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LANDMARK GUIDED BRACHIAL PLEXUS BLOCK FOR SURGERY OF PROXIMAL HUMERUS : A FORGOTTEN ART.

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ABSTRACT Fracture humerus is a common cause of morbidity among orthopedic patients. Brachial plexus block provides ideal operating conditions in a fracture humerus patient and it also takes care of post operative pain. Ultrasound guided brachial plexus has become the gold standard. Here we have discussed a safer approach to landmark guided brachial plexus block via supraclavicular approach with least possibility of pneumothorax.

KEYWORDS : Humerus fracture, Brachial plexus block, Supraclavicular block, landmark guided blocks, no pneumothorax.

INTRODUCTION

Fracture of proximal humerus is a common cause of morbidity among orthopedic patients. Many times patient lands up in a peripheral health institute with fracture proximal humerus for orthopedic surgery. Standard text (mostly foreign origin) mostly recommends upper humerus surgery to be performed under ultrasound guided brachial plexus block either by interscalene approach or by supraclavicular approach. But we live in India which is a developing country where availability of ultrasound facility is an issue. So when a patient lands up with a proximal humerus fracture, the only option left is general anaesthesia. Now here comes the disparity part, as most of the teaching institutes have availability of ultrasound for interventional anaesthesia. So most of the modern anaesthetists are trained in ultrasound guided nerve blocks and they are not much proficient in landmark guided nerve blocks. So we can say that the modern anaesthetist has forgotten the art of landmark guided nerve blocks. Such anaesthetists can survive in the cozy environment of a medical college but the situation becomes very difficult in a peripheral health institute. Forget ultrasound, sometimes even a properly functioning anaesthesia workstation is not available. So when opportunity knocked, I decided to revitalise the art of landmark guided brachial plexus block. A case of proximal humerus fracture operated under landmark guided supraclavicular brachial plexus block and superficial cervical plexus block is discussed in the following text.

CASE REPORT

A 35 year old male with a history of roadside accident presented in the emergency department of our hospital with pain and deformity of his left arm. After radiologic investigation, a diagnosis of fracture left proximal humerus was made. In pre anaesthetic evaluation, the vitals of the patient were:

- Pulse: 80/minute
- BP: 122/84 mmHg
- Chest: B/L ronchi all over lung fields
- CVS: No abnormality
- CNS: No abnormality
- P/A: Soft, No abnormality

On careful history taking, the patient told about history of bronchial asthma since childhood and an allergy to diclofenac. Investigations showed an Hb of 13g/dL and platelet count of 120000 all other investigations were within normal limits. So it was decided to go for the surgery under regional anaesthesia and also to avoid diclofenac during the management of the patient. Patient was told the anaesthesia plan and written informed consent was taken. Now the problem with peripheral health institutes is that we don't have ultrasound machine in operation theatre so I decided to perform landmark guided brachial plexus block via supraclavicular approach.

On the day of surgery, the patient was shifted to OT with 8 hours of fasting. Monitors were attached. Pre operative vitals were:

- Pulse: 86/minute.
- B.P.: 124/78 mmHg
- SpO2: 98% on room air
- ECG: WNL

So, we proceeded with the block. After cleaning and draping the patient under aseptic conditions, brachial plexus block via supraclavicular approach was given. We used a modified Kulenkampff technique to proceed with the block. With the patient in a supine position with the head rotated to the opposite side, the patient wass asked to lower the shoulder and flex the elbow, so the forearm rested on the lap. The wrist was supinated so the palm of the hand faced the patient's face. This maneuver allowed for detection of any subtle finger movement produced by nerve stimulation. I stood at head end of the patient towards the left side, palpated the landmarks with left hand and manipulated the needle with right hand. The lateral border of the SCM was clearly visible at the level where the external jugular vein crosses it. From this level, the border was traced caudally to the point where it meets the clavicle. A parasagittal line (parallel to the midline) was drawn at this level to recognize an area medial to it that is at risk for pneumothorax. The point of needle entrance found lateral to this parasagittal plane, separated by a distance we call "margin of safety." This distance is about 2.5 cm lateral to the insertion of the SCM on the clavicle. The palpating index finger was placed at this site. The needle was inserted immediately cephalad to the palpating finger and advanced first perpendicularly to the skin for 5 mm and then turned caudally under the palpating finger to advance it in a direction that was parallel to the midline. The nerve was contacted above the clavicle, under the palpating finger. The patient felt paresthesia over left forearm and hand, I stabilized the needle with my right hand and injected 30ml of local anaesthetic solution (15ml of 0.5% bupivacaime + 15ml of 2% lignocaine with 0.005mg/ml adrenaline) at that point. Negative aspiration was done after injecting every 3ml of solution to check for any unintentional intravascular injection. An assistant was continuously monitoring the ECG. The needle was then gently withdrawn. After 10 minutes, there was complete sensory and motor blockade in left arm. The surgery proceeded and was completed in 90 minutes without any complication. The sensory block lasted around 3 hours.

DISCUSSION

In the present era of ultrasound guided nerve blocks, supraclavicular brachial plexus block is a relatively safe option for upper limb surgery. But tables are turned in the absence of ultrasound or nerve stimulator. Brachial plexus block produces ideal operating conditions by complete muscle relaxation and maintaining stable intraoperative hemodynamics. The associated sympathetic block decreases postoperative pain, vasospasm and edema.

Brachial plexus block was first accomplished by Halsted in 1884 with cocaine solution. In 1887, Crile disarticulated the shoulder joint after rendering the arm insensitive by blocking the brachial plexus using direct intraneural injection of each nerve trunk with 0.5% cocaine under direct vision.[1] Hirschel produced the first percutaneous brachial plexus block in 1911 through the axillary approach. Kulenkampff introduced the supraclavicular brachial plexus block a few months after Hirschel described the axillary approach. He injected his own plexus with 10 ml of procaine at the midclavicular position lateral to the subclavian artery obtaining complete anaesthesia of the arm.[2]

Supraclavicular block is a reliable, rapid-onset approach to brachial plexus anesthesia. The anatomy of the brachial plexus, with its three trunks confined to a much-reduced surface area, affords a high success rate for achieving anesthesia in the upper extremity below the shoulder. A combination of good anatomic knowledge, simple landmarks, and meticulous technique are paramount for consistent success rate and limiting its potential for complications. Only concern with this block was pleural perforation. The pleura can potentially be injured in two places during a supraclavicular block; the pleural dome

and the first intercostal space. The pleural dome is the apex of the parietal pleura, circumscribed by the first rib. The first rib is a short, broad, and flattened bone shaped like the letter C. It's medial border forms the outer boundary of the pleural dome. The anterior scalene, by inserting in this border of the first rib, comes in contact medially with the pleural dome. There is no pleural dome lateral to the anterior scalene muscle. The first intercostal space on the other hand, is for the most part infraclavicular and consequently should not be reached when a supraclavicular block is properly performed using this technique.

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