The Few, The Proud: Spontaneous Pneumomediastinum Due to Vocal Trauma in a Marine Drill Instructor

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Abstract

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the causes of spontaneous pneumomediastinum, and explain its pathophysiology. Also to describe the unique set of laryngologic complications for which professional vocal abusers are at risk.
Objectives: To present a case of spontaneous pneumomediastinum suffered by a US Marine during the performance of his duties as a drill instructor. To review the laryngologic occupational hazards of this unique population and to review the pathophysiology of spontaneous pneumothorax.
Study Design: Case report.
Methods: A healthy 29 year old Marine with a two day history of acute onset of vocal hoarseness and extensive pneumomediastinum that occurred during a training trip for Marine drill instructors.
Results: After a period of inpatient observation, patient was discharged and followed by ENT and speech therapy, with resolution of subcutaneous emphysema and improvement of voice.
Conclusions: US Marine drill instructors are an extremely specialized population with a unique laryngologic risk profile, due to routine, sustained vocal abuse. To the list of occupational hazards we may add spontaneous pneumomediastinum

Case

29 year old healthy Marine Corps Drill Instructor with 2 days of throat pain and hoarse voice.

- Symptoms developed suddenly while shouting at recruits during exercises
- Felt a “pop” while yelling which immediately preceded symptoms
- After 2 days he noted a “crunchy” sensation in his neck

Physical Exam

- No distress, normal vital signs
- Strained/hoarse voice, with no stridor
- Diffuse cervical crepitus of bilateral anterior and lateral neck
- Flexible laryngoscopy revealed edema/inflammation of the true vocal folds without mucosal laceration or blood

Imaging

- Plain neck films demonstrated prevertebral, submandibular, and anterolateral neck subcutaneous emphysema
- CT demonstrated pneumomediastinum and subcutaneous emphysema throughout upper chest and neck

Clinical Course

- Admitted for overnight observation and discharged home the following day
- Voice rest for 3 days
- Referral for speech pathology evaluation and therapy.
- Voice recovered and subcutaneous emphysema completely resolved upon follow-up chest film 10 days later.

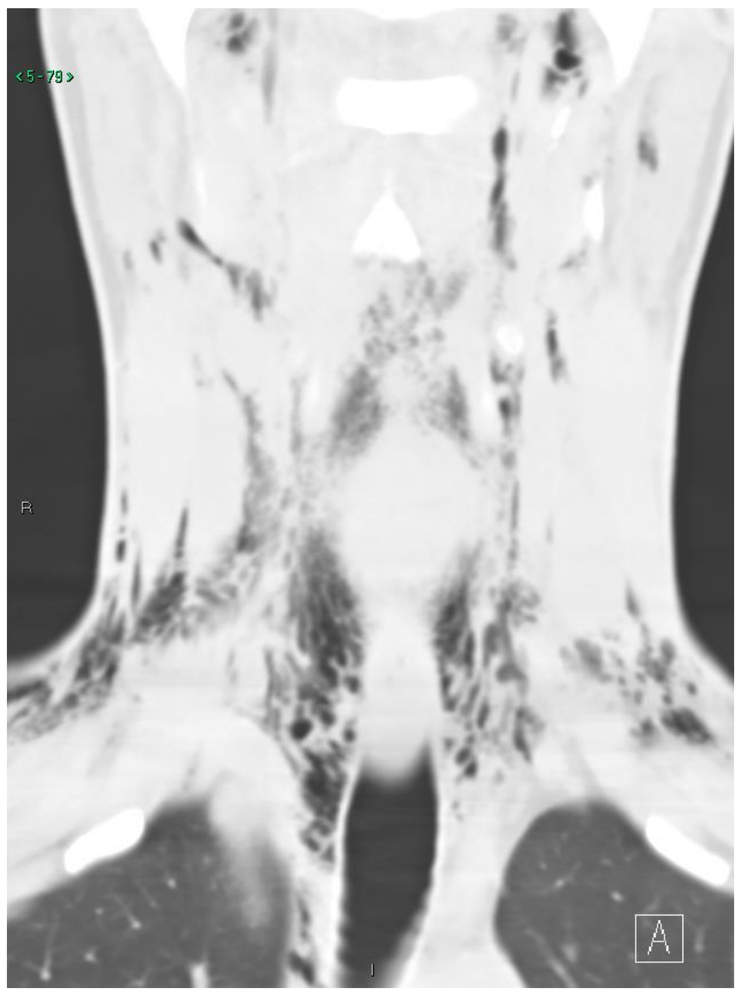

Figure 2. Coronal (left) and axial (right) cuts of non-contrast CT demonstrating extensive pneumomediastinum.

Discussion

There are few reports of SPM, and fewer still that present with dysphonia.

- First case described in 1939
- Benign, self-limited condition which typically occurs in young adults without any inciting factors
- Pathophysiology thought to be increased thoracic pressure with obstructed bronchi, causing alveolar rupture with dissection of air up the bronchovascular sheath into the superficial cervical spaces
- In this case obstruction would be caused by a closed glottis during forceful phonation
- Largest case series from Rochester, MN revealed 62 patients over 11 years.
- Most common presenting symptoms: Chest pain, cough, dyspnea
- Only 5% presented with dysphonia
- Inciting factors include inhalational drug use and upper respiratory infections

Figure 1. Lateral neck film demonstrates prevertebral, anterior cervical, and submandibular subcutaneous emphysema

Conclusions

US Marine drill instructors are a highly specialized population with a unique laryngologic risk profile due to routine, sustained vocal abuse. Further research to quantify and describe this risk is ongoing at our institution.

- SPM is an uncommon entity associated with a benign clinical course.
- In our case, imaging and exam revealed no apparent source of the pneumomediastinum or SCE.
- Flexible laryngoscopy should be performed in patients with voice complaints.
- Conservative management with voice rest will allow the pneumomediastinum to resolve.
- Speech therapy should play a role in prevention of future or recurrent SPE or SCE.

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References

1. Hamman L. Spontaneous mediastinal emphysema. Bull Johns Hopkins Hosp. 1939 64:1–21.
2. Smith JL 2nd, Hsu JM. Spontaneous pneumomediastinum presenting with retropharyngeal emphysema. Am J Otolaryngol. 2004 Jul-Aug;25(4):290–4.
3. Skogvoll E, Grammeltvedt AT, Aadahl P, Mostad U, Slordahl S. Life-threatening upper airway obstruction in a child caused by retropharyngeal emphysema. Acta Anaesthesiol Scand. 2001 Mar;45(3):393–5.
4. Macklin MT, Macklin CC. Malignant interstitial emphysema of the lungs and mediastinum as an important occult complication in many respiratory diseases and other conditions: an interpretation of the clinical literature in the light in the light of laboratory experiment. Medicine. 1944 Dec;23(4):281–358.
5. Iyer V, Joshi A, Ryu J. Spontaneous Pneumomediastinum: Analysis of 62 consecutive Adult Patients. Mayo Clin Proc. 2009;84(5):417-421.
6. Singla, M., Potocko, J., Sanstead, J., & Pepper, P. (2012). Ooh-rah! An Unusual Cause of Spontaneous Pneumomediastinum. *Military Medicine*, *177*(11), 1396-1398