ISSN: 2474-9206

Case Report

Journal of Anesthesia & Pain Medicine

Complex Airway after Electric Burns in the Neck - A Challenge for the Anesthesiologist

Nitika Goel*[1], Indumohini Sen[2], Kiran Jhangra[3] and Mukesh Kumar[4]

[1 3]*Assistant Professor Anesthesia, PGIMER, Chandigarh, India.*

[2]*Professor Anesthesia PGIMER, Chandigarh, India.*

[4]*Senior Resident Anesthesia PGIMER, Chandigarh, India.*

***Corresponding author**
Nitika Goel MD, Assistant Professor Anesthesia, PGIMER, Chandigarh, India, Tel: +91 8826622159; E-mail: nitikagoel7@gmail.com.

Submitted: 30 July 2017; **Accepted**: 08 Aug 2017; **Published**: 22 Sep 2017

Abstract

High voltage electric burns can cause massive damage to the body tissues. Direct contact with the live electric wires may result in the severe damage of the underlying subdermal tissues. However the superficial presentation is often misleading as most of the damage occurs under the skin. Very less literature has been found regarding the presentation of high voltage burns in head and neck region. We present a patient who sustained high voltage burns in the neck region resulting in massive damage of the underlying tissues.

Keywords: Electric Burns, Burns Neck, Tracheal Injury.

Introduction

With widespread use of electricity, electric burn injuries are getting more common nowadays. Direct contact with the live electric wires may result in the severe damage of the underlying sub dermal tissues [1]. Injuries are more common in developing countries especially in suburban and rural areas. Though electricity is available in these areas but there is ignorance about safety measures. Electric burns of head and neck region comprised of 61.4% of high/low voltage injuries and is quite high than other parts of the world [2-4]. Electric burn injuries of head and neck are more common in males, age group of 20 to 40 years. This is probably because in most of the rural families males are the earning members. Hence they are prone to this occupational hazard [5-8].

Perioperative care in head and neck burn injuries is complicated by physiologic derangements due to massive destruction of tissues that affect virtually all organ systems and alter patient response to anesthetic agents. Localized burns to head and neck can result in erythema, ulceration, and edema. However, clinical symptoms such as dyspnea and stridor may not develop until the edema significantly decreases airway diameter [9]. here we present a patient with electric burns over head and neck with no symptoms of airway collapse in preoperative phase. However the patient was diagnosed with defect in the continuity of airway and difficulty in vocalization during preoxygenation. The further management and related complications has been described. Informed and written consent was taken from the patient.

Case Report

A 35 year, 73 kg male, an electrician sustained high voltage electric burns while working over an electricity pole. His right side of neck, chest, hand and left back area were affected, amounting to 20% of total body surface area. He was initially treated at local hospital and was referred to our institute for further management. The patient came to our hospital 5 days after his injury. Here the patient was planned for debridement and flap coverage on the burnt area. Preoperative evaluation revealed normal routine investigations. Patient was communicative with no abnormality in speech. A huge dressing was present around the neck. There was no history suggestive of dyspnoea or orthopnoea. On examination of the airway, there was no facial abnormality, mouth opening-1.5 cms and Mallampatti grade 4 was noted. Considering neck injury and dressing around neck, cervical extension and flexion could not be assessed. Ultrasound Doppler of the neck showed normal common carotid artery and internal jugular vein. His cervical roentgenogram showed normal midline tracheal shadow **(Figure 1 & 2)**.

Figure 1

Figure 2

Patient was explained regarding the operative procedure, anticipated difficult airway, need for awake intubation, tracheostomy and elective ventilation in the postoperative period. He was instructed to fast for eight hours prior to surgery. Tablet Ranitidine 40 mg, and Perinorm 10 mg was given at 10 pm amd 6 am. No sedative premedication was advised considering difficult airway. Injection glycopyrolate 0.2 mg intramuscularly was given 30 minutes before shifting to operating room. He was nebulized with 4% lignocaine 20 minutes before shifting inside operation theatre. Difficult airway cart consisted of appropriate size oral airways, nasopharyngeal airways, laryngeal mask airways, videolaryngoscope and fiberoptic bronchoscope were kept ready. Preoperatively, standard monitoring was established and wide bore intravenous cannula was secured. On removal of huge dressing around the neck, slough was present without obvious external breach in the continuity of the airway **(Figure 3)**.

Figure 3

Thyroid cartilage was seen in the midline moving with deglutition and mouth opening was judged to be adequate. Our plan was preoxygenation to an end tidal O2 more than 90% followed by fiberoptic intubation using spray as you go technique. However, during preoxygenation, capnograph trace was damp despite a well fitting face mask. On inspection, air bubbles were seen in the slough around the neck **(figure 4)**.

Figure 4

At this point, patient also developed difficulty in speech and Sp02 dropped to 85-90%. Anticipating underlying tracheal defect awake fiberoptic was abandoned and a decision to do tracheostomy under local anaesthesia was taken. The procedure successfully restored ventilation of both the lungs. Subsequently general anaesthesia was induced using 75µg fentanyl, 80 mg propofol and atracurium 25 mg. An arterial cannula in right radial artery was secured after induction of general anaesthesia. General anaesthesia was maintained on IPPV using 02, nitrous oxide mixture with Isoflurane maintaining hemodynamics within 20% of the baseline.The surgery was started and it was found that burn had also involved the hypopharynx, epiglottis and right inferior mandible. The soft tissues along right side of neck were totally sloughed off including anterior wall of internal jugular vein which got ruptured during debridement. This required ligation of two ends of IJV to control the bleeding. Meanwhile patient became hemodynamically unstable and was resuscitated with crystalloids. After debridement nasogastric tube was inserted which was placed into the exposed oesophageal lumen. Tracheal rent was covered with Pectoralis Major Myocutaneous Flap. At the completion of the procedure, Injection Neostigmine 3.5 mg, injection Glycopyrolate 0.6 mg was given for reversal of anaesthesia. Patient was shifted to burn ICU with tracheostomy in situ. Subsequently patient required two additional debridement and revision of flap under general anaesthesia. Presently the patient is recovering well. However the patient's speech functions are still impaired.

Discussion

Electricians comprise 47.16% of victims. The most common mode of injury was touching a live wire directly or indirectly, and was seen in 63.6% of victims [10]. The young adults were associated with electric burns of head and neck due to their carelessness and risk taking behavior. Another reason is lack of public awareness about the precautions like using helmets, electric gloves. Burn neck are devastating in the way that they can damage the vital structures present in anterior and lateral side of neck. Injury to pretracheal fascia can lead to minor rents in the trachea which may not manifest during spontaneous respiration. In the preanaesthetic check up, due to massive dressings in the neck area, detailed airway examination is not possible. The removal of dressings in burns patients is in itself one painful procedure. Therefore, dressing should only be removed in the controlled environment, taking all possible precautions for need of emergency tracheostomy and with facilities to manage inturupted airway & massive haemorrage, in case any neck vessels is involved.. The slough formation occurring in burns patients adheres to the dressings which can lead to some loss of skin and underlying tissues on removal. In most of cases, if airway difficulty is not suspected, the dressings are opened after intubating the patient. In the present case, no defect was seen during spontaneous ventilation. However when the patient was being preoxygenated, due to excessive negative inspiratory pressure, breach in the continuity of airway manifested and lead to difficulty in ventilation.

Literature reveals that iaterogenic tracheal disruption can produce progressive life threatening surgical emphysema. Chauhan et al reported subcutaneous emphysema following thyroid surgery because of undetected tracheal injuries [11]. Limited literature has been found wherein the burn injury has directly lead to tracheal defect. Seidl et al conducted a retrospective study of 1693 burn patients requiring ventilation after injury [12]. They found tracheal rupture in two patients (0.1%) following immediate orotracheal intubation after injury. Authors suggested surgical intervention should be done without delay. In our patient severity of injury was underestimated by the local practitioner which lead to delay in referral and subsequent management. On the other hand, Tan et al reported occurrence of trachea-oesophageal fistula following intubation in a burn patient [13]. Eipe et al, reported a case of electric burns where emergency airway management was done by inserting the tracheostomy tube through the tracheal defect [14]. However their patient subsequently developed trachea-oesophageal fistula which required surgical intervention.

Conclusion

Great caution should be practiced in managing patients with electric burns neck. Early airway management in patients with respiratory distress should be done. However if patient does not require early intubation, a suspicion about presence of underlying tracheal defect or trachea-oesophageal fistula should always be kept. Blind insertion

of airway devices through the slough should be avoided because it can lead to massive bleeding or formation of fistula. In conclusion, management of burns neck patients is challenging and involves multidisciplinary approach in a setup where adequate facilities are available provides a favorable outcome.

References

1. Docking P (1999) "Electrical Burn Injuries." Accident and emergency nursing 7: 70-76.
2. Rai J, Jeschke MG, Barrow RE, Herndon DN (1999) Electrical injuries: a 30-year review. J Trauma 46: 933-936.
3. Haberal M, Ucar N, Bilgin N (1995) Epidemiological survey of burns treated in Ankara. Burns 21: 601-606.
4. Craige W, MacDonald W (1978) High voltage injuries. Am J Surg 136: 693-696.
5. Haberal M (1986) Electrical burns: A five year experience The Journal of Trauma 1986; 26: 103-109.
6. Marshall KA and Fisher JC. Salvage and reconstruction of electrical hand injury. Am J Surg 1977; 134 (3): 385-387.
7. Garcia-Sanchez V, Morell PG (1999) Electrical burns: high and low tension injuries. Burns 25: 357-360.
8. Achauer B, Applebaum R, Vander Kam VM (1994) Electrical burn injury to upper extremity Br J Plast Surg 47: 331-340.
9. Kimy R. Harbin, Teresa E. Norris (2012) Anesthetic Management of Patients with Major Burn Injury. American Association of Nurse Anesthetists Journal 80: 6.
10. Baba PU, Wani AH (2016) Pattern of high voltage electrical injuries in the Kashmir valley: a 10-year single centre experience. Ann Burns Fire Disasters 29: 259-263.
11. Chauhan A, Ganguly M, Saidha N, Gulia P (2009) Tracheal necrosis with surgical emphysema following thyroidectomy. J Postgrad Med55: 193-195.
12. Rainer O. Seidl, Ingo Todt, Martin Westhofen, Arne Ernst (2008) Tracheal rupture in burns-A retrospective study. Burns 34: 525-530.
13. Tan KK, Lee JK, Tan I, Sarvesvaran R (1993) Acquired tracheo-oesophageal fistula following tracheal intubation in a burned patient. Burns 19:360-361.
14. N Eipe, A D. Pillai, R. Choudhrie (2005) Burns and tracheo-oesophageal-cutaneous fistula. Br J Anaesth 94: 132-134.