CASE REPORT

Fatal subcutaneous emphysema by manja: a deadly string

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SUMMARY

'Manja' is an abrasive string which is gummed, coloured and coated with powdered glass used in fighter kites in Afghanistan, Bangladesh, Chile, India, Nepal, Pakistan, etc. Subcutaneous emphysema occurs when gas or air is present in the subcutaneous layer of the skin either because of blunt and penetrating trauma, chest surgeries or by necrotising skin infections such as gangrene. Here, we present a case of subcutaneous emphysema owing to a cut-throat injury by 'manja', which is rare and has not been reported to date to the best of our knowledge.

BACKGROUND

Most of the cases reported of 'manja' string were either simple cuts of fingers or serious neck injuries.¹⁻³ In one case, electrocution owing to the use of copper wire as 'manja' string for flying kite was reported, whereas most of the cases of subcutaneous emphysema occurred because of stab or gunshot injury to the neck, fracture of the ribs tearing the pleura, ruptured gastrointestinal tract and rarely by tooth extraction.⁴⁻⁵ The presentation of subcutaneous emphysema in a cut-throat injury by 'manja' is uncommon and has not been reported till date, and hence highlights its importance.

CASE PRESENTATION

Late in the morning on the day of the kite festival in our region, a 34-year-old man was going to his home on his scooter. While riding on his vehicle, suddenly a 'manja' string got entangled around his neck and he sustained a cut throat injury. He was immediately taken to a nearby private hospital for further treatment. The patient was conscious but experiencing pain at the site of the wound. He was immediately taken to the operation theatre for wound exploration and repair. There was an incised wound over the neck, caused by the 'manja', which was immediately stitched, and tracheostomy was also performed. No radiological investigation was carried out as the patient was having respiratory distress and haemorrhage at the site of injury. Postoperatively, the patient was stable. His blood pressure was 130/80, pulse 88/min, SpO₂ 100% and respiratory rate 12/min. The patient was stable on the next day without any major complaints. Early in the morning of the third day postincident, the patient complained of breathlessness, restlessness and chest pain. His heart rate was 112/min, pulse was feeble, SpO₂ 86%, and he was having respiratory distress. Subcutaneous emphysema over the chest was evident. O₂ was

immediately given to the patient. Despite this, the patient's condition worsened. He had bradyarrhythmia and became uncontrollable. His blood pressure and SpO₂ were not recordable. The patient was immediately put on a ventilator and cardio pulmonary resuscitation (CPR) was given. There was progressive increase in the subcutaneous emphysema over the chest, neck and face. After about 1 h, the patient landed in ventricular asystole, with no spontaneous respiration and no heart sound. His blood pressure was not recordable and his heart sound was not audible. He was declared dead after exhausting all resuscitative measures.

OUTCOME AND FOLLOW-UP

Autopsy

Autopsy was performed on the same day. The body was well nourished. Marked subcutaneous emphysema was present over the face, neck, chest, abdomen, as well as the upper and lower limbs (figures 1 and 2). A stitched wound was present over the front of the neck below the level of the thyroid cartilage transversely placed of length 23 cm extending from the right anterolateral aspect of the neck to the left lateral aspect of the neck (figure 3). On removal of the stitches, it was found

Figure 1 Subcutaneous emphysema over the face.

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Figure 2 Subcutaneous emphysema over the back of the hand.

to be an incised wound with a deepened centre, the underlying anterior half of the larynx cut and extravasation of blood in the surrounding region (figure 4). No major vessels or nerves were injured beneath this injury. The therapeutic tracheostomy wound could also be seen.

An internal examination of the brain showed congestion and oedema with focal subarachnoid haemorrhage over the right parietal region. Evidence of pneumothorax was found with both the lungs found to have collapsed in the posterior thoracic wall (figure 5). Both the lungs are congested. All the other visceral organs are also congested.

DISCUSSION

Kite flying is common in most parts of the world, especially in Asian countries like India. It is associated with a wide range of injuries ranging from simple cuts to grave lacerations and neck injuries or head trauma.¹ The commonest sites of injury to a kite flyer or even to those who try to catch the kite string are the palmar aspect of the hand. Lacerated wounds and, in a few of the cases, incised internal structures like tendons and blood vessels caused by the fast moving kite strings, especially manja, are described.⁶ Motorcyclists, cyclists and pedestrians including both the adult and elderly people may sustain injuries when they come across strings of a flying kite or a wandering kite because of inattention to their surroundings.³ Manja having a white colour can be more dangerous as they are difficult to visualise by driving motorcyclists.

Although most instances of subcutaneous emphysema are physiologically unimportant, these forms of extra-alveolar air

Figure 4 Incised wound of the larynx owing to the manja on removal of stitches over the neck with a therapeutic tracheostomy wound.

can occasionally pose a threat to life. Massive subcutaneous emphysema can be life-threatening if it involves the deeper tissues of the thoracic outlet, chest and abdominal wall. Compression of the thoracic outlet can result in airflow obstruction, decreased venous return to the heart and poor perfusion to the head and neck.⁷ Rigidity of the chest wall secondary to subcutaneous air restricts full expansion of the lungs and can lead to high airway pressure, severe respiratory acidosis and ventilator failure. In the present case, trauma to a part of the respiratory system other than the lungs, such as incision of the larynx, caused subcutaneous emphysema. Air may have travelled downwards from the cut larynx into the soft tissues of the chest producing mediastinal emphysema progressing to subcutaneous emphysema. Again, the tracheotomy and positive pressure ventilation given to the patient may also have aggravated the subcutaneous emphysema.

The key to successful management for such a type of laryngo-tracheal injury begins in the emergency room. If there is respiratory difficulty or profuse haemorrhage, resuscitation should be performed and an immediate attempt should be made to stop haemorrhage and secure the airway by whatever means appropriate depending on the type of injury. If the facilities are available and the emergency management of the patient is not compromised, radiological assessment is invaluable. Anteroposterior and lateral soft tissue radiographs may demonstrate endolaryngeal swelling, a shift in the position of the epiglottis or subcutaneous emphysema.⁸ A contrast swallow to rule out perforation of the oesophagus can be performed if there is evidence of

Figure 3 Stitched wound over the neck because of the manja with a therapeutic tracheostomy wound.

Figure 5 Evidence of pneumothorax with both the lungs found to have collapsed in the posterior thoracic wall.

subcutaneous emphysema. In the present case, no such investigations were carried out, which might be lacunae on the part of the surgeon for not properly diagnosing the laryngeal lesion.

The timing of the open exploration is controversial. Most authorities recommend operating within 24 h if feasible,^{9–11} and others suggest waiting 3–5 days to allow the oedema to subside.¹² The usual policy should be to operate at the time of tracheostomy and endoscopy to obviate the need for a second anaesthetic procedure. The management of an individual case depends on the specific pathological condition encountered. The larynx is explored through a transverse incision at the level of the upper end of the thyroid cartilage. Flaps are elevated allowing visualisation of the whole larynx. If a perforated oesophagus or hypopharynx is suspected, these structures should be carefully explored.⁸

Learning points

- ▶ Injuries by the manja (kite string) occur such as cuts to the palms, cut throat injury, etc.
- ▶ Fatal subcutaneous emphysema may occur because of cut throat injury by the manja.
- ▶ Immediate resuscitation and prevention of haemorrhage are essential.
- ▶ Radiological assessment of the patient is invaluable.
- ▶ Identification of the laryngotracheal lesion is very important.
- ▶ Timely management by open exploration is to be the usual policy.

Competing interests None.

Patient consent Obtained.

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