A rare case of pneumoparotitis  AN aeromedical perspective

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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.
overview

• Clinical presentation.
  - Pilot profile.
  - Present illness.
  - History.
  - Investigations.
• Pneumoparotitis overview.
• Discussion.
• Aeromedical disposition.
• Summary.
Clinical presentation

- **Pilot profile:**
  - Sex: Male.
  - Age: 19 years.
  - Rank: Student pilot.
  - Aircraft: K8.
  - Position: Egyptian Air Force.
Clinical presentation

- 19 October 2009, painless, rapidly increased left parotid swelling that interfered with his putting on his helmet and oxygen mask.

- Never played a wind instrument.
- Denied any nervous tic or habit of blowing out his cheek as well as any recent dental treatment.

- Noted after his second flight in a K8 (fighter trainer aircraft) that included high G profile maneuvers.
Clinical presentation

• **Past medical history:**
  
  Not significant.

• **Social history:**
  
  Marital State: Not married.
  Tobacco: None.
  Alcohol: None.

• **Family History:**
  
  Not significant.
Clinical presentation

• Clinical examination at time of admission:
  - Vital signs: Blood pressure: 110/70 mmHg.
    Heart rate: 65 BPM.
    Respiratory rate: 16 cycle/min.
    Temperature: Afebrile.

  - Swelling of the left side of the face.
Clinical presentation

- **Chest:** Clear to auscultation.
- **Heart:** No abnormality detected.
- **Abdomen:** Soft, non-tender, no masses on palpation.
- **CNS:**
  - Pilot was conscious, oriented to time, place and person.
  - No signs of increased intracranial tension.
  - No signs of lateralization.
Clinical presentation

Local examination:

- A painless swelling on the left side of the face.
- Overlying the left parotid area.
- Raising the ear lobe.
- No redness or warmth.
- Crepitus sensation on palpation.
Ct scan of the parotid gland
Ct scan of the parotid gland
Ct scan of the parotid gland
Ct scan of the parotid gland
What was done

• **Full laboratory investigations:** Normal.

• **Diagnosis:** Pneumoparotitis.

• **Treatment:**
  - Admission and conservative treatment.
  - Instructed to practice the correct AGSM (anti-G strain maneuver) against closed glottis and not mouth.

• **Outcome:** The condition lasted for two days and resolved completely with no clinical or radiological residual findings.
• **Three days later:**
  - Admitted to the hospital again with a similar yet slightly painful condition, also regarding his left parotid gland.
  - Temperature was 37.8°C (100.04 F).
  - White blood cell count was 11300/mm³ with normal neutrophil and lymphocyte counts.
  - Elevated serum amylase (652 U/mL).
  - **Negative IgM and positive IgG for mumps (past history of vaccination).**

• **Final diagnosis:** *viral parotitis other than mumps virus.*
scan of the parotid gland after second admission
treatment

- Isolated.
- Intravenous antibiotics to guard against secondary bacterial infection.
- Anti-inflammatory drugs.
- Encouraged fluid intake.
- Close observation.

Outcome:

Full recovery without any clinical or radiological residual findings after 7 days.
follow up Ct scan of the parotid gland
pneumoparotitis

• Normal intraoral pressure is 2-3 mmHg. Dental instruments driven by compressed air may increase intrabuccal pressure to 60-65 mmHg.

• Glassblowing and trumpet playing can also increase intraoral pressure up to 140 or 150 mmHg.

• Such dramatic and brutal elevations of intraoral pressure may overwhelm normal protective mechanisms and air with saliva can enter the ductal system of salivary glands. This air may be pushed as far up to the acini.
pneumoparotitis

- At this stage it can become palpable as crepitus.

- If the pressure continues to increase, the acini may rupture leading to diffusion of air into the parapharyngeal space and neck. Ultimately, a pneumomediastinum may occur.
The normal anatomic features of Stensen’s duct preventing the reflux of air and saliva into the parotid gland are:

- **First**, the diameter of the duct orifice is smaller than that of the duct itself.
- **Second**, the slit-like duct opening is covered by redundant mucosal folds, which cover the duct orifice when there is increased intraoral pressure.
- **Third**, the duct is compressed in its lateral course along the masseter muscle and its passage through the buccinator muscle with increased oral pressure.
discussion

• Anatomic abnormalities, which are believed to contribute to pneumoparotitis include:

  - Insufficiency or hypotonia of the buccinator muscle fibers surrounding the papilla.
  - Hypertrophy of the masseter muscle.
  - Transient mucous plugging, causing decreased salivary flow and abnormal dilation of the duct orifice or patulous duct.
discussion

• The range of normal intraoral pressure is 2 to 3 mm Hg; however, glassblowing and trumpet playing can increase intraoral pressure to 150 mm Hg.

• It is not fully understood why some people experience pneumatic insufflation of the parotid gland with high intraoral pressures whereas others do not.

• Only the left-side pneumoparotitis, developed in our patient because of elevated intraoral pressure due to faulty AGSM against a closed mouth and weakened Stenson’s duct reflux-preventing system due to superimposed latent left parotitis.
• **According to the USAF waiver guide;** any condition which interferes with the wearing of the aviator oxygen mask as might occur with certain conditions involving swelling of the parotid and/or submandibular glands is disqualifying **if permanent**, unless it is treatable with **no** residual effects. In such cases, the individual is DNIF till complete resolution and needs **no** waiver, except if the problem progressed to one of chronic infections.
Aeromedical disposition

- **USAF waiver process:**
  - Starts at the base level.
  - Forwarded as a recommendation, to the higher medical authorities (Surgeon General of AF) for final decision.
  - If the higher authorities desire a second opinion then the case will be sent to the ACS for consultation, then back again to the higher authorities for final decision.
Aeromedical disposition

• According to the Egyptian Air Force (EAF) policy the pilot is DNIF until fully cured, with regular three months follow up for one year, then yearly for three years. Follow up includes clinical and radiological evaluation.
Aeromedical disposition

- **EAF waiver process:**
  - Starts at the **Aeromedical Board** level (equivalent to the ACS).
  - Forwarded as a recommendation to the higher authorities (Chief of Staff of AF) for final decision.

- Student pilots generally are granted no waivers, yet in our case the **Aeromedical Board** decided to take the risk and (wait and see) as the medical condition was not that severe and the student was doing fine and about to graduate from pilot training.
Aeromedical disposition

• The pilot was scheduled for his quarter annual follow up then the yearly follow up for three years.
• All turned out to be satisfactory showing no clinical or radiological residual findings that can interfere with his flight duties.

• He is an F-16 pilot since 2011 with about 350 hours of flight having no recorded medical problems.
• Pilot with a history of pneumoparotitis resulted from faulty AGSM together with underlying viral parotid infection.

• Long term follow up was performed that showed no residual effects.

• Pilot is now flying a high performance jet with no waiver, no further follow ups or restrictions.

• This was the final recommendation of the Egyptian Aeromedical Board.
Thank you
Question?