Does timing of revision total hip arthroplasty prior to or after lumbar spine fusion have an effect on dislocation and revision rates?

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INTRODUCTION: Total hip arthroplasty (THA) is a commonly performed orthopaedic procedure that will only continue to increase in prevalence due to an ageing population, with an estimated 2.5 million THAs being performed by 2030. Previous studies demonstrated that patients undergoing primary THA following lumbar spine fusion have an increased incidence of dislocation compared to those without prior lumbar fusion. A recent study with small sample size suggested that primary THA with prior lumbar fusion may be associated with inferior outcomes. However, there is a paucity of data determining if timing of revision THA prior to or after lumbar fusion has an effect on clinical outcomes. The aim of this study is to determine if timing of revision THA prior to or after lumbar fusion would have an effect on dislocation and re-revision rates.

METHODS: A retrospective review was performed on 651 consecutive patients who underwent hip revision surgery. Patient demographics as well as clinical information including readmission, dislocation and re-revision rates were evaluated alongside surgical parameters associated with lumbar fusion. A multivariate Cox regression was used to compare the risk of dislocation and re-revision between the group with prior lumbar fusion and the group with lumbar fusion within 2 years post revision THA.

RESULTS: The cohort involved 651 patients: 367 patients with lumbar spinal fusion prior to revision THA and 284 patients with lumbar spinal fusion within 2 years post revision THA. When compared to patients with prior lumbar spinal fusion, patients with lumbar spinal fusion following THA were more likely to be male ($p=0.04$), younger than 70 years of age ($p=0.01$) with an ASA score of less than 2 ($p=0.01$; Table 1). Patients with prior lumbar spinal fusion demonstrated a significantly increased risk of dislocation ($p<0.01$) as well as a 2.5-fold increase in re-revision rates. There was no significant difference in dislocation and re-revision rates for patients with lumbar spinal fusion within 1 year following surgery and those that underwent lumbar spinal fusion within 2 years following revision THA.

DISCUSSION: The results of this study demonstrate that lumbar spinal fusion prior to revision THA is associated with inferior outcomes with regards to dislocation and re-revision rates. This finding is similar to studies investigating lumbar spinal fusion prior to primary THA, with the similarity of these findings being potentially linked to alterations in spinopelvic kinematics following lumbar fusion prior to hip replacement surgery. As this study did not find any significant difference in outcomes for patients treated with lumbar spinal fusion at 1 or 2 years following THA, the timing of lumbar spinal fusion post revision THA has less of an impact on patient outcomes.

SIGNIFICANCE/CLINICAL RELEVANCE: This study identifies that lumbar spinal fusion prior to revision THA is associated with inferior outcomes, when compared to lumbar spinal fusion following revision THA. As lumbar spinal fusion at 1 or 2 years following THA was not associated with inferior patient outcomes, the timing of lumbar spinal fusion post revision THA has less of an impact on patient outcomes.

Table 1: Comparison of patient demographics and clinical outcomes between both study cohorts.

Risk factor	Lumbar spinal fusion prior to revision THA (N=367)	Lumbar spinal fusion following revision THA (N=284)	p-value
Age	69.8 ± 12.4	70.4.6 ± 13.1	0.69
Gender	191 males; 176 Females	155 Males; 129 Females	0.53
ASA score	2.4 ± 0.5	2.3 ± 0.6	0.53
Smoking	128	94	0.19
Drinking	77	63	0.11
Renal failure	12	10	0.66
Depression	38	36	0.08
Diabetes	56	41	0.58
Cardiovascular disease	184	128	0.41
Dislocation (%)	27	23	**0.07**
Prosthetic joint infection (%)	24	28	0.51
Fracture (%)	11	9	0.19
Loosening (%)	29	32	0.21