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Case Report

“Fish Gill” Incisions for Severe Periorbital Surgical Emphysema Following Tension Pneumothorax – A Case Report and Review of the Literature [☆]

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ABSTRACT

Background: Surgical emphysema refers to the presence of air within the subcutaneous space and is a known complication of chest drain insertion. Symptoms range from mild crepitus of the chest wall to the accumulation of air in the face and neck, which can ultimately result in cardiovascular compromise.

Objective: The aim of this article is to present a rare case of cervical, facial and periorbital surgical emphysema following chest drain insertion, and describes a novel use of ‘fish gill’ incisions in the palpebromalar groove with an associated review of the literature.

Case Report: A 68-year-old gentleman presented with acute dyspnoea due to a right-sided tension pneumothorax. Emergency decompression with a Seldinger chest drain resulted in persistent cervical, facial and periorbital surgical emphysema causing difficulty in movement, inability to open the eyes and progressive risk to cervical venous return. “Fish gill” incisions at the lateral-most edge of the palpebromalar groove, down to the level of the orbicularis oculi muscle, rapidly released air from the face and neck, alleviating discomfort, reducing venous compression and restoring vision.

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Conclusion: Cervical, fascial and periorbital surgical emphysema may be resolved with the use of “fish gill” incisions at the lateral palpebromalar groove and simple drains. To the best of our knowledge, this method has not been reported previously in the literature.

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Introduction

Surgical emphysema refers to the infiltration of gas within the subcutaneous space. It most commonly occurs in the chest and neck. Causes include injury to the thoracic cavity or bowel, infection or iatrogenic factors, including chest drain insertion¹. Extensive surgical emphysema may develop as air tracks along the fascial planes from the site of origin to the face and periorbital region² and, in severe cases, may result in respiratory or cardiovascular compromise³. As such, treatment is indicated to alleviate discomfort, restore sight and reduce the risk of tension physiology.

In this report, in which STROBE guidelines were adhered to, we present a rare case of severe cervical, facial and periorbital surgical emphysema following chest drain insertion, which was managed with ‘fish gill’ incisions sited in the palpebromalar groove. To the best of our knowledge, this is the first reported case where this technique has been successfully employed resulting in complete and immediate resolution of symptoms.

Case report

A 68-year-old gentleman, with a background of chronic obstructive pulmonary disease and non-small-cell lung carcinoma, presented to the emergency department with worsening shortness of breath. Tension pneumothorax was suspected and emergency decompression with a Seldinger chest drain was performed.

Air leak around the drain entry site resulted in widespread surgical emphysema. ‘Fish gill’ or ‘blow hole’ incisions, 2 cm in size, were made directly over the clavicles under local anaesthesia at the patient’s bedside. Blunt dissection was made down to beneath the deep fascial plane where air was accumulating. Negative pressure wound therapy dressings were applied in order to relieve the subcutaneous emphysema. Unfortunately, the suction device registered a persistent ‘air leak’ and would intermittently power off. In addition, the clavicular location of the dressing had little effect on cervical and facial swelling. Despite two further chest drain changes over the following 72 hours, persistent cervical and facial surgical emphysema made it difficult for the patient to move his head and communicate. He was unable to open his eyes due to palpebral swelling and further accumulation of air in the neck was progressively threatening cervical venous return.

In order to address this, two tubes of a corrugate drain, 4 cm in length, were inserted at the lateral-most edge of the palpebromalar groove (2 cm lateral to the lateral canthus of the eye) on each side, down to the level of the orbicularis oculi muscle and secured with a silk stitch (Fig. 1). This technique successfully released air from the face and neck, alleviating discomfort, reducing cervical venous compression and restoring vision.

Discussion

Cervical, facial and periorbital surgical emphysema is a frightening complication of tube thoracostomy, which may be sight and, in severe cases, life-threatening. This case reports the first use of palpebromalar “fish gill” incisions for successful resolution of severe cervical, fascial and periorbital



Fig. 1. A. Immediate decompression of left periorbital surgical emphysema following left facial 'fish gill' incisions and drain insertion compared with the untreated right side. B. Clavicular 'fish gill' drains can be seen, but also notice how swelling of the left cheek and neck have decreased, as well as the eyelids, compared to the untreated right side.

surgical emphysema which occur following chest drain insertion for tension pneumothorax. Previously, such cases have often been described in the context of dental⁴ or facial surgical procedures⁵ and facial trauma, with only a handful of cases following iatrogenic factors such as chest drain insertion or other thoracic procedures². Immediate intervention should be considered due to the risk of cardiovascular compromise. In addition, air may track into the orbits resulting in ophthalmoplegia, globe compression and ultimately visual loss⁶.

A recent best evidence appraisal by Johnson et al. (2020)⁷ investigating multifactorial cases of extensive surgical emphysema has found that management is heterogeneous. In one-third of cases, air leak is refractory to the initial management of increasing suction applied to the chest drain. 'Fish gill' incisions made above⁸, below⁹ and directly over¹⁰ the clavicles have thus been used successfully, largely offering resolution within three to four days. Optional adjunctive therapy includes the application of negative pressure wound dressings for ongoing air leak¹¹ and thoracic 'microdrainage' techniques with fenestrated angiocatheters have also been described¹².

In the present case, the recalcitrant nature of the swelling, the level of discomfort, threat to cervical venous return and the inability of the patient to open his eyes warranted immediate intervention. In a previous case report, orbital emphysema had been managed with needle decompression directed into the extraconal air pocket⁶. To the best of our knowledge, this study is the first case study involving the use of 'fish gill' incisions for the insertion of corrugated drains for cervical, facial and periorbital emphysema. This technique is safe, simple and efficient and facilitates rapid resolution of symptoms. Unlike needle decompression, re-accumulation of air will not occur while the drains remain in situ. The drains can then be removed once the air leak has been corrected.

Conclusion

Cervical, facial and periorbital surgical emphysema is a known complication of chest drain insertion. Symptoms may be rapidly relieved through the use of 'fish gill' incisions and simple drains at the lateral palpebromalar groove, helping to alleviate discomfort, reduce venous compression and restore vision.

Conflict of Interest

None.

Funding

None.

Ethical Approval

Not required.

Informed Consent

Full written informed consent was sought for the publication of this case report and the associated clinical images.

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