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A single centre pragmatic study of clinico-radiological outcomes using expandable (EC) or non-expandable (NEC) cervical corpectomy cages

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Background: Use of EC in cervical corpectomies is increasing due to their ease of insertion and ability to modestly improve cervical alignment. However, there has been limited literature on direct comparison of post-operative clinical outcomes when using EC or NEC insertion.

Research question:

1. Clinico-radiological differences in post-operative outcome when using EC or NEC
2. Incidence of complications including cage subsidence or revision procedures with EC or NEC

Design: Single centre pragmatic retrospective cohort study

Methods: Retrospective observational study at a tertiary spinal centre. Cases from December 2016 till April 2023 included and categorised in two cohorts – EC and NEC. Pre-operative, immediate post-operative and final follow-up imaging studied to assess:

1. Sagittal alignment: C2-C7 lordosis angle, focal lordosis angle and C2-C7 sagittal vertebral alignment (SVA)
2. Anterior and posterior disc heights (ADH and PDH)
3. Cage subsidence at final follow-up

Results: Twenty-five patients treated with EC (n=15, mean age 58.1 years [43-70], M:F=11:5) or NEC (n=10, mean age 59.6 years [38-84], M:F=8:2) were included with a mean follow-up of 13.8 months (5-36) for NEC vs 7 months (2-31) for EC. Main indications were degenerative (n=6 each) or tumour (n=8 EC, n=2 NEC).

NEC provided better restoration of PDH with a mean improvement of 27.4mm vs 21.7mm (p-value<0.05). Mean SVA improvement with NEC is 15.5mm v/s 7.6mm (p-value>0.05).

EC provides a mean C2-C7 lordotic angle improvement of 1.97° vs 0.03°, p-value>0.05 and a mean improvement of focal lordosis by 5.8° vs 1.78°, p-value>0.05. NEC has increased subsidence of >3mm (relative risk of 2.25, 95% CI [0.522, 9.697], p-value>0.05).

At final follow-up all patients maintained their neurological status and none of them required revision procedures.

Discussion: With no clear clinical benefit and similar radiological outcomes imparted by EC, their routine use in cervical corpectomies is not justified.

Fig. 1

Table 1: Demographic data, indication, ancillary stabilisation for the cage and follow-up duration

	Expandable cage group (n=15)	Non-expandable cage group (n=10)	p-value
Age (in years)	58.1 (43-70)	59.3 (38-84)	0.38
Gender	M=11, F=5	M=8, F=2	0.53
Indication	Tumour = 8 Degenerative = 6 Trauma = 1	Tumour = 2 Degenerative = 6 Trauma = 1 Infection = 1	0.33
Last follow-up duration (in months)	7	13.8	0.09
Anterior fixation	15	10	
Posterior stabilisation	3	4	0.38

Fig. 2

Table 2: Pre-op radiographic parameters

	Expandable cage group (n=15)	Non-expandable cage group (n=10)	p-value
C2-C7 angle	8.52, 95% CI [1.50, 15.54]	12.35, 95% CI [-5, 29.70]	0.33
C2-C7 SVA	2.36, 95% CI [1.87, 2.85]	2.06, 95% CI [1.17, 2.95]	0.27
Focal lordosis angle	-3.46, 95% CI [-3.75, 10.67]	-0.55, 95% CI [-12.24, 13.34]	0.33
Anterior disc height	1.65, 95% CI [1.40, 1.90]	2.16, 95% CI [1.62, 2.7]	0.04
Posterior disc height	1.63, 95% CI [1.40, 1.86]	2.05, 95% CI [1.58, 2.53]	0.05

Fig. 3

Table 3: Immediate post-op radiographic parameters

	Expandable cage group (n=15)	Non-expandable cage group (n=10)	p-value
C2-C7 angle	10.49, 95% CI [5.11, 15.87]	12.38, 95% CI [-3.50, 28.26]	0.40
C2-C7 SVA	2.87, 95% CI [1.90, 3.84]	3.61, 95% CI [2.22, 4.99]	0.17
Focal lordosis angle	2.34, 95% CI [-1.77, 6.45]	-0.01, 95% CI [-9.25, 9.27]	0.31
Anterior disc height	2.41, 95% CI [2.22, 2.60]	2.80, 95% CI [2.25, 3.35]	0.08
Posterior disc height	2.17, 95% CI [1.97, 2.37]	2.74, 95% CI [2.21, 3.27]	0.03

Fig. 4

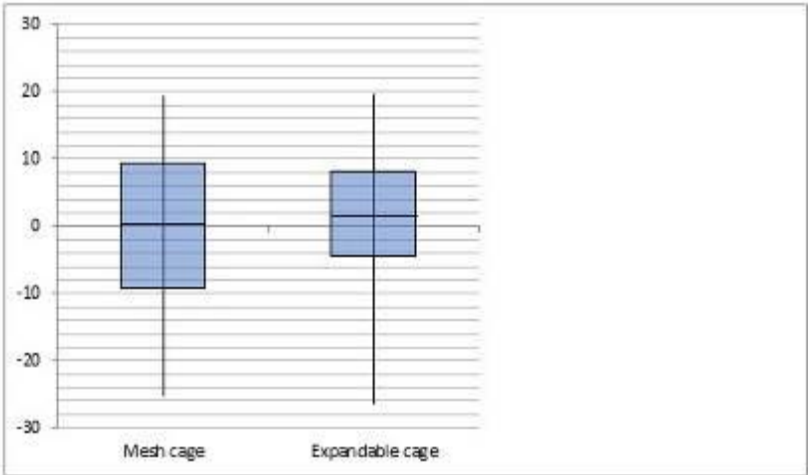


Figure 1: Box and whisker plot of change in C2-C7 lordotic angles ((immediate post-op) – (pre-op)) for both groups

Fig. 5

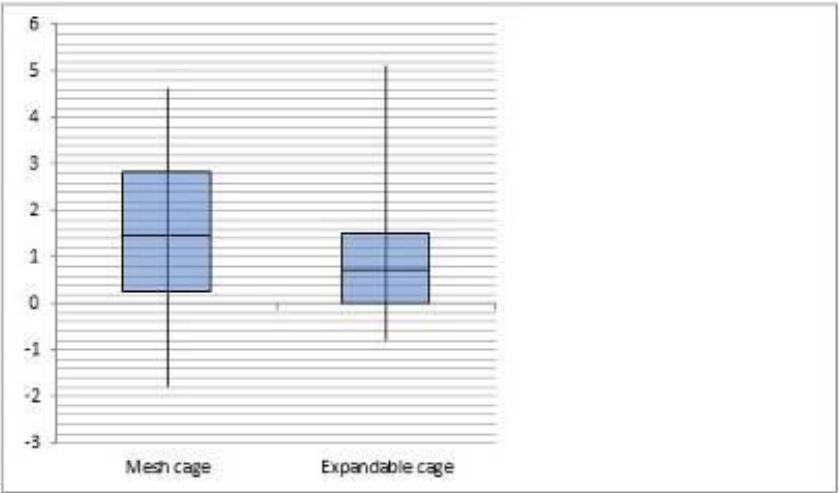


Figure 2: Box and whisker plot of change in SVA ((immediate post-op) – (pre-op)) for both groups

Fig. 6

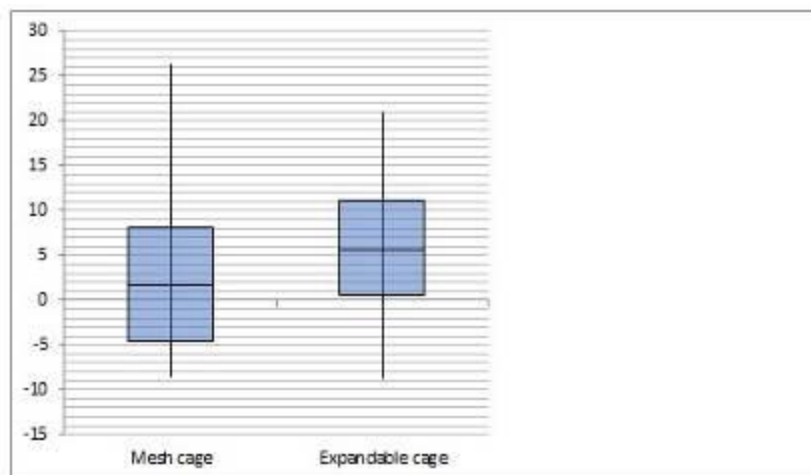


Figure 3: Box and whisker plot of change in Focal Lordosis ((immediate post-op) – (pre-op)) for both groups