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TITLE

Combined embolotherapy and percutaneous image guided alcohol ablation for aggressive vertebral hemangioma: Preliminary experience in two patients

Registration number: 343

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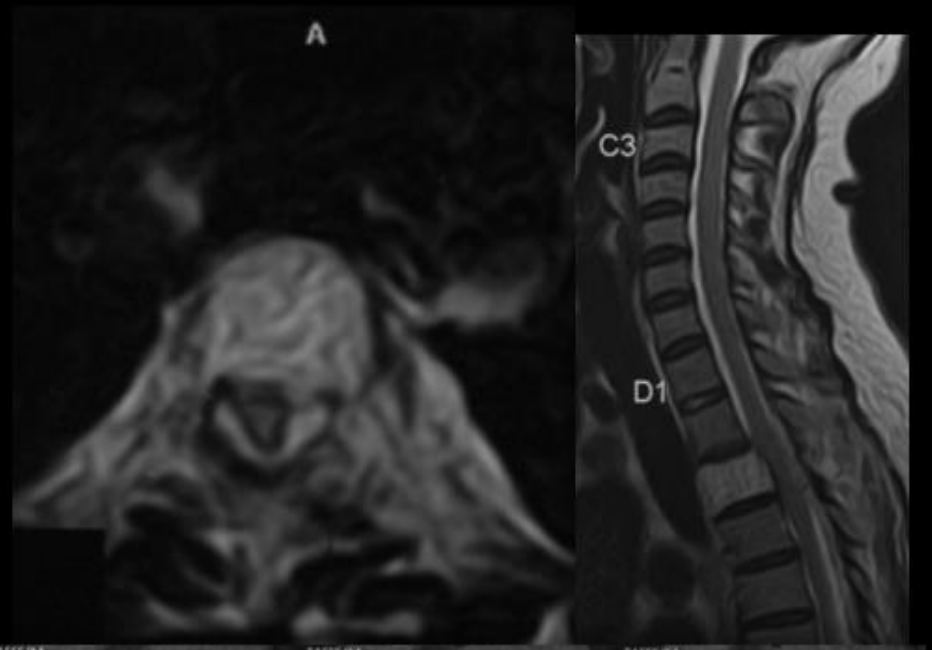
Background and AIM

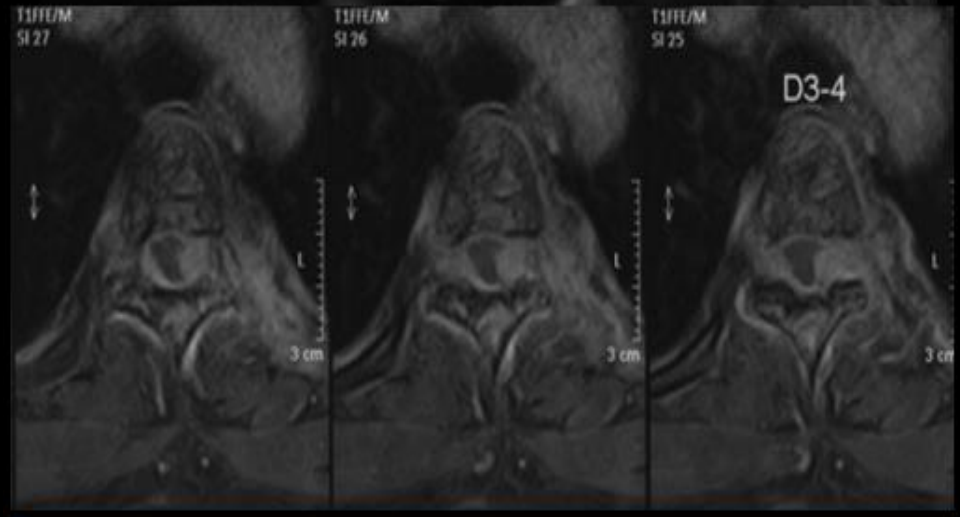
- Aggressive vertebral haemangioma is a rare form of vertebral haemangiomata usually present with significant vertebral expansion, extra-osseous component with epidural extension causing spinal cord and/or nerve root compression.
- Can occur at any age, with peak prevalence in young adults.
- They represent approximately 1% of spinal haemangiomas and are usually symptomatic.
- 75% of these lesions occur in the thoracic spine between T3 and T9 vertebral segments.

- Treatment for aggressive hemangioma causing neurological deficit is multidisciplinary including surgery, embolization, percutaneous ablation and radiotherapy with each having its own limitations.
- Surgery is useful if lesion is causing acute significant neurological deficit.
- Angioembolization and percutaneous alcohol ablation are minimally invasive method for treatment.
- Radiotherapy is mainly useful for painful lesions.

The aim of this study is to delineate the utility of combined embolotherapy and percutaneous image guided alcohol ablation for aggressive vertebral hemangiomas.

Case 1- 32 Y/F presented with bilateral lower limb paraesthesia and weakness since 1 month. Right LL power-3/5; Left lower limb power-4/5.





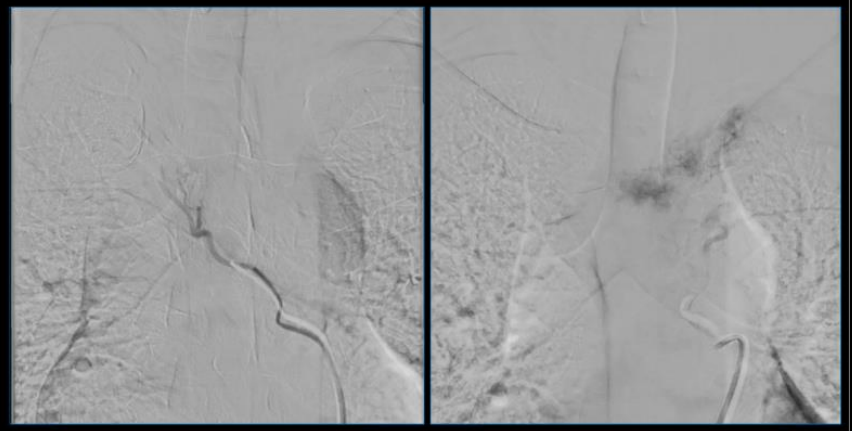
Aggressive D3 vertebral haemangioma involving body , both pedicle & lamina with extra-osseous soft tissue component in extradural –spinal canal space causing spinal cord compression (Bony trabeculations are maintained)

Planned for transarterial embolisation of vertebral hemnagioma

Right D3 intercostal artery injection | Left D3 intercostal artery injection | Left Thyrocervical trunk injection

Diagnostic contrast run showing tumoral blush involving D3 vertebral body

Selective Angioembolisation Of Feeding Arteries With PVA Particles

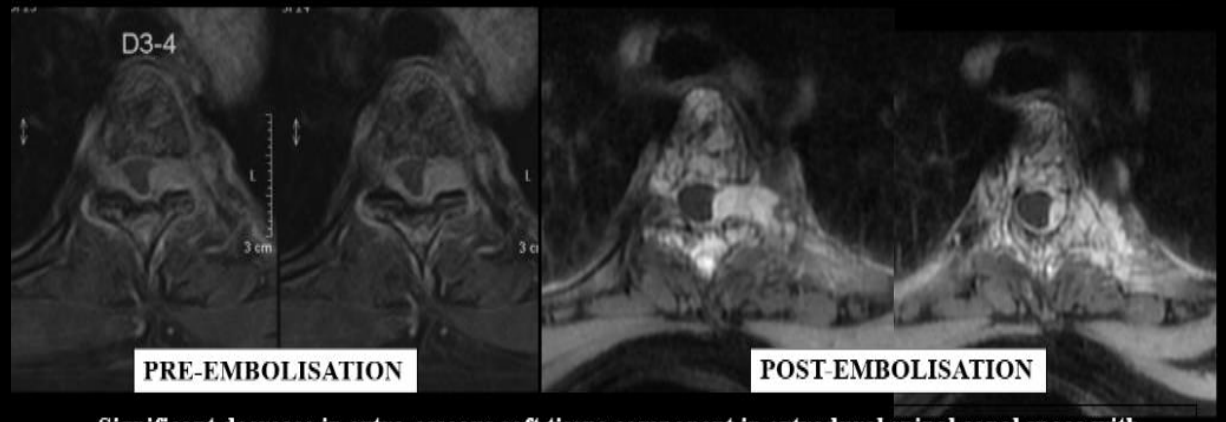


Right D3 Intercostal Artery Injection | Right D3 Intercostal Artery Injection

Post-embolisation contrast run showing reduction in tumoral blush

Post Angioembolisation Course

	Pre-embolization Power	Post- embolization Power
Right Lower Limb	4/5	5/5
Left Lower Limb	3/5	4/5



Significant decrease in extra-osseous soft tissue component in extradural spinal canal space with decrease in spinal cord compression

CT Guided Percutaneous Intralesional Alcohol Injection

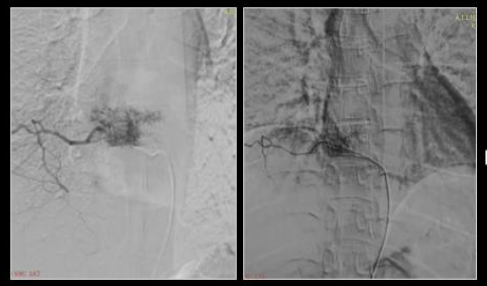
Final Clinical Outcome

PRE-EMBOLISATION-Not able to move limbs against force or gravity

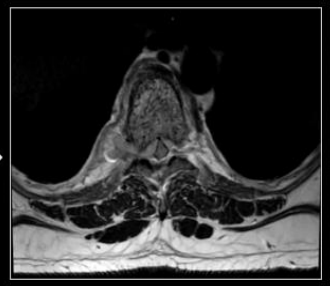
POST-EMBOLISATION

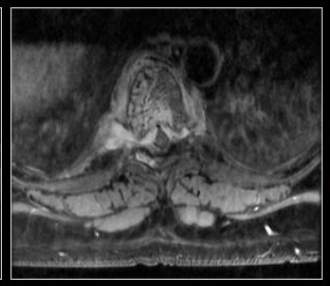
POST-ABLATION

Case 2- 32 Y/M presented with bilateral lower limb weakness and gait abnormality. Right LL power-3/5; Left lower limb power-4/5.



Transcatheter embolization done using PVA particles.



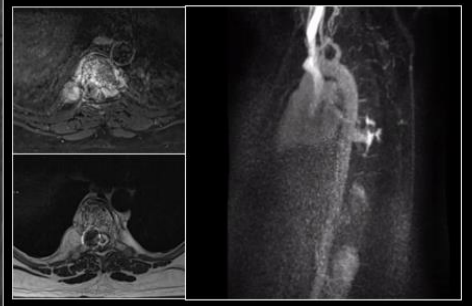


- Clinical improvement - Power Lt-5/5; Rt-4/5
- Follow up MRI 4 weeks later – residual epidural soft tissue (R>L)

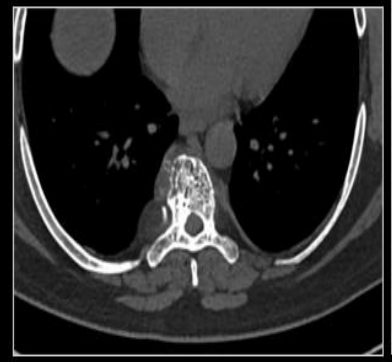
- CT guided percutaneous Alcohol (5ml) injection planned using18 gauze biopsy needle
- While removing the needle stuck with in vertebra and finally broken

RECURRENCE

- Presented with history of recent onset B/L lower limb weakness since last 15 days.
- MRI DL spine showed D7 vertebral haemangioma with paravertebral soft tissue.

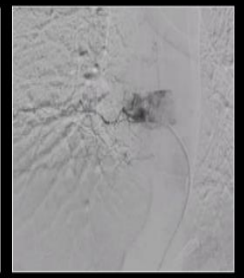


Screening CT of the dorso-lumbar spine



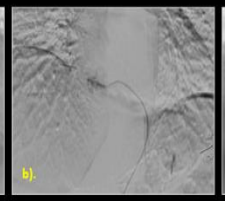
Mild antalgic limping gait pre procedure

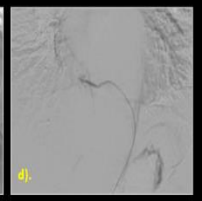
Patient was admitted and planned for angioembolization of feeders of vertebral haemangioma and subsequent alcohol ablation



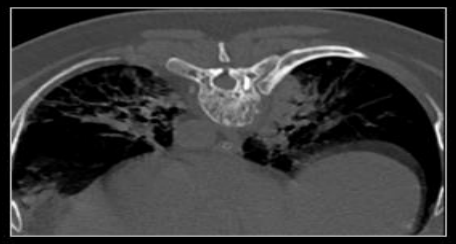
Localizing the intercostal artery level of interest

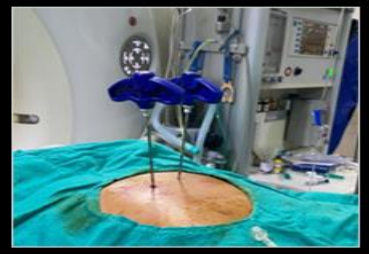
Selective right and left D7 intercostal artery angiograms showing intense tumoral blush of the vertebral hemangioma





a). Microcoil deployment in intercostal artery, distal to feeding artery origin; b). Post coiling no forward flow into artery; c). Microcatheter selective cannulation of feeding artery followed by Embospheres particle embolization (300-500 microns); d). Post embolization angiogram showing near total reduction of tumoral blush





Under Ct guidance, two 13 G osteocyte bone biopsy co-axial needles were tracked upto the D7 level vertebral body haemangioma through bilateral trans-pedicular route.

- After confirmation of backflow of blood, around 5 ml of contrast (50 % dilution) each were injected
- Imaging showed contrast uptake within the haemangioma with no obvious filling of adjacent vascular structures

- Further, ~ 2.5 ml of absolute alcohol was injected slowly over 5 minutes through the right needle and 2 ml injected through the left needle with constant vitals monitoring.
- No intra-procedural complication documented.
- Patient was extubated in the CT table and shifted to the ward after stabilization.

- Post procedural VAS reduced to 3 (baseline 7/10)
- No obvious gait abnormality; patient discharged
- FOLLOW UP IN OPD (December 2022): Patient has significant improvement in pain and betterment of walking and gait

Conclusion:

Combining trans-arterial angio-embolization with percutaneous intralesional alcohol ablation can provide long-term results comparable to surgery or single modality embolization.

Demographics	Presenting Complaint	Pre Embolization	Post Embolization	Post Ablation	Follow-up
1. 32 Year/Female	Lower limb paresthesia and weakness	Right lower limb-3/5 Left lower limb-4/5	Right lower limb-5/5 Left lower limb-4/5	Able to lift lower limbs against gravity	Doing clinically well
2. 32 Year/Male	Lower limb paresthesia and weakness	Right lower limb-3/5 Left lower limb-4/5	Right lower limb-4/5 Left lower limb-5/5	VAS reduced to 3 (Baseline-7/10)	Doing clinically well

References

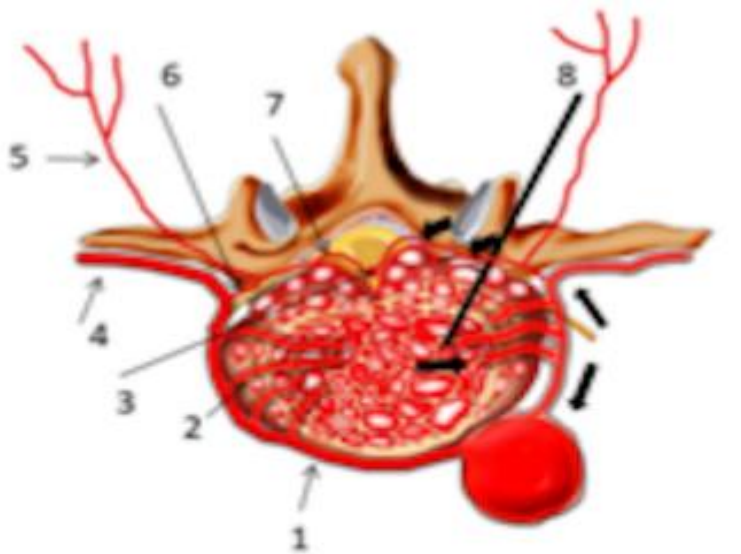


Fig. 1 **a** Schematic diagram showing retrograde reflux (thick arrows) during CT-guided direct alcohol injection into the vertebral hemangioma (1), intercostal artery (2), anterior vertebral branches (3), anterior spinal artery (4), anterior intercostal artery (5), muscular branches (6), dorsal spinal artery (7), radiculo-medullary artery (8), needle positioned in the hemangioma for alcohol injection

*Srinivasan, G. *et al.* (2021) "Utility of spinal angiography and arterial embolization in patients undergoing CT guided alcohol injection of aggressive vertebral hemangiomas," *Neuroradiology*, 63(11), pp. 1935–1945. Available at: https://doi.org/10.1007/s00234-021-02788-7.

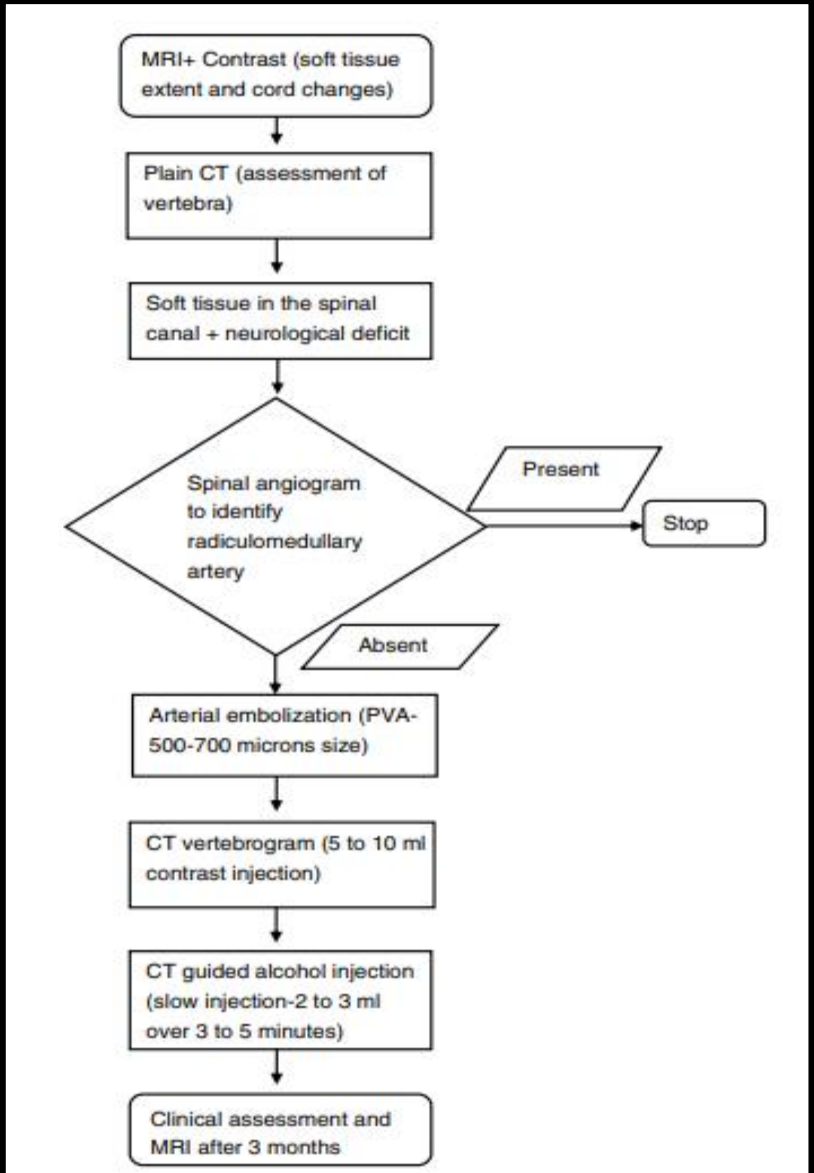
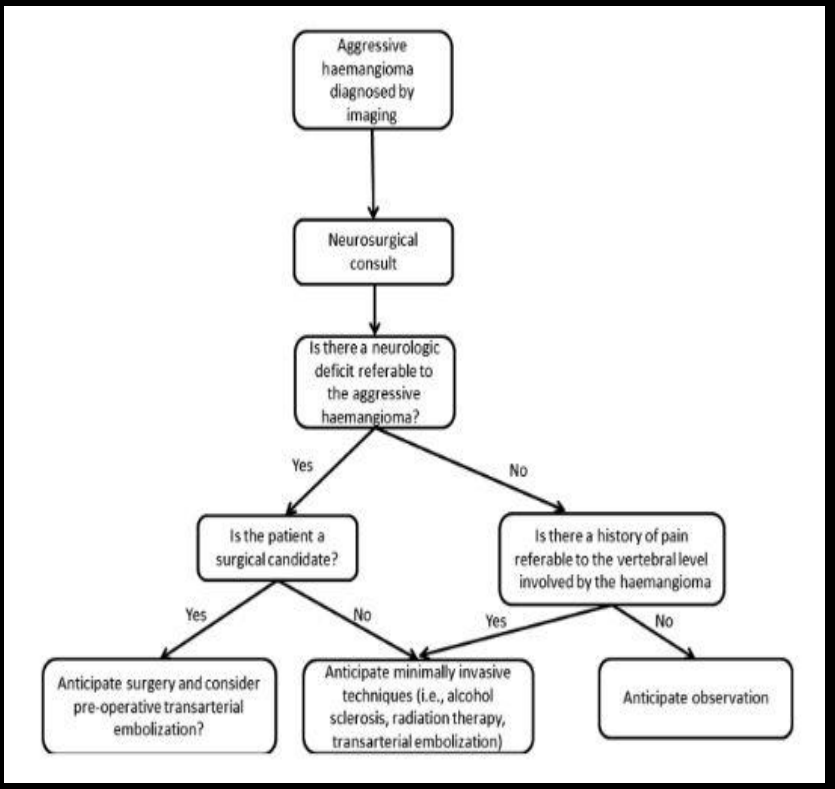


Fig. 6 Algorithm for interventional radiology management of a patient with suspected aggressive vertebral hemangioma



*Cloran, F.J. *et al.* (2015) "Aggressive spinal haemangiomas: Imaging correlates to clinical presentation with analysis of treatment algorithm and clinical outcomes," *The British Journal of Radiology*, 88(1055), p. 20140771. Available at: https://doi.org/10.1259/bjr.20140771.