THE ROLE OF THORACIC EPIDURAL ANALGESIA IN THE MANAGEMENT OF BLUNT CHEST INJURIES IN A RESOURCE-POOR SETTING –A CASE REPORT.

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ABSTRACT

Background: Chest trauma is a significant cause of morbidity and mortality, accounting for about 25% of all trauma death. Motor vehicle accident is responsible for majority of thoracic trauma while isolated rib fractures is the commonest presentation. Over 90% of thoracic trauma can be successfully managed conservatively. Thoracic epidural analgesia is a significant method of pain relief in chest trauma. We report the role of thoracic epidural analgesia in the successful management of chest trauma in a 54yr old man in a poor resource setting, and suggest that given excellent pain relief, most chest injuries can be managed in low-resourced peripheral centers.

Key words: chest injury, thoracic epidural analgesia, poor-resource setting.

INTRODUCTION

A chest injury is any form of physical injury to the chest including the heart and lungs. It is an important cause of morbidity and mortality, accounting directly for 25% of all trauma death worldwide[1]. This figure may be more staggering in Nigeria due to the paucity of trained personnel and facilities to manage this life threatening condition. Kesieme et al[2], and Ekpe et al[3] reported a mortality rate of 9.9% and 5.4% respectively from chest trauma alone in tertiary health institutions in Nigeria with considerable level of expertise and facility. This statistics will certainly be higher in most peripheral centers where facilities and trained personnel are grossly inadequate. Typically, chest injuries can be caused by blunt mechanisms such as motor vehicle collisions or penetrating mechanisms such as gunshots.[2,3]

Previous studies have documented that over 90% of chest injuries are managed conservatively.[2,4] The cornerstone of conservative management include analgesics, thoracostomy tube drainage, chest physiotherapy and oxygen therapy, primary surgical therapy is only indicated in a few proportion of cases. [2,4]

The superiority of thoracic epidural analgesia over parentaral opioid in chest injuries has been established in previous studies,[5-9] however the use of thoracic epidural analgesia in the management of thoracic trauma is rarely reported in our environment. Here we report the role of thoracic epidural analgesia in the successful management of chest injury in a 55yr old man in a resource-poor private hospital setting.

CASE REPORT

A 55 years old man presented to our facility with complaints of difficulty in breathing, chest pain and massive generalized body swelling involving the neck, trunk, scrotum and limbs of one day duration. The patient was a rider of a motorcycle that was involved in a road traffic accident. There was no loss of consciousness and no history of any comorbid diseases. Physical examination revealed a middle aged man who was conscious, in respiratory and painful distress, generalized body swelling with crepitus felt in the entire body.

His vital signs on admission were: pulse rate 94/m, respiratory rate -34/m, and blood pressure 152/105mmHg. The breathsounds and heartsounds were normal but muffled

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Figure 1: *Patient with generalised body swelling*

Figure 2: *Swelling involved the scrotum and penis*

Figure 3: *Epidural catheter secured with adhesive tape*

Figure 4: *Resolution of subcutaneous emphysema*

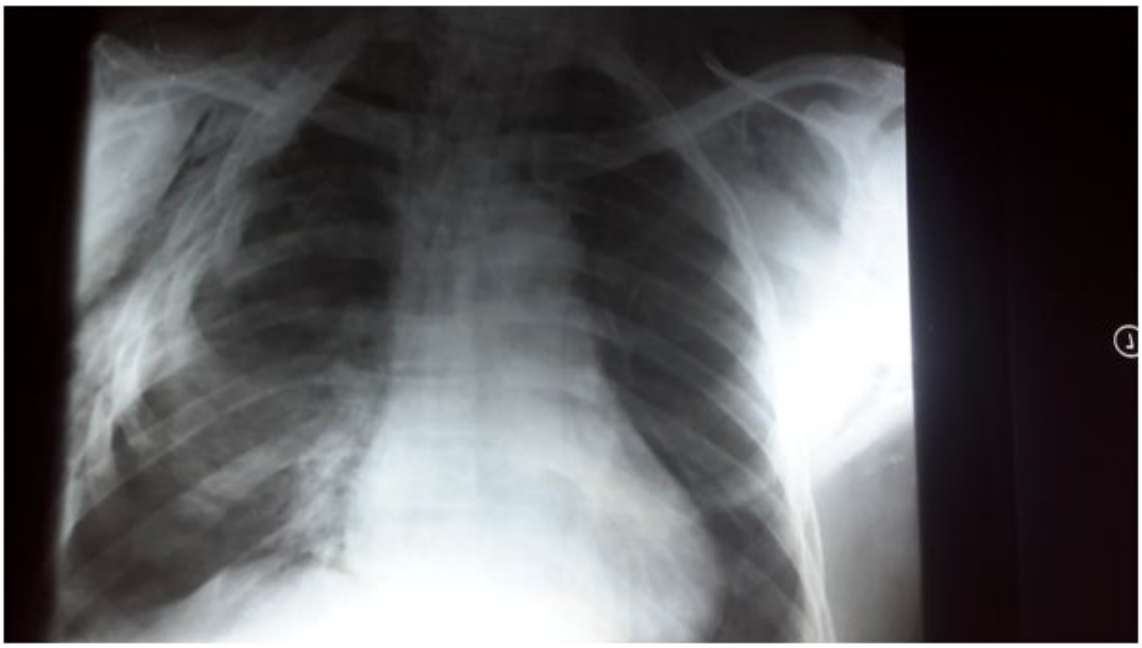

Figure 5: *Chest radiograph of the patient showing multiple rib fractures on the right side and subcutaneous emphysema*

by the chest wall swellings and crepitus. Oxygen saturation was 94% in room air, further examination was limited by the massive degree of subcutaneous emphysema. Chest X-ray showed fractures of 3rd-5th right ribs, and subcutaneous emphysema, other findings were normal.

The patient was scheduled for right closed thoracostomy tube drainage. A mid thoracic epidural analgesia was instituted with the patient in sitting position. After skin preparation with antiseptic lotions, and skin infiltration using 2mls of 1% lidocaine with adrenaline, an 18G Tuohy epidural needle was inserted at T5-T6 thoracic intervetebral space, the needle was advanced till loss of resistance to air at 5cm, an epidural catheter was inserted, 4cm of the catheter was left in the epidural space with the tip cephalad. The epidural space was loaded with 5ml of 2% lidocaine with adrenaline(1: 200,000). A sensory block height of C8 to T8 was achieved. Thoracostomy was performed in supine position on the 5th thoracic intercostals space along the mid axillary line. A size 28 chest tube was inserted and directed upward and anteriorly, and connected to a chest tube bottle with under-water seal.

Postoperatively pain management consisted of 5mls of 0.125% plain bupivacaine plus 25mg pethidine given via the epidural catheter intermittently when the pain assessment using verbal rating scale(VRS) was mild to moderate. A total of six epidural top-up injections were given within 48hrs. Also, intravenous paracetamol 600mg 6 hourly was given to complement analgesia. The epidural catheter was removed after 48hours. Further pain management was done with oral tramadol, diclofenac and paracetamol.

In addition, antibiotics were given, and early ambulation as well as regular chest exercise were encouraged. The patient made a steady, progressive improvement in his clinical status. The chest tube was extubated on the 10th postoperative day, and the patient was subsequently discharged from hospital on the 14th postoperative day.

DISCUSSION

Mortality rate of patient having chest trauma ranges between 4% and 20% worldwide.[10] Previous studies have shown that male sex, blunt chest injuries as opposed to penetrating, and motor vehicle accident account for majority of cases of chest trauma.[11-13] This was the observation in our patient being a middle aged man who sustained a blunt chest trauma from motorcycle accident.

Our patient presented with increasing difficulty in breathing, chest pain, massive subcutaneous emphysema and was found to have multiple rib fractures and clavicular fracture. In a recent study, Ekpe et al[14] reported a case of extensive subcutaneous emphysema complicating a blunt chest injury. Also, kesieme et al[2] in a retrospective study of 142 patients found that rib fracture (49.3%) was the commonest form of specific chest injuries, followed by haemopneumothorax, pneumothorax and haemothorax. other injuries such as pulmonary contusion, flail chest and pneumonia were reported in a small proportion of patient. Similarly, Husaini et al[15] in a previous study on pattern of thoraco-abdominal injuries in a rural region in India found that rib fracture was also the commonest form of specific injury (45.08%)

The cornerstone of conservative management of chest trauma consists of analgesia, oxygen therapy, physiotherapy, and closed thoracostomy tube drainage with or without mechanical ventilation.[2,14] In our patient, thoracic epidural analgesia was used, which was instituted by the anesthetist, thoracostomy was performed by a general surgeon in a setting of a six bedded private hospital without ventilator or ICU. The patient and nurses were educated on the care of the chest tube, and chest physiotherapy was supervised by the nurses.

Abouhatem et al[5,] studied the use of thoracic epidural analgesia in the treatment of rib

fractures in 19 patients, their result showed that 18 of the patients were successfully treated including patients with flail chest, chronic obstructive pulmonary disease and minor pulmonary contusions, they stated that efficient pain relief with continous thoracic epidural analgesia allows a good physiotherapy management without central sedation and impairment of cought reflex, this prevents pulmonary atelectasis and infection, they concluded that intermittent positive pressure ventilation must be reserved for severe pulmonary contusion and other crushing injuries of the chest such as bronchial or great vessel ruptures.
Similarly, Liman et al[16] proposed a protocol for the management of thoracic trauma, they stated that rib fractures with minor pulmonary contusions with remarkably reduced vital capacity even with flail chest can be treated with thoracic epidural. They recommended that mechanical ventilation should be reserved only for severe pulmonary lesion.

Also, Mackersie et al[8] documented that thoracic epidural was superior to parenteral opioid analgesia. They prospectively studied 32 patients comparing thoracic epidural and parenteral opioid, their result showed that thoracic epidural opioid offered excellent relief of pain and improvement in ventilatory functions.

Predictors of mortality of chest trauma vary globally.[3,10] AL Eassa et al[10] in a recent study found that mortality from chest trauma was significantly related to the severity of head injury, injury severity score and hypotension on arrival. Also, Liman et al[16] showed that an age of more than 60 years significantly increased mortality. The quality of prehospital care was demonstrated to affect mortality from chest injury. [17,18] Our patient no doubt had low risk for mortality given his age, injury severity, consciousness and no hypotension on admission, however, this study demonstrates that thoracic epidural analgesia is feasible and beneficial in the management of chest injuries, and could be applied even in worse case scenario.

CONCLUSION

Thoracic epidural analgesia is feasible and offers excellent analgesia in the management of chest injuries. Therefore, it is recommended especially in the conservative management of chest injuries in resource-poor settings.

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