

# RETROSPECTIVE STUDY OF THE LAST 100 CASES OF ECHO-GUIDED LUMBAR BLOCK FOR MEDICAL FACETS AND BRANCHES IN A REFERENCE CLINIC IN THE CITY OF GOIÂNIA, BRAZIL

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## ABSTRACT

**OBJECTIVE:** This study aims to demonstrate the results of ultrasound-guided blockade of the medial branches and lumbar facets in the treatment for pain relief.

**MATERIALS AND METHODS:** In this retrospective and comparative study, data analysis of the last 100 cases of lumbar block for medial facets and branches was performed in a reference clinic in the city of Goiânia-GO. The following information was also analyzed: age, sex, laterality, levels of involvement and confirmation of pain improvement using the visual analog scale (VAS). All patients underwent echo-guided puncture for blockade and the following medications were administered according to each case: 2% lidocaine without vasoconstrictor + betamethasone dipropionate (5mg/mL) + betamethasone disodium phosphate (2mg/mL) in medial cephalic and caudal branches of each level; Sodium hyaluronate 10mg/ml, being 0.5ml in each affected facet.

**RESULTS:** The ultrasound and other imaging tests of these patients contained data on impairment of articular facets at 1, 2 or 3 levels. The mean age of the patients was 61 years old, being the youngest patient at 32 years old and the oldest at 93 years old. As for sex, 40% were male and 60% female. As for laterality, 72 patients were affected bilaterally, which is equivalent to 72%. As for the levels of involvement that were blocked, there was the following arrangement of cases: 13% of the cases were of blocks in only one level, 67% of the cases affecting two levels and 20% of the cases affecting three levels, with the prevalence of occurrence being level of L4-L5.

**CONCLUSION:** Ultrasound-guided blockade of medial branches and lumbar articular facets at specific levels according to each indication, proved to be effective in the treatment of pain relief in degenerative interfacetary spondyloarthropathy. Two articular levels were the highest frequency of procedures, with the L4-L5 level being the most prevalent. And pain relief was rated between 0 and 3, after procedure.

**KEYWORDS:** ULTRASOUND-GUIDED BLOCKS, INTERFACETARY SPONDYLOARTHROSIS, LOW BACK PAIN.

## INTRODUCTION

Low back pain is considered to be the first cause of visit to an orthopedic doctor's office worldwide. Lumbar facet joints correspond to 15% to 45% of patients with chronic low back pain according to the literature. The medial branches of the dorsal branch of the spinal nerve are responsible for innervating the interapophyseal joints and the deep spinal erector musculature. Over time, radiographic methods such as tomography and fluoroscopy have been and are still used as a guide for facet infiltrations and blockade of the medial branches. Ultrasound-guided nerve blocks have been reported, more recently as an important tool in the management of these cases, freeing

patients and doctors from the harmful and cumulative effects of radiation.

This study aims to demonstrate the results of ultrasound-guided blockade of the medial branches and lumbar facets in the treatment for pain relief in the last 100 cases performed at a reference clinic in the city of Goiânia, Brazil.

## MATERIAL AND METHODS

A Samsung brand, model HS 50 ultrasound equipment, with linear and convex multifrequency probes was used. A 22Gx3-1/2 spinal needle was used for the punctures.

Data analysis of the last 100 cases of blockade of the medial

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branches and lumbar facets was performed in a reference clinic in the city of Goiânia-GO.

This retrospective and comparative study of the medical record data maintained the patients' privacy and data confidentiality throughout all the research process. This study did not have direct contact with the studied group and all patient identifiers were discarded from the data set at the time of the initial collection, thus obtaining the waiver of informed consent.

The following information was also analyzed: age, sex, laterality, levels of involvement and confirmation of pain improvement using the visual analog scale (VAS). After collecting and computing data via the Epi Info™ | CDC, the tabulated statistical information was obtained using the Microsoft Excel program.

All patients underwent echo-guided puncture for blockade and the following medications were administered according to each case: 2% lidocaine without vasoconstrictor + betamethasone dipropionate (5mg/mL) + betamethasone disodium phosphate (2mg/mL) in the medial cephalic and caudal branches of each level; sodium hyaluronate 10mg/ml, being 0.5ml in each compromised facet.

**RESULTS**

The last 100 cases of echo-guided procedures for lumbar degenerative facet spondyloarthropathy, performed at the reference musculoskeletal ultrasound clinic in Goiânia-GO, which provided the data for this research, were the basis of this study. The ultrasound and other imaging tests of these patients contained data on impairment of articular facets at 1, 2 or 3 levels.

These patients were submitted to ultrasound-guided puncture to block the medial cephalic and caudal branches of each level and their respective articular facets, with 2% lidocaine without vasoconstrictor + betamethasone dipropionate (5mg/mL) + betamethasone disodium phosphate (2mg/mL) and sodium hyaluronate 10mg/ml, the latter for facet infiltration.

The data are represented by table 1-5 and graphs 1-5.

The average age of the patients was 61 years old, being the youngest patient at 32 years old and the oldest at 93 years old. As for gender, 40% were male and 60% female.

As for laterality, 72 patients were affected bilaterally, which is equivalent to 72%. The left side was affected in 14% of the cases, which is equivalent to 14 patients. The right side was affected by 14% of the patients as well.

As for the levels of involvement that were blocked, there was the following arrangement of cases: 13% of the cases were of blocks in only one level, 67% of the cases affecting two levels and 20% of the cases affecting three levels, with the prevalence of occurrence being the level of L4-L5.

The analogue pain scale (VAS) was applied 30 minutes after the echo-guided procedure and showed that 100% of the patients rated the pain improvement from 0 to 3 in the VAS scale and walked out of the medical clinic. No complications greater than a simple lipothymia in just two cases were observed.

Table 1. Age of patients attended at a clinic in Goiânia, with interfacetary spondyloarthropathy.

CI (years)	CC	FA	FR(%)	FRA(%)
32 † 40	36	15	15	15
40 † 48	44	9	9	24
48 † 56	52	10	10	34
56 † 64	60	21	21	55
64 † 72	68	10	10	65
72 † 80	76	14	14	79
80 H 93	87	21	21	100
<b>TOTAL</b>		<b>100</b>	<b>100</b>	

CI - Class Interval. CM - Class Mark. FA - Absolute Frequency AF - Relative Cumulative Frequency RCF

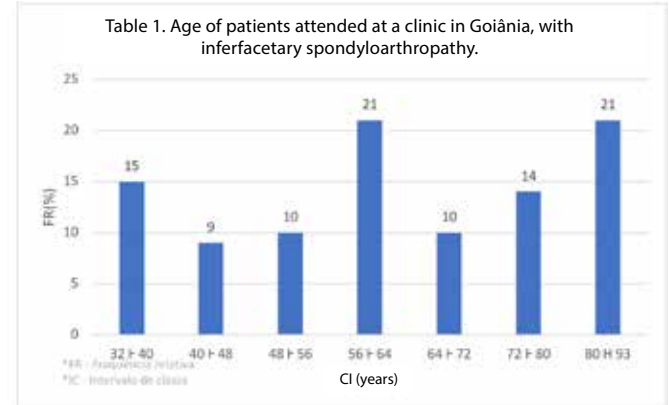


Table 2. Most affected sides of Interfacetary Spondyloarthropathy.

Sides	FA	FR(%)	FRA(%)
Left	14	14	14
Right	14	14	28
Bilateral	72	72	100
<b>TOTAL</b>	<b>100</b>	<b>100</b>	

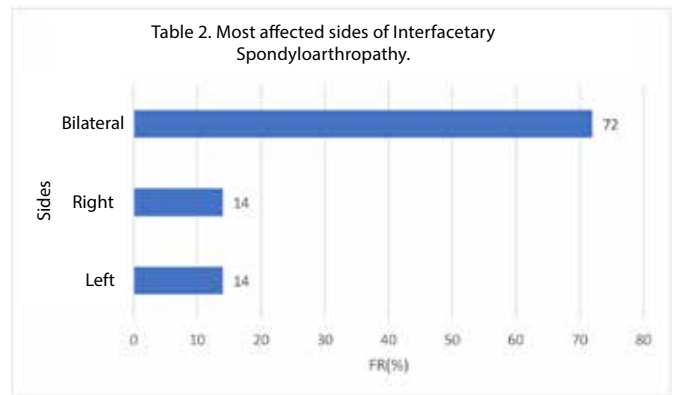


Table 3. Gender Distribution of patients with Interfacetary Spondyloarthropathy.

Sex	FA	FR(%)	FRA(%)
Male	40	40	40
Female	60	60	100
<b>TOTAL</b>	<b>100</b>	<b>100</b>	

Table 3. Gender Distribution of patients with Intervertebral Spondyloarthropathy.

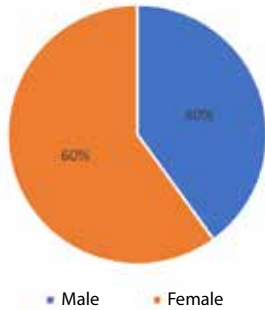


Table 4. Levels of involvement of Intervertebral Spondyloarthropathy.

Levels	FA	FR(%)	FRA(%)
One level	13	13	13
Two levels	67	67	80
Three levels	20	20	100
TOTAL	100	100	

Table 4. Levels of involvement of Intervertebral Spondyloarthropathy.

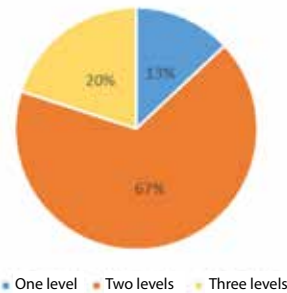


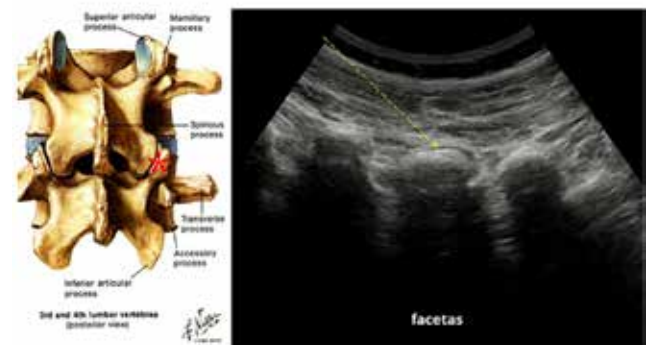
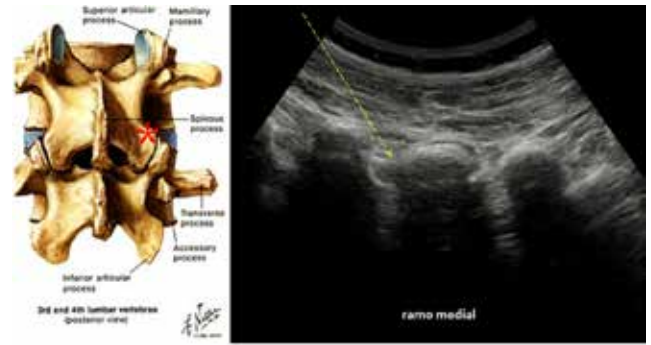
Table 5. VAS of pain after procedure in patients with Spondyloarthropathy Intervertebral

IC (EVA)	CC	FA	FR(%)	FRA(%)
0-3	2	100	100	100
3-6	5	0	0	
6-10	8	0	0	
TOTAL		100	100	

The videos of the eco-guided procedures can be viewed according to the QR codes below (bring your camera close to the QR Code):



Video 1: Facet blockade. Video 2: Caudal medial branch block



Figures 1, 2 and 3: Images illustrate with a red asterisk locating the targets in the interapophyseal and facet joints, where the needle is inserted in the path from proximal to distal, longitudinally in the direction of these targets at the level of L4-L5. The dotted arrow indicates the route.

Image 4 illustrates an echographic aspect of L4-L5 interfacet arthrosis comparing it to the image obtained by magnetic resonance imaging.



Figure 4: Transverse ultrasound image at the L4-L5 level showing facet arthrosis. Attached magnetic resonance image in the axial plane in T2.

## DISCUSSION

The term facet syndrome was first described in 1933 by Chormley RK<sup>1</sup> as pain induced during torsion or rotation of the lumbosacral region. The medial branches of the dorsal branch of the spinal nerve are responsible for innervating the interapophyseal joints and the deep spinal erector musculature. Over time, radiographic methods such as tomography and fluoroscopy have been and are still used as a guide for facet infiltrations and blockade of the medial branches.

Ultrasound-guided blocks began broadly in 1978 with La Grange et al<sup>2</sup>, who drew attention for trying to perform ultrasound-guided brachial plexus block procedures. And from then on, numerous studies were published in this sense, until Greher et al<sup>3</sup> reported a target point for ultrasound-guided facet blockade. Since then, countless authors have been adding knowledge and qualifying the ultrasound method as a reliable guide for the procedures of facet and medial branches blocks.

Galiano et al<sup>4</sup> conducted this study to develop an ultrasound-guided approach for injections into the facet joints of the lumbar spine. Five zygapophyseal joints (L1-S1) on each side of five embalmed corpses were examined by ultrasound of a total of 50 exams. The study was comparative with computed tomography. They concluded that the orientation of the ultrasound can be a useful complement for injections in the facet joints in the lumbar spine<sup>4</sup>.

In 2007 Galiano et al<sup>5</sup> in a prospective randomized clinical trial with 40 patients used facet injections guided by ultrasound versus computed tomography in the lumbar spine and concluded that the US approach in the facet joints of the lumbar spine is feasible with minimal risks in most patients and results in a significant reduction in the duration of the procedure and in the radiation dose<sup>5</sup>.

Kim et al<sup>6</sup> in 2013 observed that ultrasound-guided blocks of the medial branches and facet joints can be performed with 89.5% effectiveness, and advised that these procedures should be performed in outpatient clinics without the concern for radiation exposure<sup>6</sup>.

In 2015, in a literature review with a total of 202 adult patients with facet joint pain, Wu et al.<sup>7</sup> evaluated the comparative effectiveness of ultrasound-guided injections (US) versus computed tomography (CT) and/or fluoroscopy. This review suggested that no significant differences in pain and functional improvement were observed between techniques guided by USG and CT/fluoroscopy in facet joint injection. USG injection is feasible and minimizes radiation exposure for patients and professionals in the process of

Ye et al<sup>8</sup> in 2018, studied ultrasound guidance versus low-dose computed tomography for injections in the lumbar facet joints, which showed the same precision and efficiency. 86.5% of the injections in the facet joints were performed correctly under the guidance of the ultrasound in the first attempt. They also concluded that the articular space of the lumbar facet can be accurately demonstrated by US.

US-guided facet joint injection in the lumbar spine achieved almost the same satisfactory viability, accuracy, and clinical efficiency compared to low-dose CT. In addition, they concluded that the ultrasound technique can provide real-time monitoring<sup>8</sup>.

In 2019 Shi et al<sup>9</sup> conducted a study showing the comparison of measurement between ultrasound and computed tomography for abnormal degenerative facet joints, and demonstrated that the US can clearly show the structure of the facet joints of the lumbar spine. That the method is accurate and viable to evaluate the lumbar spine joints by ultrasound. And that this study has an important significance for the diagnosis of degeneration of the lumbar facet joint.

In our study, the mean age of patients was 61 years and 40% were male and 60% were female. About 72% of the patients were affected bilaterally, with the left and right side with 14% for each side.

As for the levels of involvement that were blocked, there was the following arrangement of cases: 13% of the cases were of blocks in only one level, 67% of the cases affecting two levels and 20% of the cases affecting three levels, with the prevalence of occurrence being level of L4-L5.

The visual analogue pain scale (VAS) was applied in all cases after 30 minutes of the ultrasound-guided procedure and 100% of the patients rated the pain improvement between 0-3 in the VAS of 0-10 and all walked out of the surgery. No complications greater than mild lipothymia were observed in two cases.

## CONCLUSION

Ultrasound-guided blockade of medial branches and lumbar articular facets at specific levels according to each indication, proved to be effective in the treatment of pain relief in degenerative interfacetary spondyloarthropathy.

The intrarticular application of hyaluronic acid still requires follow-up studies in the medium and long term.

Two articular levels were the highest frequency of procedures, with the L4-L5 level being the most prevalent. Moreover, pain relief was rated between 0 and 3 in VAS after the procedure.

It was also shown in this study that the majority of cases affected the female gender, the average age was 61 years old and regarding laterality 72% of patients were affected bilaterally.

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