.08**	**0.06**	**0.005**	**0.23**
Hardware Intact	80 ±21	76 ±20	81.5 ± 16	1.9 ± 2.3	33%
Hardware Failed	80 ±18	70 ± 19	71.9 ± 18	1.6 ± 2.1	47%
P Value	**.71**	**0.3**	**0.06**	**0.66**	**0.5**