

Infectious Pseudoaneurysm Following Carotid Endarterectomy with Bovine Patch Angioplasty – a Case Report

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Disclosures

- None



Introduction

- Pseudoaneurysm (PSA) formation following carotid endarterectomy (CEA)

Rare complication (< 1%)

- Diagnosis and management

Under-reported true incidence

Undefined natural history

No current consensus on treatment algorithm



History of Present Illness (HPI)

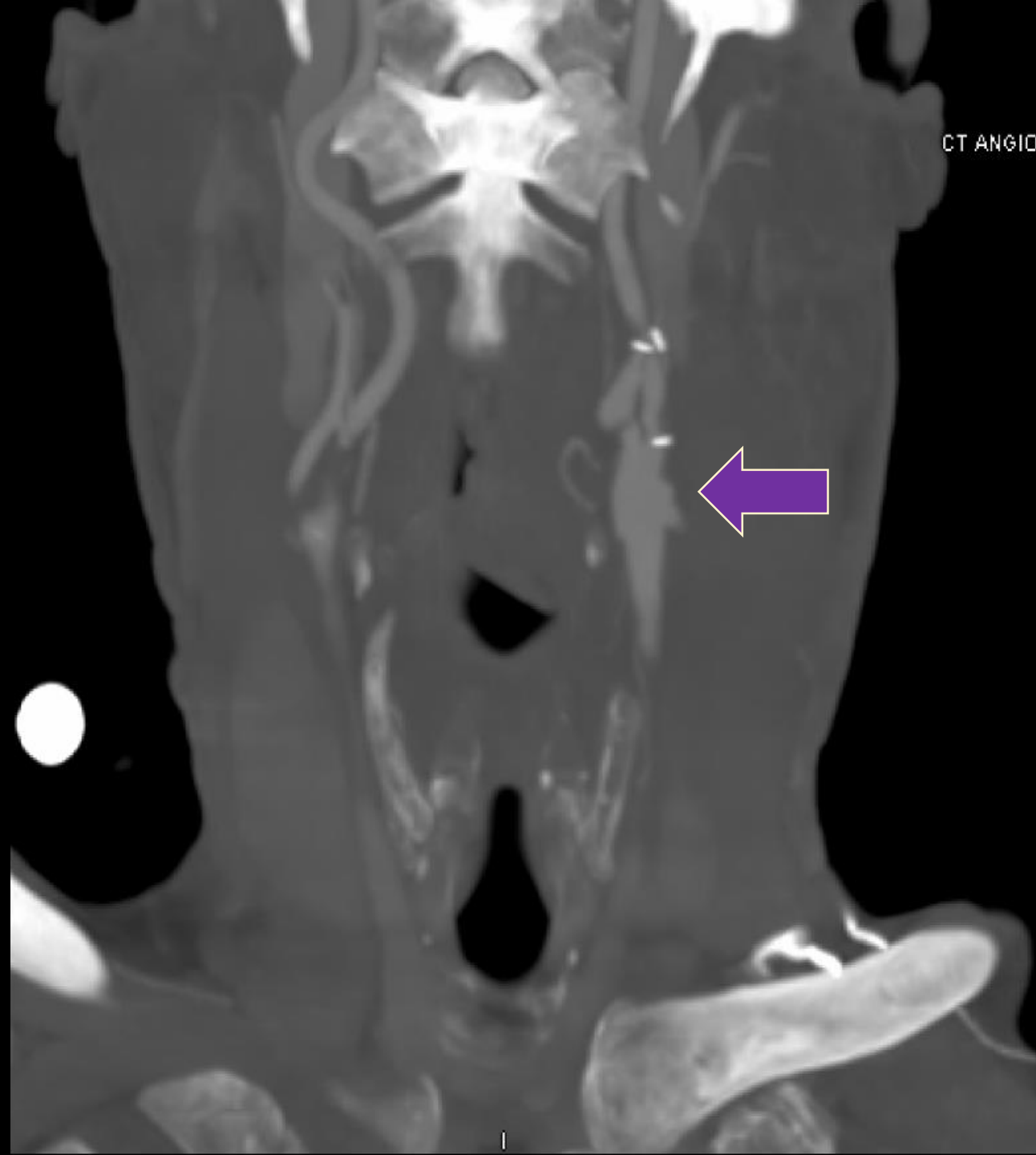
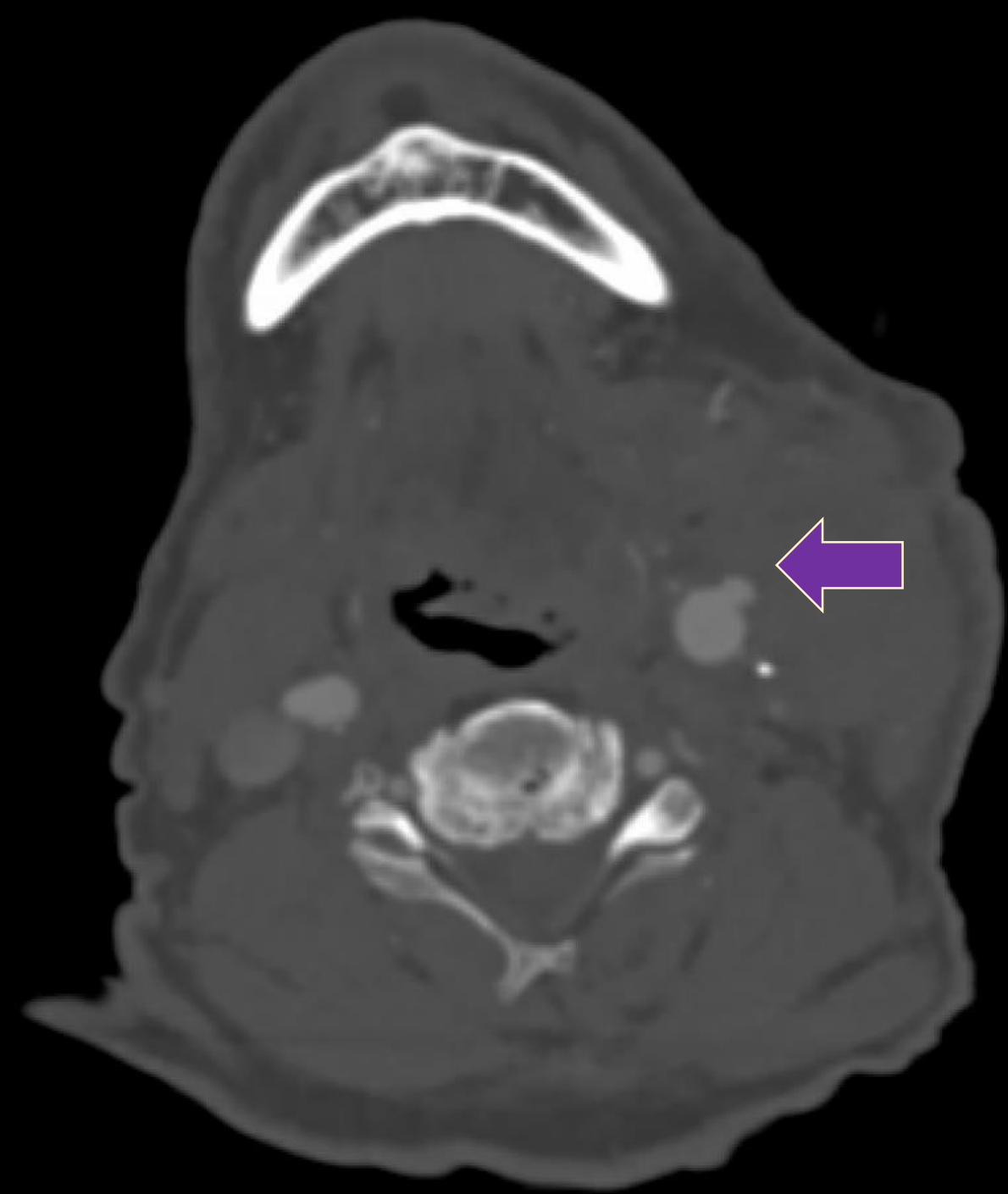
- 75-year-old male s/p left CEA with bovine patch angioplasty
- Post operative course
 - POD 1 – discharge
 - POD 2 – return for hematoma evacuation, patch revision
- 6 weeks later
 - Purulent incisional drainage with in-office incision and drainage
 - ER with progressively worsening left-sided neck pain and swelling x 2 days



HPI on transfer to TGH

- Medical history: HTN, HLD, PAD
- Surgical history: femoral-femoral artery bypass, left CEA
- Vital signs:
 - Afebrile, all within normal limits
- Physical Exam
 - Left neck swelling and tenderness
 - Left-sided tongue deviation (hypoglossal injury?)





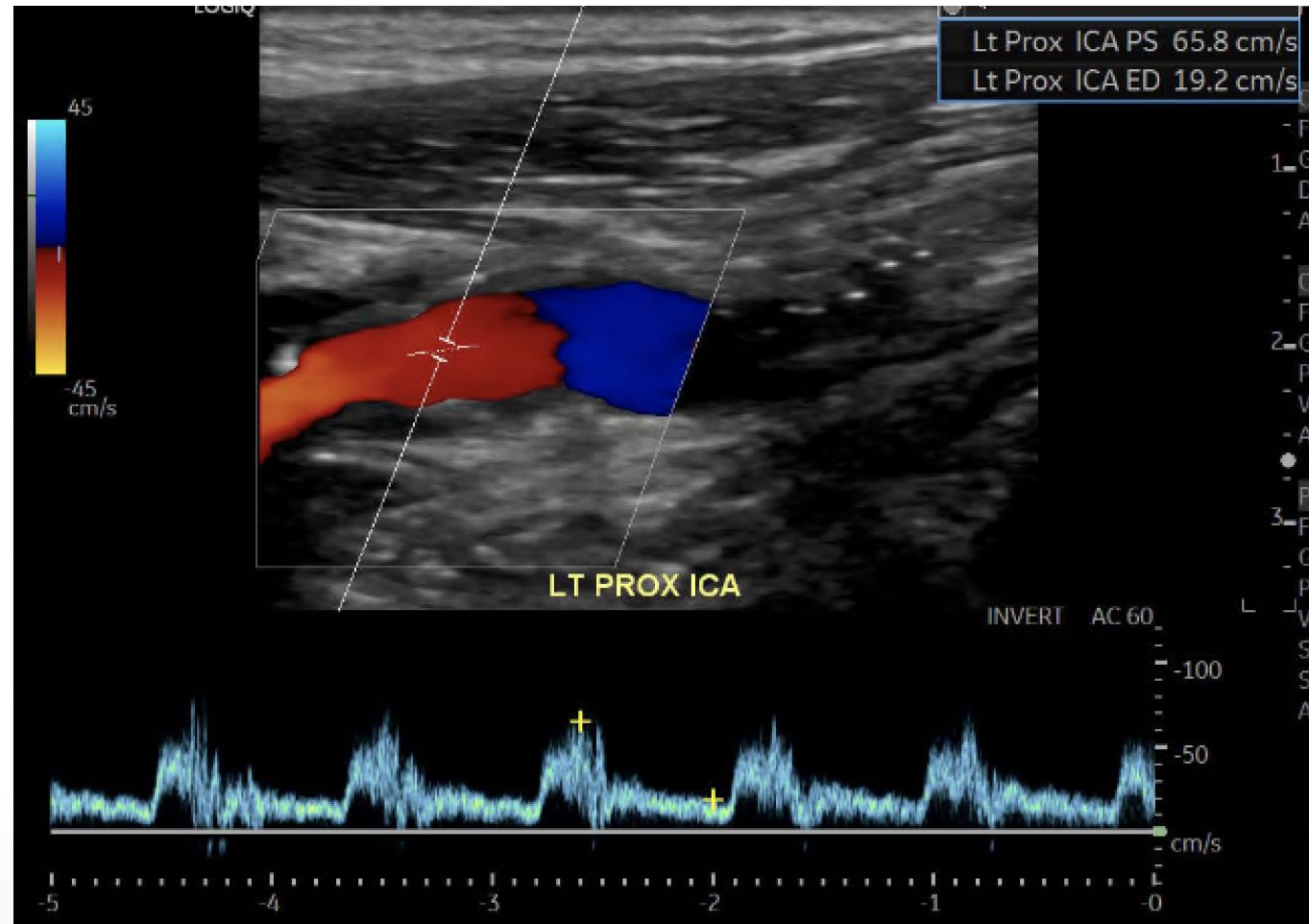
Hospital Course

- Preoperative
 - Blood cultures
 - Empiric vancomycin and piperacillin-tazobactam
- Operative exploration
 - Carotid PSA resection, saphenous vein angioplasty, wound cultures
 - Intraoperative findings: hematoma, complete dehiscence of patch, devitalized tissue
- Postoperative
 - Wound/blood cultures positive for *Streptococcus intermedius*
 - Discharged POD 6 with PICC for 6 additional weeks of ceftriaxone



Follow up

- 2-week wound check
- 3-month visit with surveillance duplex
- 6-month visit with surveillance duplex pending



Discussion

- Background

Rare

Mortality and permanent stroke morbidity rates up to 29%

Can lead to embolization, thrombosis, mass effect on airway and cranial nerves. Rupture in approximately 10%

40-60% due to infection

Early infection – *Streptococcus* and *Staphylococcus*

Late infection – skin commensals (*Staphylococcus epidermidis*)



Discussion

- Diagnosis

Average: 6 to 15 months from index operation

Symptoms: neck swelling, PSA, sinus tract. Systemic symptoms rare

Linked with hematoma, wound complications, cervical drains, poor dental hygiene, chronic immunosuppressants, smoking, diabetes



Discussion

- Treatment

ICU, antibiotics, emergent repair

Difficult due to re-operative field and inflammatory process

Gold standard: open repair with patch/interposition

- Conduit = saphenous vein, femoral vein, SFA, prosthetic

Carotid-carotid bypass

Carotid ligation

Endovascular

Antibiotics for 2-6 weeks after repair



Conclusion

- PSA due to infected carotid endarterectomy patch is a well-known though rare and under-reported complication of CEA
- Due to paucity of literature it is important that institutions publish their experiences with this rare complication



References

1. Donas, K., Schulte, S., Pitoulias, G., Siebertz, S., Horsche, S. "Surgical outcome of degenerative versus postreconstructive extracranial carotid artery aneurysms." *Journal of Vascular Surgery*. 2009. 49 (1), 93-98. doi: 10.1016/j.jvs.2008.08.006
2. Knight, B., Tait, W., "Dacron Patch Infection Following Carotid Endarterectomy: A Systematic Review of the Literature." *European Journal of Vascular and Endovascular Surgery*. 2009. (37) 140-148. Doi:10.1016/j.ejvs.2008.10.016
3. Stone, P., Srivastava, M., Campbell, J., Mousa, A., Hass, S., Kazmi, H., Dearing, D., AbuRahma, A. "A 10-year experience of infection following carotid endarterectomy with patch angioplasty." *Journal of Vascular Surgery*. 2011. 53 (6) 1473-1477. Doi: 10.1016/j.jvs.2011.02.020.
4. Fatima, J. et al. "Management of patch infections after carotid endarterectomy and utility of femoral vein interposition bypass graft." *Journal of Vascular Surgery*. 2018. 69 (6) 1815-1823.
5. Ascuitto, G., Geier, B., Marpe, B., Hummel, T., Mumme, A., "Dacron Patch Infection After Carotid Angioplasty: A Report of 6 Cases." *European Journal of Vascular and Endovascular Surgery*. 2007. 33 (1), 55-57. doi:10.1016/j.ejvs.2006.07.017
6. Varetto, Gianfranco, et al. "Carotid Pseudoaneurysm after Eversion Endarterectomy: A Case Report and Review of the Literature." *Vascular and Endovascular Surgery*, vol. 52, no. 4, 2018, pp. 309–312., <https://doi.org/10.1177/1538574418761981>.
7. Naughton, P., Garcia-Toca, M., Rodriguez, H., Pearce, W., Eskandari, M., Morasch, M. "Carotid artery reconstruction for infected carotid patches." *European Journal of Vascular and Endovascular Surgery*. 2010. 40: 492-498. Doi:10.1016/j.ejvs.2010.07.005
8. Lopes, A., Gomes, M., Sobrinho, G., Pedro, L. "Surgical Treatment of Post-Carotid Endarterectomy Carotid Pseudoaneurysm." *European Society of Vascular Surgery*. 2020; 46: 12-13. doi:<https://doi.org/10.1016/j.ejvssr.2019.06.002>
9. Naylor, A., Payne, D., London, J., Thompson, M., Dennis, S., Sayers, R., Bell, P. "Prosthetic Patch Infection After Carotid Endarterectomy." *European Journal of Vascular Surgery*. 2002. 23, 11-16. doi:10.1053/ejvs.2001.1539
10. Rizzo, A., Hertzner, N., O'Hara, P., Krajewski, L., Beven, E. "Dacron carotid patch infection: a report of eight cases." *Journal of Vascular Surgery*. 2000. 32 (3), 602-606.
11. Naylor, R Management of prosthetic patch infection after CEA. *J Cardiovasc Surg (Torino)* 2016,57:134-144
12. Mann CD, McCarthy M, Nasim A, Bown M, Dennis M, Sayers R, London N, Naylor AR. Management and outcome of prosthetic patch infection after carotid endarterectomy: a single-centre series and systematic review of the literature. *Eur J Vasc Endovasc Surg*. 2012 Jul;44(1):20-6. doi: 10.1016/j.ejvs.2012.04.025. Epub 2012 May 20. PMID: 22617731.
13. Wikkeling, T., van Gijssel, S., van der Laan, M., Zeebregts, C., Slaeen, B. "Treatment of patch infection after carotid endarterectomy: a systematic review." *Annals of Translational Medicine*. 2021. 9 (14) 1213. Doi: 10.21037/atm-20-7531
14. El-Sabrou, Rafik, et al. "Infected Postcarotid Endarterectomy Pseudoaneurysms: Retrospective Review of a Series." *Annals of Vascular Surgery*, vol. 14, no. 3, 2000, pp. 239–247., <https://doi.org/10.1007/s100169910041>.

