

JONNESCO: One Century of Thoracic Spinal Anesthesia History

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REPLY

Dear Editor,

What I have done regarding the one-hundredth anniversary of Jonnesco's study ¹ was to think on my own. In fact, much of what the anesthesiologist Dr. Fortuna wrote was based on the anatomic knowledge of Leonardo da Vinci, discoverer of Human and Animal Anatomy. Leonardo da Vinci in the Middle Ages performed more than 20 cadaver dissections in the schools of Medicine magnificently describing the vertebral column ², anatomic concepts that remain to this date regarding the dead body.

In terms of the cadaver anatomy Prof. Fortuna mistakes the subdural for the subarachnoid space. The dura-arachnoid complex is formed from the epidural to the subarachnoid space by distinct laminar structures that correspond to the dura-mater, the subdural compartment and the arachnoid ⁴.

Prof. Fortuna criticizes the study by Jonnesco ¹ in two studies from the same period, one carried out in 1910 ⁵ with 18 patients where the author finishes the article by saying "*in my opinion, spinal blocks are not yet recognized as a branch of anesthesia.*" The other in 1911 ⁶ is actually an Editorial that discusses more the complications of local anesthetic agents of the period than the anesthetic technique.

It is obvious that the anatomic knowledge obtained from the advent of magnetic nuclear resonance (MNR) did not exist yet. When mentioning the work by Parsloe ⁷, Prof. Fortuna omitted that the content was about the history of deliberate hypotension and it did not condemn at any time the technique proposed by Jonnesco.

The Editorial from *Anaesthesia* ⁸ mentioned by Prof. Fortuna also dealt with the costs of malpractice suits related to epidural anesthesia. The work ⁹ that generated the editorial ⁸ concluded that factors associated with the malpractice suits included: epidural, nerve lesion, inadequate anesthesia, obstetric patients and, to a smaller extent, ophthalmologic block. The three studies mentioned by Prof. Fortuna ⁷⁻⁹ did not affirm that the spinal block was a risky, low-safety procedure and that it should be abandoned within a short time. On the contrary, it confirms its safety.

The physiological, biochemical, electronic microscopy and X-ray diffraction techniques have been applied to the study of cells, describing their structures at the molecular level. Imaging techniques such as x-rays, angiography, computed axial tomography, magnetic nuclear resonance, echography and

thermography have opened up doors for the study of anatomy *in vivo*. The MNR is a new technique and allows the analysis of a substance property through the correlation between the absorbed energy and the applied frequency. The supine position was mandatory for carrying it out. Current technological advances though allow its performance with the patient in the orthostatic position, in an inclined position and in the supine position ¹⁰, which allows not only the visualization of the thoracic subarachnoid space at unimaginable angles, but also suggests the promise of new anatomic knowledge *in vivo*. The MNR has been highlighted due to its promising use in healthy patients or those with CNS lesions ¹¹. The nerves of the cauda equina inside the dural sac have been exhaustively studied with the help of this technique. The rootlets form a pattern similar to a crescent shape ¹² spreading diffusely and occupying the posterior region of the lumbar space ^{13,14}. The MNR has provided detailed information on the anatomy of the thoracic vertebral canal ¹⁵⁻¹⁷. Van Zundert ^{18,19} and Imbelloni ²⁰ described the performance of the combined spinal-epidural block through thoracic puncture, without complications.

Despite the advances in diagnostic methods myelograms are still carried out through a subarachnoid puncture in the cervical and thoracic regions ^{21,22} without nervous tissue damage. In 1990 a study was published involving 220 neuroradiologists and 187,300 myelograms in which the puncture was performed between the C₁ and C₂ intervertebral spaces with only 68 (0.023%) complications, of which 63% were the consequence of the hyperextension of the vertebral column during the examination ²¹.

It is well known that anesthesiologists frequently fail to correctly identify the vertebral space. In a study seeking to locate the space L₃-L₄ there were only 29% of correct identifications ²³. Therefore, very often we think we are performing a puncture in the lumbar region, when we actually are performing one in the thoracic area.

The epidural thoracic blockade is an effective method of anesthesia and postoperative analgesia used worldwide and accidental perforation of the dura-mater is a complication of the technique, demonstrated in only two Brazilian ^{24,25} and two foreign studies ^{26,27}. The accidental perforation occurred in 0.4% to 4.4% in the series of 6,496 thoracic epidural blocks and none of the 48 patients developed any neurological sequelae ²⁴⁻²⁷. A possible anatomical explanation for the absence of spinal cord lesion during the accidental perforation of the thoracic dura-mater was proposed by Imbelloni and Gouveia in a study accepted for publication in the

November-December issue of the American Journal of NeuroRadiology (AJNR) ²⁸. The study shows through the use of MNR the following measurements: 5.19 mm in T₂, 7.75 mm in T₅, 5.88 mm in T₁₀, a space sufficiently large to allow the entrance of a needle during the accidental perforation (a hazard, as we are not ready for it) or intentional (lower risk, as we are ready for it) with thin and sharp needles.

Regarding the question whether “*Would I allow the use of this block in myself, my wife and children*”, I should answer that I would definitely allow it, mainly based on the anatomic studies of this century. It is worth mentioning that the four references cited by Prof. Fortuna (57-60) when asking this question do not contemplate this phrase. Prof. Fortuna justifies the thoracic subarachnoid puncture, and has himself performed it many times, in patients with incoercible pain but leaves a variety of patients with acute pain out of the benefit from this technique. He is actually not against the puncture, but against the anesthesia.

Unfortunately, Prof. Fortuna did not understand the deference I paid when I wrote that RBA Editorial: it was an homage to a man of vision. With no imaging techniques he described almost all that is known to date on thoracic puncture and certainly would have written all about the thoracic spinal block if he had been alive in 2010.

At the moment I am finishing a study with 400 patients (approved by the Ethics Committee in Research) studying

thoracic spinal block with low doses of a local anesthetic agent, preventing all the complications described in Prof. Fortuna’s letter.

It is necessary to know the physiology of modern spinal block proposed by Gouveia and Imbelloni, that justifies the low incidence of hemodynamic effects ³¹. The fact that an anesthetic technique is not usual does not mean that it is wrong. Scientific truths, as evident and correct they seem to be in a given moment of universal knowledge, quickly dissolve in the presence of new concepts and theories, or new evidence that modifies their principles ³¹.

Who knows we might live to witness the substitution of the thoracic epidural block disapproved by Prof. Fortuna (several references from his letter, not repeated here) by the thoracic spinal block.

There is no scientific truth; there is only scientific knowledge, which can only be seen as the truth at the present moment, as they are all relative and historical.

The medical literature allows us to attack or defend any colleague, as everyone is entitled to their right of defense.

Sincerely,

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TSA/PB

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