

# Revista Colombiana de Anestesiología

## Colombian Journal of Anesthesiology

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### Case report

## Compartment syndrome of the upper limbs after bee sting: Case report

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#### ARTICLE INFO

##### Article history:

Received 5 December 2012

Accepted 14 May 2013

Available online 5 October 2013

##### Keywords:

Stellate ganglion

Analgesia epidural

Bee venoms

Compartment syndromes

Autonomic nerve block

#### ABSTRACT

**Introduction:** The upper limb compartment syndrome is considered an emergency. It may cause necrosis and loss of functionality of the hand. The principal treatment is fasciotomies. However, there are therapeutic possibilities that may help or avoid surgery, provided there is always the option to do a fasciotomy when conservative treatment fails.

**Objective:** To assess the analgesia response and treatment safety with stellate ganglion block and cervical epidural anesthesia in a patient with compartment syndrome of both upper limbs.

**Methods and materials:** Descriptive longitudinal prospective study in a case report format, of a patient with compartment syndrome of both upper extremities that underwent a stellate ganglion block and cervical epidural anesthesia for treating her condition. The patient was followed for 7 days. The recovery of sensitivity and the mobility were assessed on both hands, in addition to pain intensity and bilateral distal cyanosis improvement.

**Results:** The patient evolved satisfactorily with evidence of recovery of sensitivity and mobility in both hands, adequate pain control and immediate and bilateral improved distal cyanosis.

**Conclusions:** Sympathetic block and epidural cervical analgesia are a treatment option for the comprehensive approach of the compartment syndrome, as long as the patient receives constant monitoring of any alarm signs and a surgeon is immediately available to do fasciotomies if the intervention therapy fails.

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## Síndrome compartimental en miembros superiores por picadura de abejas: reporte de caso

### R E S U M E N

#### Palabras clave:

Ganglio estrellado  
Analgésia epidural  
Venenos de abeja  
Síndromes compartimentales  
Bloqueo nervioso autónomo

**Introducción:** el síndrome compartimental en la extremidad superior es considerado una urgencia. Puede generar necrosis y pérdida de la funcionalidad de la mano. El principal tratamiento es con fasciotomías. Sin embargo, existen posibilidades terapéuticas que pueden ayudar o evitar la cirugía, siempre y cuando exista la posibilidad rápida de realizar una fasciotomía si la terapia conservadora fracasa.

**Objetivo:** evaluar la respuesta clínica y la seguridad al tratamiento con bloqueo del ganglio estrellado y analgesia epidural cervical en una paciente con síndrome compartimental de ambos miembros superiores.

**Métodos y materiales:** estudio descriptivo longitudinal prospectivo tipo reporte de caso en una paciente con síndrome compartimental de ambos miembros superiores en la que se realizó un bloqueo del ganglio estrellado y analgesia epidural cervical como medida en el tratamiento de su enfermedad. Se realizó un seguimiento durante 7 días. Se evaluaron la recuperación de la sensibilidad y de la movilidad en ambas manos, la intensidad del dolor y la mejoría de la cianosis distal bilateral.

**Resultados:** la paciente evoluciona satisfactoriamente, se evidencia recuperación de la sensibilidad y movilidad en ambas manos, con adecuado control del dolor y mejoría de la cianosis distal de manera inmediata y bilateral.

**Conclusiones:** el bloqueo simpático y la analgesia epidural cervical son una alternativa terapéutica en el tratamiento integral del síndrome compartimental siempre y cuando el paciente reciba una monitorización continua de los signos de alarma y tenga la disponibilidad inmediata de un cirujano de mano para realizar fasciotomías en caso de que el tratamiento intervencionista falle.

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## Introduction

The compartment syndrome is an entity secondary to an increase in pressure within one or several compartments. The diagnosis is mainly clinical. The disproportionate early onset of pain is the key warning sign.<sup>1</sup>

The acute compartment syndrome is more often seen in patients under 35 years of age<sup>2</sup>; although it is usual for this phenomenon to occur in the upper extremity secondary to fractures or trauma, less frequent, non-trauma causes should also be considered: infections, blood dyscrasias, renal syndrome, spider bites, snake bites, extravasation of infusions or contrast media, injection of illicit drugs and extended compression of the extremity.<sup>3-5</sup> There is also the risk of masking the syndrome and making a late diagnosis when the patient is under the effects of regional anaesthesia, since the patient would not experience any pain.<sup>6</sup>

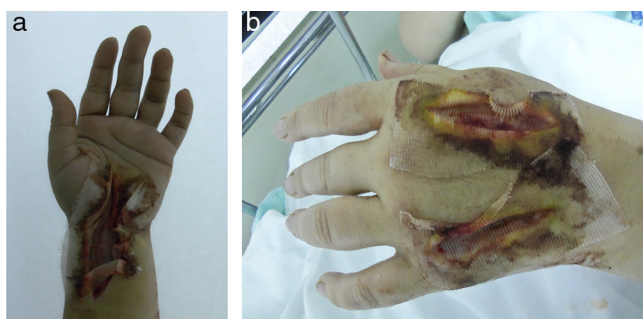
The treatment is aimed at achieving an early recovery of the microcirculation into the compartment through decompression.<sup>7</sup> It is considered a surgical emergency; however, intervention management may be considered in some selected cases through the sympathetic block of the extremity, improving distal perfusion and reducing the interstitial pressure, provided there is an interdisciplinary team that ensures surveillance of any alarm signs and provides emergency surgical decompression.<sup>8</sup>

## Case description

A 51-year-old female patient is admitted to the CES clinic (Medellín, Colombia), with a diagnosis of compartment syndrome of the upper limbs triggered by bee stings induced at an alternative medicine center for treating a chronic hand pain. The alarm signs included intense pain, areas of hypoesthesia and dysesthesia, finger pulp cyanosis and functional limitation. The patient receives initial treatment with intravenous steroid and antihistaminic. A surgeon and anesthesiologist evaluation is required for fasciotomies of both upper extremities. Both specialists carry out a joint evaluation of the patient and the following plan was agreed:

### *Fasciotomies of the upper left limb under general anesthesia*

After asepsis and antiseptics of the extremity, an incision is made on the volar aspect, from the distal third of the forearm along the midline between the flexor carpi radialis and palmaris longus up to Kaplan's line (Fig. 1). Another incision is immediately made of the complete transverse ligament and the skin wound is left open. Then, on the dorsal side of the hand, two incisions are made: one between the second and third metacarpal and the second one between the fourth and fifth metacarpal. The wounds are left opened and covered with sterile bandages. Surgery is programmed every 48 h for wound



**Fig. 1 – Fasciotomies performed on the left arm: (a) volar and (b) dorsal.**

Source: authors'.

cleansing and the decision to close the wound is based on the extent of the edema. The wounds were closed on day seven.

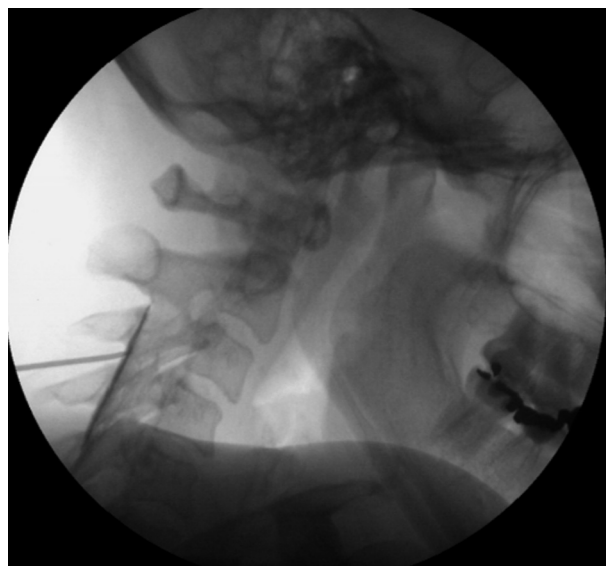
#### Fluoroscopically guided interventional therapy of the upper right limb:

- Stellate ganglion block: using a 22 spinal needle and paratracheal technique, the C6 transverse apophysis is identified and confirmed with water soluble contrast media followed by the administration of 6 mL of 0.75% levobupivacaine (Fig. 2).
- Cervical epidural catheter: the epidural space is localized at C3 C4 with epidural needle and loss of resistance technique with saline solution, confirmed by 1 mL of contrast media; the epidural catheter is then introduced, leaving three centimeters inside the space and a 3 mL of 1% lidocaine test is done with 15 µg of epinephrine that came out negative. Following tunnelization of the catheter the continuous infusion is initiated at a rate of 6 mL/h with a mixture of 0.9%



**Fig. 2 – Stellate ganglion block and thoracic sympathetic chain guided by fluoroscopy with contrast confirmed.**

Source: authors'.



**Fig. 3 – Cervical epidural localized in C3C4, confirmed with contrast media.**

Source: authors'.

saline solution with levopropivacaine at a 0.125% concentration to treat the pain in both extremities and extend the sympathetic block (Fig. 3).

A continuous evaluation of the alarm signs is maintained for the first 12 h and daily follow-up for 7 days until the left side wounds are closed. The patient evolves satisfactorily with evidence of recovery of sensitivity and mobility of both hands, with adequate pain control and immediate and bilateral improvement of the distal cyanosis.

## Discussion

The muscle groups of the extremities are divided into compartments made up of strong muscle fasciae. The upper limb has 15 compartments and the most frequently affected is the forearm volar compartment.<sup>3</sup>

The use of bee venom as a therapeutic agent for the relief of pain dates back to Hippocrates times. This technique called apitherapy is widely used in Asia, Europe and South America.<sup>9</sup> The therapeutic effect is achieved through the anti-inflammatory properties of bee venom, via a substance called *Mellitin* that is believed to be five times as potent as Cortisone; however, there are no current trials in humans, since the practice of this technique is potentially dangerous.<sup>10,11</sup>

The diagnosis of the compartment syndrome is clinical and the manifestations are known as the five "Ps": pain, pallor, pulselessness, paresthesias and passive extension of pain to the affected muscle group. In the final stages skin manifestations such as epidermolysis may be observed, and bullae secondary to marked edema inside the compartment.<sup>12</sup> Occasionally, objective diagnosis tests are needed: a pressure measurement inside the compartment above 30 mmHg is diagnostic; and in hypotensive patients a difference of less



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