

ADENOID CYSTIC CARCINOMA

CASE REPORT, BY ANDREW W. SCHIEMEL, MD

Adenoid cystic carcinoma (ACC) is a rare epithelial tumor entity and comprises about 1% of all malignant tumor of the oral and maxillofacial region.¹ The long natural history of this tumor, its propensity for perineural invasion, and its tendency for local recurrence are well known.² It is a slowly growing but highly invasive cancer with high recurrence rate; however, patients undergoing complete surgical excision have shown excellent rates of 5-year disease-free state and survivability.³ This article presents a case report of a third-class pilot who developed a parotid adenoid cystic carcinoma and underwent successful surgical excision. A brief review of disease pathophysiology, outcomes associated with treatment, and aeromedical concerns is included.

History

A 67-YEAR-OLD MALE THIRD-CLASS pilot with over 3,500 hours of flight time applied for third-class medical recertification roughly 6 months following excision of a right parotid adenoid cystic carcinoma. While initial presentation specifics are unavailable, the patient was evaluated and found to have a 2 x 2 centimeter mass in the right parotid gland. Right parotidectomy was recommended as a definitive course of action, and the patient underwent surgery in October 2010. The right parotid gland was removed in its entirety, along with two regional lymph nodes. Operative report notes the facial nerve was untouched.

Pathology report noted complete excision of the offending tumor with 1mm clear margins, and the two regional lymph nodes were without evidence of carcinoma. Liver function tests and chest x-ray were negative.

Evaluation by the pilot's aviation medical examiner (AME) in May 2011 revealed well-healed right preauricular/neck surgical scars, no evidence of masses or lymphadenopathy on head and neck examination, normal neurological findings, and a normal conversational voice test at 6 feet. The remainder of the examination was unremarkable. An evaluation by the patient's surgeon, in support of the medical certificate application, was included. The surgeon's note reported no palpable masses or lymphadenopathy on the neck or parotid beds, intact facial nerves bilaterally, and normal computed tomography imaging of the head, neck, and chest.

Aeromedical Issues

In all cases, the primary aeromedical concern remains the same – is the pilot at risk of sudden or subtle incapacitation as a result of the medical diagnosis? According to the Aeromedical Certification Reference Manual, “the risk for sudden or subtle incapacitation can arise from the primary cancer itself, paraneoplastic effects of cancer, the side effects of cancer treatment, and effects of metastases.” In this particular case, the answer is straightforward. The primary cancer was completely excised,

the airman has suffered no obvious paraneoplastic effects, tumor progression, or metastases, and he is free of post-surgical complications. We'll examine issues for the AME a bit further along, but a discussion of a few potential aeromedical issues related to salivary gland tumor excision is in order prior to moving forward.

Additional aeromedical concerns surrounding this case involve two related but separate issues. Each has to do with the potential for damage to cranial nerve VII – the facial nerve – during tumor excision. While the parotid gland is in proximity to the more distal aspects of the nerve, it is important to nonetheless evaluate for potential nerve damage from excision. The most obvious concern revolves around potential symptoms of nerve palsy such as drooping facial musculature and dry eyes due to inadequate lid closure and poor parasympathetic-driven secretion from the lacrimal glands. While the latter would produce a mere annoyance, the former may affect a pilot's ability to properly don an oxygen mask and achieve an adequate seal. Adhesion or scarring related to surgical procedure might compound this difficulty.

The other concern regards the facial nerve branch that innervates the stapedius muscle. Damage proximal to this branch of the facial nerve would result in wider oscillation of the stapes and subsequent heightened reaction of the auditory ossicles to sound vibration. This condition, known as hyperacusis, causes normal sounds to be perceived as very loud and might interfere with proper communication in the cockpit and with controllers.

Role of the Aviation Medical Examiner

The general medical standards for medical certificates annotated in Title 14 of the Code of Federal Regulations subsections 67.133, 67.213, and 67.313 include no functional or structural disease, defect, or limitation that makes the person unable to safely perform the duties or exercise the privileges of an airman.⁴ AMEs are authorized to examine airmen to determine whether or not they meet these standards.

Continued on page 13

CAMI'S FIRST POSTMORTEM AVIATION TOXICOLOGY COLLOQUIUM HELD

THE FAA CIVIL Aerospace Medical Institute (CAMI) recently held its first three-day colloquium on Postmortem Forensic Toxicology in Aviation. Those attending were aerospace medicine scientists, accident investigators, educators, medical examiners, forensic toxicologists, and students. Included were representatives from the Department of Justice, National Aeronautics and Space Administration, National Transportation Safety Board, CAMI, and the private sector. Geographically, they came from Brazil, Canada, Spain, Turkey, and a cross-section of America.

In the case of a patient with a tumor of the parotid gland, the AME should fill the dual role of examining the patient thoroughly and facilitating the collection of supporting documentation needed for a potential special issuance. Physical examination in this case should confirm adequate healing of surgical incision, absence of lymphadenopathy or masses, proper hearing acuity and lack of a history of hyperacusis, and normal facial nerve function with regard to innervation of the facial musculature. Standards for the third-class medical certificate head and neck examination are outlined in §67.305 of the aforementioned Code of Federal Regulations.⁵

Outcome

The airman was issued a time-limited special issuance following submission of a full clinical evaluation 6 months status post his parotidectomy and tumor excision by a qualified surgeon. The evaluation included documentation of normal facial nerve function and a well-healed surgical scar, along with normal head/neck/throat examination absent of masses or lymphadenopathy. Diagnostic studies included a negative head/neck/chest computed tomography scan and a normal liver panel. Per requirements set out in the *Guide for Aviation Medical Examiners*, the special issuance requires annual follow-up with submitted documentation of similar evaluation to ensure no return of the primary tumor, no metastases, and no clinical manifestation of disease related to same.

References

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About the Author

Andrew W. Schiemel, MD, MPH, CDR MC (FS) USN, was a Resident in Aerospace Medicine when he wrote this case report at the Civil Aerospace Medical Institute. Currently, he is serving as the Senior Medical Officer on the USS John C. Stennis, based in Bremerton, Washington.

TOPICS

Topics covered included sample processing; importance of chain of custody samples; analyses of samples for combustion gases, ethanol, and drugs; analytical results interpretation; significance of quality control/quality assurance; new exponential technologies in forensics; and litigation and expert testimony issues. Two panel discussion sessions highlighted the conference's important focal points, which were on "Interpretation of Analytical Results and Interesting Cases" and "Litigation and Expert Court Testimony." In these sessions, the participants actively shared their deep interests and expertise in these highly technical subjects.

The contact person for this colloquium was **Arvind K. Chaturvedi**, PhD, Biochemistry Research Team Coordinator in CAMI's Aerospace Medical Research Division.

NEXT TIME: CME PLANNED

The Civil Aerospace Medical Institute plans to host a similar colloquium in 2017 and will offer Continuing Medical Education credit through its Aerospace Medical Education Division.

CAMI is located at the Mike Monroney Aeronautical Center in Oklahoma City, Okla.

