

# Total spinal anesthesia after stellate ganglion block in complex regional pain syndrome patient. Case report\*

*Raquianestesia total após bloqueio de gânglio estrelado em paciente com síndrome dolorosa complexa regional. Relato de caso*

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## ABSTRACT

**BACKGROUND AND OBJECTIVES:** Complex regional pain syndrome (CRPS) is a debilitating painful syndrome, with high prevalence in pain management centers. CRPS has several therapeutic options being regional sympathetic block one of the most effective. This study aimed at reporting an uncommon intercurrentence of stellate ganglion block in patient with right upper limb CRPS.

**CASE REPORT:** Female patient, 49 years old, physical status ASA I, admitted for management of severe right shoulder burning pain, associated to trophic changes eight months after local trauma. Diagnosis was CRPS and sympathetic stellate ganglion block was indicated. After monitoring, blockade was induced with 0.5% (8 mL) bupivacaine, evolving, after injection in stellate ganglion topography by paratracheal route, with distal limbs paresthesia, anxiety and severe tachydyspnea. Patient was immediately sedated and intubated, remaining in observation for 135 minutes, being then transferred to the post-anesthetic care unit (PACU). Three days after procedure, patient reported pain decrease from 10 to 3 according to the visual analog scale.

**CONCLUSION:** Regional blocks are highly effective to manage different pain conditions, including CRPS. This case has shown that, although being uncommon, there might be undesirable effects and the anesthesiologist has to be prepared to adequately support patients in such situations. Adequate understanding of anatomy and of the anesthetic technique decreases the incidence of such effects.

**Keywords:** Complex regional pain syndrome, Pain, Regional block, Spinal anesthesia, Sympathetic block.

## RESUMO

**JUSTIFICATIVA E OBJETIVOS:** A síndrome dolorosa complexa regional (SDCR) é uma síndrome dolorosa debilitante, com prevalência elevada em serviços de tratamento de dor. Apresenta diversas opções terapêuticas, sendo o bloqueio regional simpático uma das mais efetivas. O objetivo deste estudo foi relatar a intercorrência incomum do bloqueio de gânglio estrelado em uma paciente portadora de SDCR no membro superior direito.

**RELATO DO CASO:** Paciente do sexo feminino, 49 anos, estado físico ASA I, admitida para tratamento de dor no ombro superior direito de forte intensidade, em queimação, associada a mudanças tróficas, após oito meses de traumatismo local. Diagnosticada com SDCR, indicou-se bloqueio simpático em gânglio estrelado. Após monitorização realizou-se bloqueio com bupivacaína a 0,5% (8 mL), evoluindo, após injeção em topografia de gânglio estrelado por abordagem paratraqueal, com parestesia de membros distal, ansiedade e taquidispneia importante. Imediatamente a paciente foi sedada e realizada intubação orotraqueal, permanecendo em observação por 135 minutos. Recuperada, foi levada para a sala de recuperação pós-anestésica (SRPA). Após três dias do procedimento, relatou redução de dor na escala visual analógica, de 10 para 3 pontos.

**CONCLUSÃO:** Bloqueios regionais já demonstraram eficácia elevada no tratamento de quadros dolorosos vários, incluindo a SDCR. Este caso demonstrou que, apesar de serem incomuns, efeitos indesejáveis podem ocorrer, e o anestesiológista deve estar preparado para o suporte adequado do paciente nessas situações. O conhecimento adequado da anatomia e da técnica anestésica reduz a ocorrência desses efeitos.

**Descritores:** Bloqueio regional, Bloqueio simpático, Dor, Raquianestesia, Síndrome dolorosa complexa regional.

## INTRODUCTION

Complex regional pain syndrome (CRPS) is a debilitating painful syndrome known for more than one century and still today inducing stressful situations. Although recognized for such a

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long time<sup>1</sup>, its etiology is not totally clear and available management options still fail to improve pain and rehabilitate patients with such syndrome. One therapeutic option is the sympathetic block, being stellate ganglion block indicated for upper limbs CRPS. Although technically easy to induce, stellate ganglion block has some undesirable effects, such as Horner syndrome, hoarseness and, less commonly, total spinal anesthesia.

This study aimed at reporting the uncommon interoccurrence of this block, namely total spinal anesthesia, induced in a CRPS patient.

## CASE REPORT

Female patient, 49 years old, single, physical status ASA I, leukodermic, referred to the Pain Treatment Outpatient Setting due to severe pain in right upper limb (RUL). Patient reported trauma approximately eight months ago when her right arm was caught by a bus door. Approximately 20 days after the incident, she started presenting severe pain associated to trophic changes ("shiny and warm skin") on trauma region. Referred to several services, she was diagnosed as CRPS type I.

Management to date was based on imipramine (25 mg), 1 tablet/day, clonazepam (2 mg), 1 tablet/day and physical therapy, however without adequate pain control. Admitted to our service, we have observed major movement amplitude limitation (MA) in right upper limb, associated to pain at passive and active manipulation and trophic changes (edema, shiny and warm skin) as compared to contralateral upper limb. Patient had score 10 in 10 by visual analog scale (VAS), characterizing pain as burning, with irradiation to RUL. After confirming clinical diagnosis of CRPS, initial approach was the indication of stellate ganglion anesthetic block and optimization of pharmacological treatment associated to physical therapy.

Three days after consultation, patient was referred to blockade induction, fasting, monitored with cardioscope, digital oxymeter, noninvasive blood pressure with 5-minute intervals and peripheral venous access. Patient was positioned in the supine position and blockade was induced with paratracheal approach. Patient was asked not to cough, speak or swallow and then, perpendicular to skin, a 30 x 8 needle was inserted until the transverse apophysis of the sixth cervical vertebra (Chassainac tubercle) where, after 1 to 2 mm retreat, blood aspiration and negative CSF, 2 mL and then 6 mL of 0.5% bupivacaine without vasoconstrictor were injected.

Approximately 2 minutes after, patient reported progressive distal paresthesia of upper and lower limbs, evolving in the following minutes to severe tachydyspnea, anxiety, aphasia and mydriatic pupils. Monitoring parameters had not significantly changed. Patient was immediately sedated and intubated and was maintained in the operating room for 135 minutes more, without hemodynamic changes. After this period patient was again clinically evaluated, sedation and ventilatory support were withdrawn and patient was referred to the post-anesthetic care unit. Asked about RUL pain she reported VAS of 3/10 at movement and VAS of 1/10 at rest. Remained under observation for 4 hours more, being discharged without sequelae, with orienta-

tions after this period. At return, three days later, patient has denied complications reporting VAS in RUL of 2/10 at movement and of 0/10 at rest.

## DISCUSSION

First CRPS reports date from 1862 and it was described by Paget still with the name of Causalgia. Many other names have been already suggested for the same presentation, such as reflex sympathetic dystrophy, post-traumatic vasomotor disorder and Sudeck atrophy<sup>1</sup>. In a consensus published in 1994<sup>2</sup> by IASP (International Association for the Study of Pain) and updated in 2006<sup>3</sup>, names were standardized and CRPS was defined as: continuous regional pain condition (spontaneous and/or evoked) disproportional to trauma time or degree or other initial injury, in general followed by sensory, motor, vasomotor symptoms or trophic findings. Still in this document, CRPS was classified in types I and II, which differ because type II has real nervous injury not limited to its innervation territory. The etiology is still controversial, but animal and human studies show the importance of the disproportional inflammatory response after injury, associated to major sympathetic system changes, responsible for maintaining chronic neuropathic pain mechanism. Primary clinical manifestations are: burning, deep or piercing pain, sweating/anhydrosis, vasomotor changes (skin color and temperature), edema, muscle disorders (weakness, shivering, dystonia or myoclonus). Major treatment options require a multidisciplinary approach involving physical therapy<sup>4</sup>, transcutaneous electric nerve stimulation (TENS)<sup>5</sup>, psychotherapeutic support<sup>6</sup> and pharmacological options. Most common drugs are: gabapentin, 5% lidocaine patch, opioid analgesics and tricyclic antidepressants. Second line drugs indicated for limited situations are steroids and other anticonvulsants and antidepressants. Sympathetic block is one of the commonest options<sup>7</sup> and more promising results are obtained the earlier the blockade is induced<sup>8</sup>. For upper limbs CRPS (UULL), stellate ganglion blockade is indicated<sup>9</sup> and is aimed at decreasing pain and functionally improving the affected limb. Stellate ganglion is star-shaped and is made by the fusion of the lower cervical ganglion with the first thoracic ganglion. Anatomically, it is anterolateral to C<sub>7</sub> body, lateral to anterior scalene muscle, anterior to subclavian artery, posterior to pre-vertebral fascia and inferior to pulmonary apex. This ganglion may be blocked with anesthetics, opioids and/or steroids and there is also indication to treat phantom limb, trigeminal, cervical or thoracic dermatome post-herpetic neuralgia, and vasospastic disorders. Additional technologies, such as fluoroscopy and ultrasound, are measures to decrease the risk of adverse effects<sup>10</sup>. The prevalence of complications is 1.7 for every 1 thousand blockades<sup>11</sup>.

A potentially common adverse effect is Horner syndrome, caused by the propagation of the anesthetic drug through the cervical sympathetic trunk, and hoarseness, caused by recurrent laryngeal nerve block. Bilateral block is avoided due to risk of phrenic nerves block, which may result in bilateral palsy of the diaphragm and in ventilatory interferences<sup>12</sup>. Life-threatening complications are usually caused by inadvertent anesthetic injection in nearby arteries (subclavian and vertebral arteries) or

in the subarachnoid space. So, adequate monitoring and venous access are suggested.

Another possible side effect, however uncommon, is total spinal anesthesia after stellate ganglion blockade. According to a study<sup>13</sup> there are three possibilities for this to occur:

- Inadequate needle advance, directly injecting anesthetics in the subarachnoid space through the intervertebral foramen;
- Dura extension, going beyond the nervous root, far from intervertebral foramen. Some cadaver studies show that dura may prolong up to 8 cm with regard to intervertebral foramen;
- Perineural local anesthetics may retrogradely propagate to the subarachnoid space. This mechanism, however, requires longer time and higher doses to be justified.

Anesthesiologists have broadly adopted regional blocks and today their indications are further consolidated, as the case of interventionist CRPS management. However, the adequate understanding of anatomy, anesthetic technique and surveillance with regard to adverse effects are requirements for a good procedure evolution. Although uncommon, the presence of such undesirable effects points to the need for adequate monitoring and readily available materials for support measures when inducing regional blocks.

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