



SCORPION STING AND SPINAL ANAESTHESIA-A RARE CASE REPORT

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ABSTRACT **INTRODUCTION:** Spinal anaesthesia is a preferred technique used for lower abdominal and lower limb surgeries. A "failure of subarachnoid block" may be due to various reasons, one of which is a resistance to local anaesthetics. This resistance to local anaesthetic is difficult to diagnose. One might miss to elicit a history of scorpion sting in the pre-operative evaluation. Here we report one such case where spinal anaesthesia was administered and later upon noticing a failed block, a history of scorpion sting was elicited in operating room.

PRESENTATION: A 47 yr old man following trauma, suspected to have scrotal haematoma was planned for emergency scrotal exploration and evacuation of haematoma. He was assessed under ASA-IE and spinal anaesthesia was planned. Spinal anaesthesia was administered by an experienced anaesthesiologist, it was found to be a "failure of block". A repeat spinal was given which again failed to take up. A history of scorpion sting was then elicited. Balanced general anaesthesia was administered and surgery was performed uneventful.

SUMMARY: The time of onsets of both sensory and motor blocks and time for the peak of sensory and motor blocks are significantly prolonged and in some cases there is total failure. The resistance to local anaesthetics is noted even in other routes of administration.

CONCLUSION: Patients with a history of scorpion bite exhibited apparent resistance to bupivacaine spinal block. This resistance manifested as inadequate block or block failure requiring conversion to general anaesthesia.

KEYWORDS : Scorpion Sting, Local Anaesthetic Resistance, Spinal Anaesthesia

INTRODUCTION

Spinal anaesthesia is commonly used for lower abdominal and lower limb surgeries safely. Failure of Spinal Anaesthesia can occur even in the expert hands of experienced anaesthesiologists. Causes of failed subarachnoid block includes technical difficulties, poor patient positioning, incorrect insertion of the spinal needle, spinal abnormalities, obesity, pseudo successful lumbar puncture, errors in the injection of drug, wrong dose selection, misplaced injection, inadequate spread of the drug intrathecally, ineffective drug action, chemical incompatibility caused by adjuvant and finally the local anaesthetic 'resistance'. This resistance to local anaesthetic is difficult to diagnose. One of the etiology for Local Anaesthetic resistance is history of scorpion bite in the past. Pumping mechanism of sodium channels in the nerve fibres, involved in the basic mechanism of action of local anaesthetic agents, are affected by the scorpion venom [1]. Here we report one such case where spinal anaesthesia was administered and later upon noticing a failed block, a history of scorpion sting was elicited in operating room.

PRESENTATION

A 47 yr old man following trauma by bullock cart, developed scrotal swelling, suspected to have scrotal haematoma was planned for emergency scrotal exploration and evacuation of haematoma. History was taken (history of medical illness, prior surgeries, hospital stay, blood transfusions and drug allergy), his general physical examination was normal and airway assessment did not reveal any difficulty. He was assessed under ASA-IE. The patient had 5 hrs of Nil Per Oral at the time of admission. His blood investigations- Complete blood count, blood sugars, renal function and liver function tests, electrolytes and coagulation profile were within normal limits. Chest X-Ray and Electrocardiogram of the patient did not detect any abnormality.

Spinal anaesthesia was planned. On arrival inside the Operating Room, electrocardiography (ECG), pulse oximetry and non-invasive blood pressure (NIBP) were connected. The patient was pre-loaded with 15ml/kg of Ringer's Lactate. Under strict aseptic precautions, with the patient in sitting position, in the L3-L4 interspace the Subarachnoid block was given using 25G Quincke's spinal needle with 2.5ml hyperbaric Bupivacaine and 20 micrograms of Fentanyl. The drug was injected after confirming free flow of CSF on aspiration. The entire procedure was done by an experienced anaesthesiologist with >20 years experience. The patient was then made to lie down. After waiting for 20 min, the patient did not show any signs or symptoms of sensory block or of motor block, as confirmed by pinprick method and movements of lower limb and toes. There was no change in hemodynamic parameters including fall in Blood Pressure. The patient was made to sit up again. The subarachnoid block was repeated with

the same amount of drug but a different batch and brand. This time L2-L3 space was chosen. In spite of waiting for 30 minutes, the patient did not show any signs or symptoms of spinal block. During this point of time, a detailed enquiry into the patient's history revealed history of scorpion sting 10 years back and another scorpion sting 4 months back. The patient was treated on out-patient basis during both the time. Hence the procedure was carried out under balanced General Anaesthesia. The surgery duration was about 85 minutes and uneventful. The patient was extubated in the Operating table and was kept in Post anaesthetic care unit for 2 hours for observation. The patient still did not have sensory or motor block.

DISCUSSION

Spinal anaesthesia is a blind procedure that is done by identifying the anatomical landmarks. Failure rates of 0.72-16.0% have been reported. Causes of failed spinal anaesthesia can be classified as [2]

1. Successfully injected drugs that are maldistributed relative to the needs of the planned surgery
2. Unrecognized failed injection of drug.
3. Technical failure to enter the subarachnoid space, with no drug injection
4. Drug errors, i.e. wrong drugs and inappropriate additives
5. Local anaesthetic resistance
6. Pseudo block failure due to excessive expectations for speed of block onset
7. Subdural injection of a spinal dose is conceptually a possible cause of spinal block failure, but has never been reported, recognized or studied in this context of small-volume injections.

This resistance to local anaesthetic is difficult to diagnose. The Sodium channels are composed of 2 subunits- A(alpha) and B(beta). Each subunit has 4 domains (D1-4), each containing 6 transmembrane helices (S1-6). The S4 plays a key role in channel activation. Local Anaesthetics act by blocking the Voltage gated Sodium channels. Their action is mainly by an interaction with the sixth segment of domain four of the Alpha subunit (IV-S6). Local anaesthetic resistance is related to the alpha subunit of the sodium channel, specifically to the sixth segment of the fourth domain of this subunit.

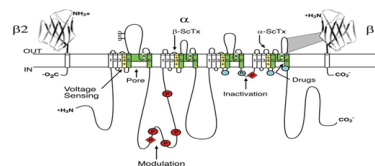
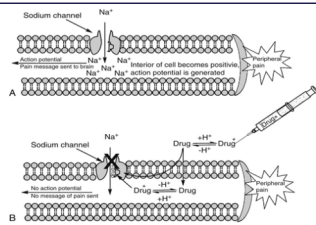


Fig.1

**Fig.2**

Scorpion sting is a common occurrence in tropical countries like India. In India, 2 species of scorpion are common-the small red *Buthus tumulus*, which is more toxic and the large black *Palamneus gravimanus*. The toxins of Buthidae family tend to affect sodium, potassium and Calcium channels. They probably affect the pumping mechanism of sodium channels. Neurotoxic proteins are present in the scorpion venom. Alpha and Beta toxins act on sodium channels. Scyllatoxin, charybdotoxin and tityus toxin present in scorpion venom exert inhibitory effects on the calcium dependent potassium channels [3]. In addition they cause opening of the sodium channels at pre synaptic nerve endings. The Beta toxin binds to receptor site 4 of voltage gated sodium channels and modify the activation process of the channels. One possible mechanism for the resistance to local anaesthetic agents following scorpion sting could be antibody mediated. Due to its antigenic nature, the scorpion venom may produce an antigen-antibody response, causing antibodies to form against the scorpion venom [4]. When local anaesthetics are administered, these antibodies which are circulating, may cause competitive antagonism at the sixth segment of domain four of the alpha subunit (IV-S6) of the sodium channels, which is the site of action of the local anaesthetics.

CONCLUSION

Scorpion bite is common incident in our country. Still we do not consider past history of scorpion bite as a part of our routine history taking when a patient comes for any surgical procedure. Anaesthesiologists should always keep in mind the possibility of past history of scorpion bite for failed regional blocks, in all patients.

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