Acute Carotid Rupture Associated with Postoperative Staphylococcus Aureus Infection

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Objective:
To describe the clinical and histopathologic findings associated with acute carotid artery rupture (CAR) related to post-operative wound infection with S. Aureus following oncologic neck surgery.

Introduction:
CAR is a rare but potentially catastrophic event following oncologic neck surgery.

We report a case of CAR due to local infection with S. Aureus in the immediate post-operative period following re-operation for parathyroid disease. Findings in this case are consistent with prior reports suggesting that staphylococcal cervical wound infection predisposes to CAR within the first post-operative week due to rapid destruction of the arterial wall.

The structural compromise of the carotid arterial wall occurs rapidly. Relentless progression to carotid artery rupture may occur despite prompt initiation of antibiotic therapy.

Case Report:
A 57 year old man with a history of prior thyroid and parathyroid surgery underwent resection of residual parathyroid carcinoma. The initial post-operative period was uneventful.

He presented on POD #3 with mild erythema and tenderness at the cervical incision site. IV Vancomycin was started with rapid resolution of his infectious symptoms.

On POD #6, he suffered an acute CAR. Emergent surgical exploration was performed with repair of the carotid using a saphenous vein interposition graft.

Within hours, the patient suffered a second massive CAR which required carotid artery ligation.

Cultures taken from the resected portion of the common carotid artery revealed Methillin-sensitive S. Aureus (MSSA).

Discussion:
Acute S. Aureus infection can cause catastrophic CAR. Machen and Dralle reported a series of patients who developed CAR within 1 week due to local infection with S. Aureus after re-operation for thyroid or parathyroid disease. Disruption of the arterial wall media by S. Aureus was identified as the causative factor.

Jamaan et al reported a similar case of a patient with local cervical infection following re-operation for thyroid carcinoma who suffered post-operative CAR on POD#8 despite aggressive treatment. Histopathology revealed focal disruption of the carotid by S. Aureus.

The intact carotid adventitia functions as a strong barrier to invasion. However, prior adventitial injury renders the carotid media vulnerable to subsequent degeneration. Shumrick described the course of carotid degeneration to rupture. The first stage is degradation of the adventitia followed by rapid erosion of the media. Once the media is eroded, the denuded intima is subject to dilation and rupture.

Prior adventitial injury due to surgical dissection or radiation leaves the carotid media susceptible to degeneration by infection. In canine models, Swain and colleagues found that vessels stripped of their vaso vasorum and subsequently exposed to infection ruptured within 5 days. Their findings demonstrated the combination of surgically-compromised blood supply to the carotid wall and infection to be the critical factor leading to CAR; either factor in isolation was unlikely to produce rupture.

Histopathologic Findings:
The resected carotid artery from the initial attempt at repair revealed dense myofibroblastic proliferation consistent with previous scarring.

Several foci of inflammatory change were present in the adventitia involving over 50% of the circumference of the arterial media (Figs A, B).

Although the elastic media was extensively necrotic, the lamina propria interna was preserved for most of the arterial circumference and was disrupted only at the site of transmural rupture (Fig B).

The external elastic layers were first disrupted and a centripetal pattern of necrosis was seen in all samples.

Summary:
The case described illustrates the role of S. Aureus infection within CAR in the post-operative setting. This finding is consistent with prior reports suggesting that S. Aureus infection within the first week following cervical re-operation may induce rapid destruction of the carotid artery media predisposing to rupture, even with prompt medical treatment.

The risk is highest among patients who have undergone previous cervical operation due to compromise of the carotid vascular supply and disruption of adventitial barriers to invasion of the arterial media.

- Local wound infection with S. Aureus following cervical re-operation may lead to rapid destruction of the carotid artery media.
- Progression to acute carotid artery rupture may occur despite prompt initiation of appropriate antibiotic therapy.
- Patients presenting with even mild symptoms of local infection with S. Aureus following cervical re-operation are at risk of catastrophic carotid rupture within the first post-operative week.

References: