Case Report: Simultaneous Endovascular Repair of a Thoracic Aortic Injury during Posterior Pedicle Screw Removal

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Introduction

•Posterior spinal stabilisation is technically demanding and increasing in popularity
•Accuracy of screw placement improves with intra-operative imaging
•Vascular injuries are rare but have potentially fatal complications
•Discovery of vascular injury is often incidental on post-op imaging or after prolonged symptoms (Back pain and anaemia)

Our Case

We report a case of a rare vascular complication following pedicle screw misplacement for posterior spinal stabilisation
As well as...
A novel endovascular method of simultaneous screw removal and endovascular stent deployment with the patient on their side

Case History

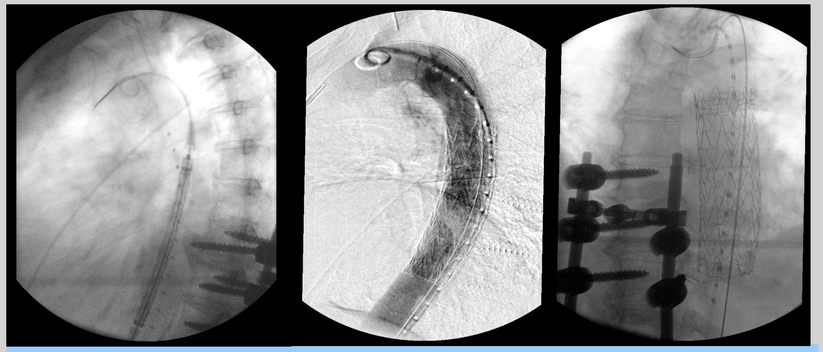
•72yr old lady with a 5 week history of lower back pain after a mechanical injury
•Increasing pain and reduced mobility for 2 weeks
•MRI spine revealed **acute discitis** affecting T11-T12

•*Staphylococcus aureus* grown on blood culture –> IV antibiotics commenced
•Proceeded to have posterior spinal stabilisation of T8-L3 vertebrae under fluoroscopic guidance

Endovascular Intervention

Simultaneous screw removal and stent deployment

•GORE® C TAG® thoracic stent (31 x 100mm) placed in position but not deployed
•Patient rotated into lateral decubitus position
•Thoracic stent deployed simultaneously as the orthopaedic team removed the misplaced screw
•Three-planar aortography performed showed successful endograft placement with no leak



Thoracic endograft in position prior to deployment and removal of the misplaced screw.

Thoracic endograft after deployment - no contrast extravasation

Remaining spinal stabilisation device and thoracic stent graft

Discussion

•Aortic injury following misplaced pedicle screws is rare -> *Incidence unknown*
•Majority are asymptomatic and diagnosed incidentally
Chronic irritation of the aorta -> aortic tears, aortic dissection and pseudo-aneurysm
•Rare reports of immediate vascular compromise peri-operatively

Open Thoracotomy	Endovascular Repair
Major operation	Minimally invasive
Aorta cross-clamped	Cross clamping and associated morbidity not required
High morbidity and mortality	Lower morbidity and mortality rates
	Requires endovascular training

Timing of Endovascular stent placement

Stent placed after partial removal of screws
- Risk of aortic tear or dissection when screw removed
- No stent in place to prevent potential haemorrhage

Stent deployment over the misplaced screw prior to removal
- Risk of damage to the stent when the metal screw is removed
- Screw or damaged stent may cause an aortic tear
- Reduced efficacy of a damaged or dislodged aortic stent

Stent deployed simultaneously as misplaced screw is withdrawn
- Stent in place while screw is removed in case of aortic tear or dissection
- Risks of moving the patient with stent in-situ – bleeding, loss of access, damage to access vessels, wire misplacement

Summary

•Spinal stabilisation using pedicle screws is increasing in popularity
•Associated risks are becoming more common

Simultaneous stent deployment and misplaced screw removal has been shown to be a safe and effective method of preventing further aortic damage in these cases.

References: Akinrinlola. A and Brinster. D.R, Endovascular Treatment of a Malpositioned Screw in the Thoracic Aorta After Anterior Spinal Instrumentation: The Screwed Aorta. Vascular and Endovascular Surgery, 2013; 47 (7); 555-557, Wegener. B, Birkenmaier. C, Fottner. A, Jansson. V, Duur. H.R. Delayed perforation of the aorta by a thoracic pedicle screw, Eur Spine J, 2008; 17 (Suppl 2); S351-S354, Kopp. R, Beisse. R, Weidenhagen. R, Piltz. S, Hauck. S, Becker. C, Pieske. O, Bühren. V, Jauch. K, Lauterjung. L. Strategies for Prevention and Operative Treatment of Aortic Lesions Related to Spinal Interventions, Spine 2007, 32:E753–E760