INTRODUCTION: Chordomas are rare low to intermediate grade malignant neoplasms that arise from remnants of the embryonic notochord. Sacrectomy is the treatment of choice for sacral chordomas but is associated with high risk of disease recurrence and metastases. This study presents the results of the largest case series to date on the operative management of sacral chordomas and aims to identify prognostic factors associated with increased risk of disease recurrence, metastases and reduced survival.

METHODS: The results of 58 patients undergoing sacrectomy for sacral chordoma at our supra-regional orthopaedic oncologic unit were retrospectively reviewed. The series included 36 men and 22 women with a mean age of 63 years (range, 41-80) at time of surgery and the average overall follow-up time was 45.3 months. All tumors caudal to S2 vertebra underwent sacrectomy through a posterior approach and tumors at or cephalad to S2 vertebra underwent the combined anterior-posterior approach. Localized recurrence occurred in 32 patients (51.7%) and metastases developed in 19 patients (32.7%). Twenty-six patients (44.8%) died during the follow-up period.

RESULTS: The five-year survival and 10-year survival rates were 62% (95 CI [46% to 75%]) and 26% (95% CI [11% to 45%]) respectively. Wide resection margins were associated with significantly reduced risk of disease recurrence (P<0.01) and metastases (P<0.01) compared to marginal and intralesional resection margins. The log rank test also confirmed a significant difference in survival time by resection margin (P=0.04). Dedifferentiated chordomas showed a trend towards increased risk of disease recurrence (p=0.65) and metastases (p=0.48) compared to conventional chordomas but this did not reach statistical significance. Log rank test revealed no significant difference in survival based on tumor histology alone (P=0.12). Fisher’s exact test confirmed there was no significant association between sacroiliac joint invasion and incidence of local recurrence (P=0.27) or systemic metastases (P=0.56) but log rank test revealed there was a significant reduction in survival time with sacroiliac joint invasion (P<0.01). There was no difference between the combined anterior-posterior and posterior approach with respect to localized disease recurrence (P=0.15), metastases (P=0.21) or long-term survival (P=0.85). The size of the primary tumor did not impact the risk of local disease recurrence (P=0.13). However, tumors greater than 8cm in diameter had increased risk of systemic metastases (p<0.01) and reduced survival compared to tumors less than 8cm in diameter (HR=1.11, 95%CI: 1.01 to 1.23, P=0.04). Site of primary tumor did not impact incidence of local recurrence (P=0.11), new systemic metastases (P=0.12) or overall survival on log-rank test (P=0.55). The use of adjuvant radiotherapy was associated with a
significantly increased risk of localized disease recurrence (p<0.01) but did not impact risk of metastatic disease (p=0.09) or survival compared to surgery alone (p=0.32).

CONCLUSION: Increasing tumor size, sacroiliac joint infiltration and inadequate surgical margins are associated with increased risk of disease recurrence and reduced survival. We recommend stringent lifelong follow up of patients with any of the aforementioned prognostic factors at a specialized center to allow early detection and appropriate treatment of recurrent disease.