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Introduction

Rates of revision for cervical spine surgery vary across the literature, ranging between 1.2% and 7.9% after 30 days¹⁻⁶, and a multitude of factors influence the rate of reoperation, including, but not limited to, surgical approach, number of vertebral levels involved, type of surgery, pathology, and patient characteristics, such as age, smoking status and comorbidities^{1,7-11}.

This study reviews long-term revisions of cervical spine surgery in a tertiary centre across a ten-year period, focusing on reasons for revision, and the surgical approach, timing, and pathology of the primary surgeries that necessitated a return to theatre.

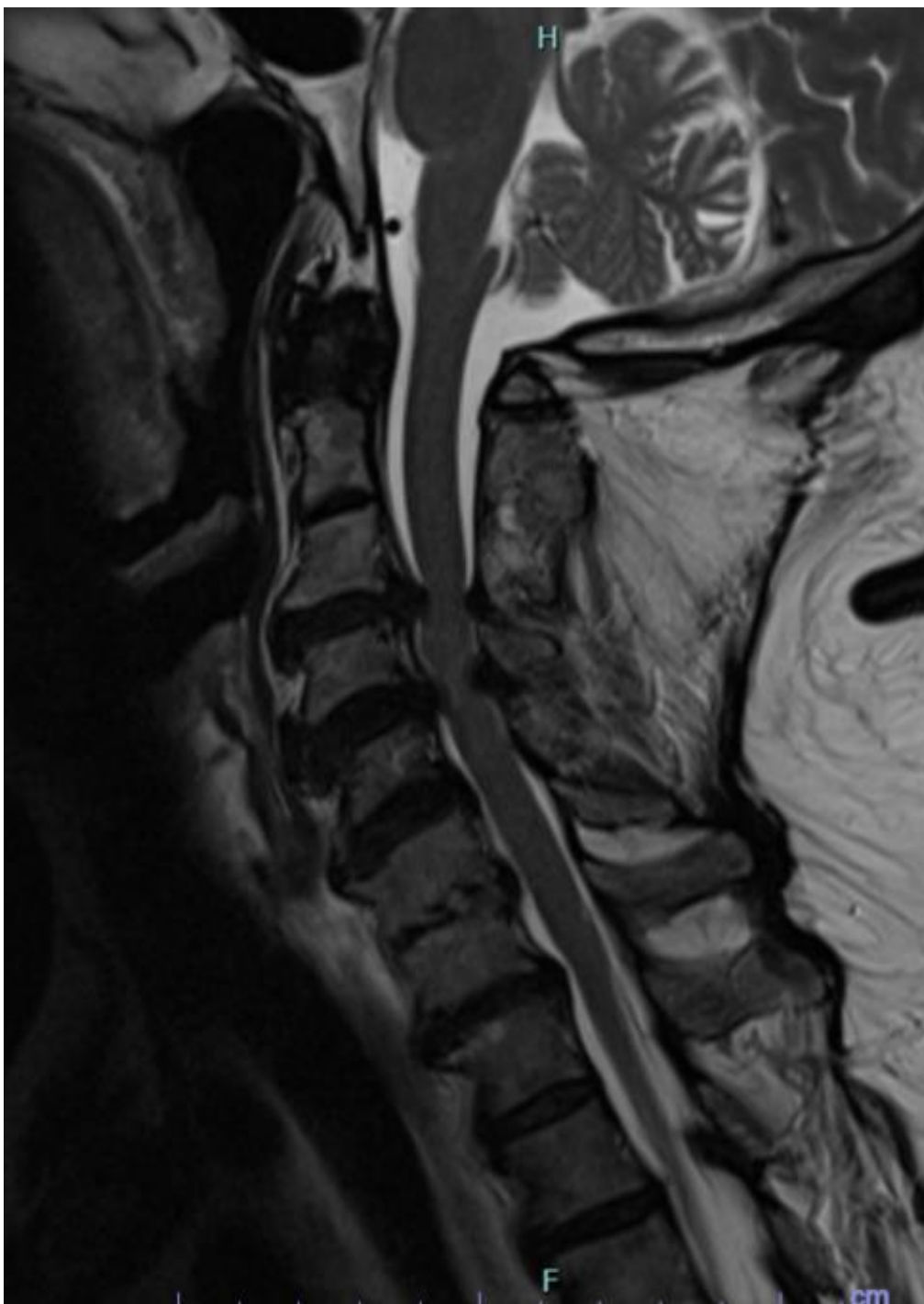


Figure 1. C3/4 and C4/5 spinal canal narrowing requiring decompression

Aims

- To review cervical spine surgeries that took place in our hospital over a ten-year period, including surgical approach, timing of surgery from symptom onset, and underlying pathology.
- To identify and compare unplanned revision rates for cervical spine surgery in our hospital.
- To identify factors that may be associated with an increased rate of revision in cervical spine surgery.

Method

- The Bluesprier database was used to gather a complete list of adult patients who underwent cervical spine surgery in our hospital between 2013 and 2023.
- Patients that underwent a primary surgical procedure to the cervical spine during the study period were included. Revisions of these operations that took place within the study period were identified.
- Various clinical databases were then used to access clinical notes to gather supplementary information on these patients.
- Revision operations were analysed to investigate reasons for reoperation, factors that led to revision, and the time interval between primary and revision surgery.
- Data analysis was performed using IBM SPSS Software Version 29.

Results

A total of 1063 patients aged between 18 and 94 underwent a primary cervical spine surgery, of which 71 (6.7%) had at least one unplanned return to theatre during the study period. 76 (7.1%) patients also underwent surgery to the thoracic, lumbar or sacral spine during the same time period.

900 (84.7%) patients had a combined decompression and fusion of their cervical spine. 87 (8.2%) had a fusion alone, and 68 (6.4%) underwent a sole decompression. 775 (72.9%) patients had an anterior incision, 255 (24.0%) were approached posteriorly, and 23 (2.2%) patients had both anterior and posterior incisions. Approximately three quarters (809/1063, 76.1%) of surgeries were elective procedures, while the remaining quarter (254/1063, 23.9%) were emergencies. The common pathologies treated during the ten-year period were degenerative conditions. 222 (20.9%) of cases were a result of trauma.

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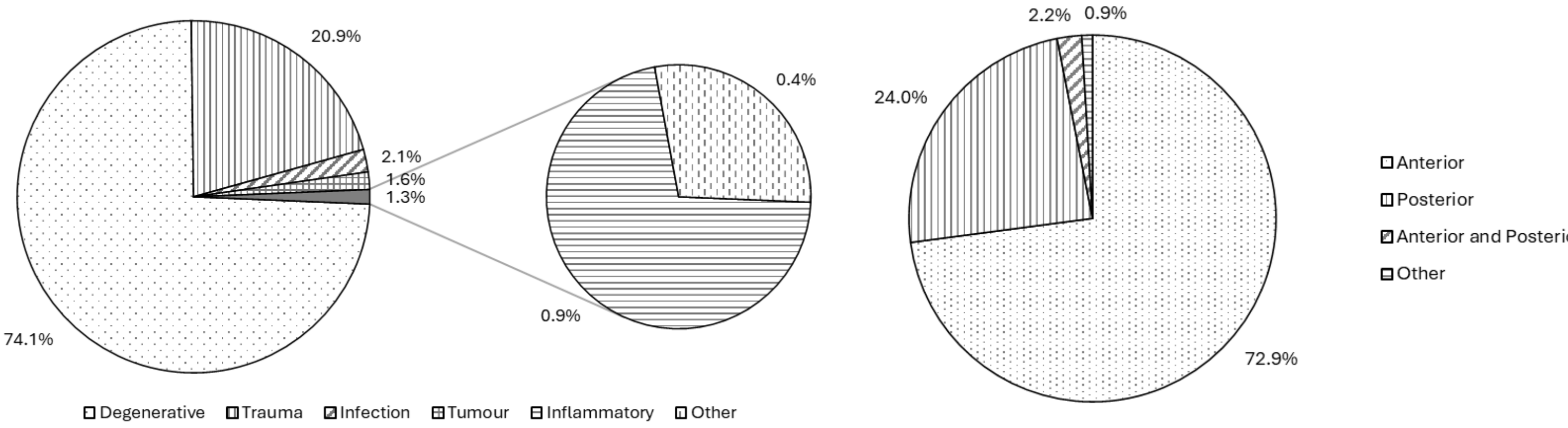


Figure 2. Pie chart representing the proportion of primary cervical spine operations undertaken for each categorised clinical indication.

Figure 3. Pie chart depicting the proportions of the patient cohort that underwent various surgical approaches during the study period.

Of the 84 total unplanned returns to theatre, 19 (22.6%) took place as a result of a wound problem, such as infection, dehiscence or cerebrospinal fluid leak. 17 (20.2%) revisions were due to a recurrence/progression of the original pathology (for example a recurrent disc prolapse or tumour recurrence). Persistent pain/neurology accounted for 16 (19.0%) reoperations. Other causes for revision included metalwork failure (10/84, 11.9%), development of new pain, neurological deficit or deformity (10/84, 11.9%), non-union/pseudarthrosis (7/84, 8.3%), adjacent segment disease (4/84, 4.8%), and repeated trauma (1/84, 1.2%).

23 (27.4%) revisions took place within 30 days (early) of the primary operation, 8 (9.5%) between 30 days and 3 months (delayed), and 53 (63.1%) revisions occurred more than 3 months later (late). 47 (66.2%) of the 71 patients who had unplanned returns to theatre were reoperated on within 2 years. Only 12.7% (9/71) returned to theatre after five years.

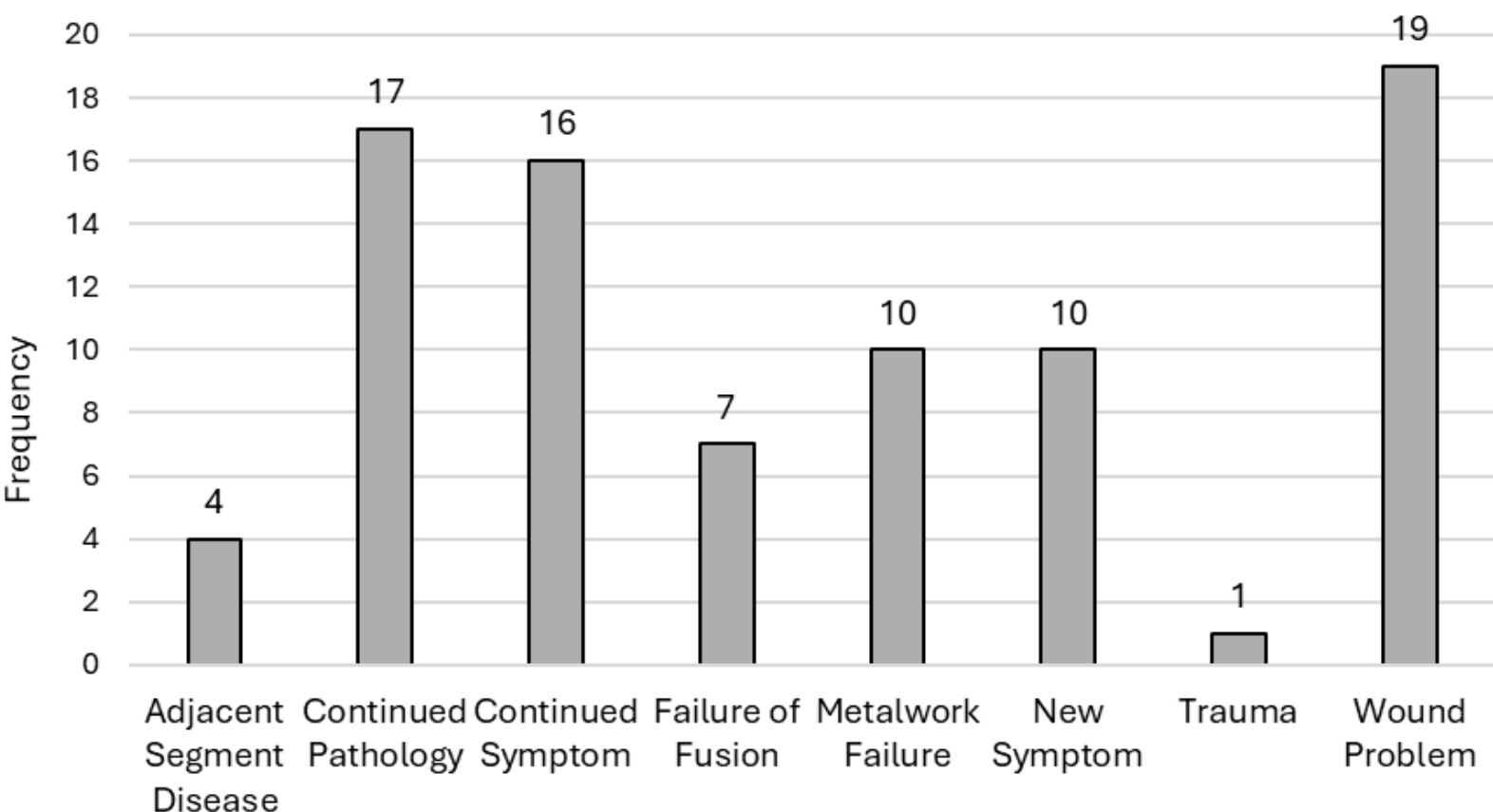


Figure 4. Bar chart representing the frequencies of reasons why patients had an unplanned return to theatre

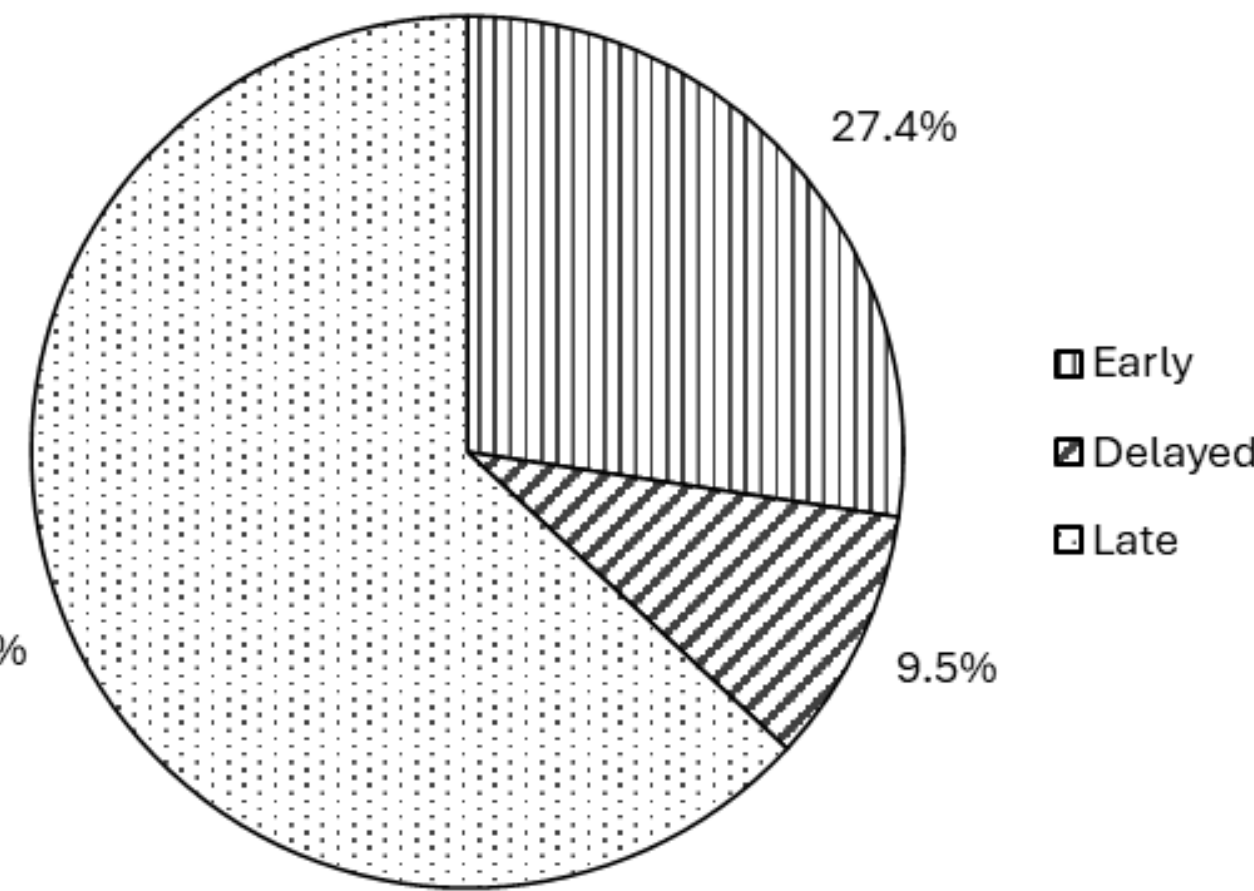


Figure 5. Portrays the proportions of revision surgeries that took place within each categorised time frame

6.1% of patients who originally received an anterior incision went on to require revision, compared to 9.4% of those that underwent posterior approach. None of the 23 patients who had a combined anterior and posterior approach had an unplanned return to theatre during the study period.

A higher proportion of patients who underwent an emergency procedure (7.9%) went on to require revision surgery compared to those that had an elective procedure (6.3%). 23.5% of patients whose primary pathology was a tumour (benign or malignant) proceeded to require revision. Other pathologies that had high rates of revision included inflammatory disorders (20%) and trauma cases (7.7%).

Conclusion

- The overall unplanned return to theatre rate in our hospital was 6.7%.
- 22.6% of revisions were due to a wound problem, the majority of which (73%) occurred following a posterior approach.
- Patients who required emergency surgery (7.9%) were more likely to return to theatre than those that had an elective procedure (6.3%).