JONNESCO: One Century of Thoracic Spinal Anesthesia History

In November 2009, the 100th anniversary of the publication of the work of Thomas Jonnesco, titled "**General spinal analgesia**" through subarachnoid puncture in the thoracic region, was celebrated [1].

Through magnetic resonance imaging (MRI) studies, it was demonstrated the existence of a wide space between the meninges and the spinal cord [2]. This study included 16 patients and it demonstrated the presence of a space where a needle can be safely inserted for thoracic spinal blocks; the greatest distance was observed around the 5th thoracic vertebra (± 5 mm). In the past, subarachnoid myelography, done by neurologists and neuroradiologists, using thoracic and cervical puncture [3], was common and it was immediately accepted as an alternative for lumbar puncture [4]. This procedure is usually considered safe, but, occasionally, an "electrical feeling" caused by the penetration of the needle in the spinal cord was noticed, but without reports of complications [5]. Interestingly, with the advent of the MRI, subarachnoid myelography continue to be performed with some indications [6]. However, among anesthesiologists, the fear of the risk of direct damage to the spinal cord with puncture of the arachnoid space above the 1st lumbar vertebra persists.

In 1909, Thomas Jonnesco [1] proposed the use of general spinal block for surgeries of the skull, head, neck, and thorax. He performed punctures between the 1st and 2nd thoracic vertebrae, which produced perfect and deep analgesia for the body segment including the head, neck, and upper limbs. Since middle thoracic puncture, between the 7th and 8th vertebrae, was more difficult to accomplish and unnecessary for surgeries of the lower thoracic segment, he performed the puncture between the 12th thoracic vertebra and the 1st lumbar vertebra, which was easily accomplished e produced anesthesia for the lower portion of the body.

In 1954, Frumin et al. [7] proposed the use of segmental spinal block using low thoracic puncture. The group investigated segmental spinal block in 10 patients, by lumbar puncture and placement of a radio opaque catheter in the subarachnoid space until it reached the 12th thoracic vertebra. With the patient in dorsal decubitus, 5% procaine was injected through the catheter over 3 seconds, obtaining low thoracic and upper lumbar blockade in nine out of 10 patients.

In 2006, the new era of studies on spinal blocks in the thoracic region, looking for complete safety, started. Van Zundert et al. [8] proposed segmental spinal block, for videolaparoscopic cholecystectomy in a patient with severe obstructive lung disease, using a low thoracic puncture (T_{10}) for combined spinal-epidural block. In the following year [9], the same group demonstrated that segmental spinal block, similar to the technique in the previous report [8], could be safely used in healthy patients undergoing videolaparoscopic cholecystectomy. Unlike van Zundert et al. [8,9], who used the pencil-tip needle for the thoracic spinal block, here, in Brazil, the Quincke cut-bevel needle has been used since it has an orifice in its distal end [10]. The orifice of the pencil-tip needle is located 0.8 mm from its end, and, therefore, it is necessary to introduce the needle another 2 mm in the subarachnoid space to make sure that the whole orifice is within the vertebral channel in order to obtain the reflow of cerebrospinal fluid (CSF) [11]. Turner and Shaw [12] were the first to call attention for the safety of the pencil-tip needles, since they reported a high incidence of paresthesia. This is true for pencil-tip needles, also called non-traumatic needles, since there is the need of introducing them up to 1 mm of its blunt end until the flow of CSF can be observed, which is not necessary with the Quincke needle. With cut-bevel needles, immediately after its penetration in the dura mater, a reflow of the CSF can be observed.

The pencil-tip needle, usually the 25G and 27G Whitacre, was used in all seven cases described with neurologic damage after spinal block or combined spinal-epidural block [13]. An in vitro study with scanning electron microscopy demonstrated that the pencil-tip needle causes greater damage to the membranes than the cut-bevel needle [14]. The orifice left by the pencil-tip needle probably causes less loss of CSF; however, the damage can be greater when in contact with the spinal tissue.

In Brazil, data to state which needle is used more often does not exist. Without a good comparative study, it s impossible to say which needle is more associated with damage to the spinal cord; however, some data indicates it to be the pencil-tip needle. A high incidence of paresthesia (12%) was observed with the pencil-tip needle when compared to the cut-bevel needle[15], and 26.6% with combined spinal-epidural block [16], higher numbers than those reported for the cut-bevel needle.

In 1909, Jonnesco wrote [1]: "The needle I prefer has a point cut rather squarely, for since the arachnoid space is relatively small, if the point of the needle be oblique, it is possible that part of the opening might go through the dura mater while part remained outside it." Fantastic vision; he not only used thoracic spinal block but he also had a preference for cut-tip needle. The histories described of damage to more than one nerve root in all patients in whom pencil-tip needles were used, strongly suggest that the tip of the needle by itself can damage the medullary cone. Thus, studies comparing the needles available in the market are important at this moment that thoracic spinal block starts to be scientifically well developed.

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