F-15 Pilot with ACOUSTIC NEUROMA

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Disclosure Information

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• I have no financial relationships to disclose.

• I will not discuss off-label use and/or investigational use in my presentation.
Scope of Presentation

- Clinical Presentation
  - Pilot profile
  - Present illness
  - History
  - Treatment
  - Follow-up

- Acoustic Neuroma Overview

- Aeromedical Concerns

- Aeromedical Disposition and Waiver

- ACS Evaluation
Clinical Presentation

- Pilot Profile:
  - Sex: Female
  - Age: 29 years old
  - Rank: Captain
  - Aircraft: F-15
  - Flying Hours: 1750
Clinical Presentation

• Past few years - Preferred to hear conversations in her left ear
• Dec 2011 - Hearing loss was discovered on routine periodic health assessment
Clinical Presentation

- Fall 2010 - Difficulty with ocular tracking
  - Had to stop to read food labels
  - Unable to read them while walking
- No other ocular difficulties while flying
- Noticed difficulties
  - After missions when she was fatigued
  - Following other heavy physical exertion
Clinical Presentation

• Headaches on awakening
  • Resolved several hours after awakening
  • Not accompanied by nausea or vomiting
  • About 2/10 in intensity
  • Dull in character
  • Diffuse in location
• Around this time, noticed some new clumsiness when working out

• When the hearing loss was noted on periodic health assessment, initially felt to be otitis media and was briefly placed on antibiotics.

• However, the history prompted a more detailed exam
Dec 2011 - MRI study:

- Right cerebello-pontine angle mass
- Pressure on the brainstem
- Obstructive hydrocephalus.

Clinical Presentation
Clinical Presentation

• Past medical history:
  Not significant

• Social history:
  Tobacco: Never
  Alcohol: 2 glasses of wine/week

• Family History:
  Not significant
Treatment

• Dec 2011 - Trans-labyrinthine decompressive surgery with sacrifice of the right acoustic nerve and vestibular apparatus

• Pathologic Diagnosis: Schwannoma

• Genetic testing for Neurofibromatosis-2 was negative
• Postoperatively
  • Right facial weakness
  • Vertigo
Treatment

- 10 days post-op cerebrospinal fluid (CSF) rhinorrhea
  - Initial unsuccessful lumbar drainage surgery
  - Jan 2012 - Surgery eliminated CSF leakage
Follow-up After Surgery

- Ocular tracking symptoms and facial weakness gradually resolved
- Still noted very mild facial asymmetry
- Dryness of the right eye that required treatment with artificial tears for a few months
Follow-up After Surgery

- Residual unsteadiness treated with vestibular rehabilitation
- Symptoms resolved about four months postoperatively
Follow-up MRI

- Mar 2012 - Brain MRI:
  - Postoperative changes
  - Resolution of hydrocephalus
  - Minimal residual mass effect
- Mar 2012 - Full Spine MRI:
  - No evidence of tumors
Follow-up

- Residual deafness
- Very minimal right facial asymmetry
- Rare right eye dryness
  - Artificial tears
- Minimal unsteadiness
- No other neurologic symptoms
Acoustic Neuroma Overview

- Acoustic Neuroma
  - Benign Schwann cell derived tumors
  - Arising from the inferior vestibular branch of the CN-VIII
Acoustic Neuroma Overview

- The overall incidence
  - 1:100,000
  - Appears to be increasing

- Incidence
  - Peaks in the fifth and sixth decades
  - Both sexes are affected equally
Acoustic Neuroma Overview

- Generally slow growing tumors

- Symptoms
  - Hearing loss
  - Tinnitus
  - Dizziness/balance issues
  - Facial nerve paralysis
  - Trigeminal nerve disorders
Acoustic Neuroma Overview

- Its treatments (surgery and radio-surgery) can provoke complications
  - CSF leak
  - Facial palsy
  - Hearing loss
Tumors are classified based on size:

Grade 1: small tumors measuring 1-10 mm
Grade 2: medium tumors measuring 11-20 mm
Grade 3: moderately-large tumors measuring 21-30 mm
Grade 4: large tumors measuring 31-40 mm
Grade 5: giant tumors those measuring more than 40 mm
Primary aeromedical concerns relate to the neurologic deficits’ potential negative effects on flight safety and mission effectiveness.

Secondary concerns relate to future risk of tumor recurrence.
USAF Aeromedical Disposition

- Acoustic Neuroma - not specifically addressed in USAF Instruction
- Can be covered under several other headings that include:
  - History of tumor involving the brain or its coverings
  - History of surgery involving the middle ear, excluding cholesteatoma
  - Any conditions that interfere with the auditory or vestibular functions
  - Hearing loss greater than H-1 profile (25 dB for 500, 1000, and 2000 Hz; 35 dB for 3000 Hz, 45 dB for 4000 and 6000 Hz), or asymmetric hearing loss
• Waiver requests
  • Submitted six months after successful treatment of the acoustic neuroma
  • Provided any post-treatment sequelae are within acceptable respective flying-class limits
• The tumor must be unilateral, and there must be complete resolution of vertigo after treatment
USAF Waiver Policy

• Residual cranial nerve deficits
  • Should allow full ocular movements without tracking deficits or strabismus
  • Allow for acceptable protective mask sealing

• ENT and neurology consultations are required for waiver consideration
### USAF Waiver Policy

<table>
<thead>
<tr>
<th>Flying Class</th>
<th>Condition</th>
<th>Waiver Potential Waiver Authority</th>
<th>ACS Review / Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>II / III</td>
<td>Completely resected acoustic neuroma or radiotherapy with some retained functional hearing and no other sequelae Completely resected acoustic neuroma or radiotherapy with extra CN-VIII involvement with/without retained functional hearing</td>
<td>Maybe* / Major Command</td>
<td>Yes</td>
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</tbody>
</table>

*Must be at least 6 months after definitive treatment and no aeromedically significant new or residual symptoms.
Turkish AF (TUAF) Regulation

- History of central nervous system tumors are disqualifying for flying for any military pilot.
- Moderate diseases or their sequelae of central nervous system are disqualifying for flying for any military pilot.
- Deafness in one ear is disqualifying for flying for any military pilot.
TUAF Waiver Policy

- TUAF does not grant waivers for any disqualifying condition.

- But if the pilot objects to the decision pilot can appeal to the TUAF. There are 4 Aeromedical Examination Centers and TUAF may refer the pilot to another one. If the second center decides pilot condition is not disqualifying, pilot will be sent to another aeromedical center for the final decision.
ACS Evaluation

- Oct 2012
  - Ophthalmology: NL
  - Internal Medicine: NL
  - Psychiatry: NL
  - Neurology: Needs further information about in-flight communication assessment and assessment of vestibular tolerance
ACS Evaluation

- She participated in three operational sorties with two different pilots.
- One sortie was at night and included night-vision equipment.
- Both pilots reported no difficulty with in-flight communication or speech discrimination.
ACS Evaluation

- She had no difficulties with G-tolerance up to 7.5G, including one prolonged “check six” position with turns and G-exposure.

- During the night mission she wore night-vision goggles for two hours and reported no problems, successfully performing the mission.
1. Surgically resected right acoustic Schwannoma, surgically resected Dec 2011

2. Postoperative right-sided permanent deafness

3. Postoperative right facial weakness, essentially resolved, with no apparent current clinical findings
4. Ocular tracking dysfunction with associated nystagmus, resolved, with no functional impairment

5. Postoperative CSF leakage, surgically repaired, no recurrence

6. Unusual genetic variant noted on NF2 mutation analysis, felt to be clinically insignificant, not disqualifying
1. Recommend FC-IIC waiver for diagnoses #1 through #4 (restricted to aircraft and settings that do not require stereoacusis), valid for two years

2. Local Neurosurgery and ENT follow-up every year

3. Follow-up brain and internal auditory canal imaging studies

4. At time of waiver renewal request, specialist notes, report and images from any neuroimaging studies, and results of current neurologic and otolaryngologic examination to ACS for review
Questions?