

Diagnostic Medial Branch Blocks before Lumbar Radiofrequency Zygapophysial (Facet) Joint Denervation

Benefit or Burden?

DEGENERATIVE changes of the zygapophysial joints (facet joints) account for approximately 10–15% of the cases with chronic low back pain.¹ Radiofrequency ablation of the medial branches of the dorsal rami is a frequently performed procedure to treat pain originating from the facet joints. The success of radiofrequency facet denervation is highly dependent on patient selection. Diagnostic blocks are recommended in guidelines and reviews for selecting patients with facet joint pain from a population with nonspecific low back pain, however, with a large variation in the techniques of performing and assessing the blocks.² Cohen *et al.*³ published in this issue of ANESTHESIOLOGY a randomized controlled trial (RCT) assessing three selection paradigms before radiofrequency lumbar facet denervation. The design and findings of this study provide an important contribution to the ongoing debate on patient selection and the so-called diagnostic blocks.

The importance of the correctly performed and assessed diagnostic blocks becomes clear when examining the seven RCTs on radiofrequency lumbar facet denervation.^{4–10} In five of seven RCTs, the radiofrequency treatment has a superior outcome to its comparator,^{4,5,7–10} whereas there is one negative⁶ and one equivocal study.⁷ In all of these studies, diagnostic blocks were performed. However, there is no definitive standard on how to perform the diagnostic blocks, resulting in a wide variation of technique, medication used, dose, and whether to block the facet joint or its nerve supply as well as the interpretation of the results of such blocks, which is illustrated in table 1. Consequently, the percentage of patients who are ultimately selected for treatment varies from 10 to 92%, which is not in line with prevalence data of facet arthropathy (10–15%). These large variations in patient selection may contribute to the differences in observed success rates among different RCTs. The goal of diagnostic blocks is to select patients with facet joint pain, who are supposed to benefit mostly from the use of radiofrequency facet denervation. This can be expressed by the number of patients needed to be treated (NNT) to result in one patient

with a positive outcome. The lower the NNT, the more effective the treatment.

In the negative⁶ and equivocal⁷ RCT on radiofrequency facet denervation, patients were selected by means of specific intraarticular blocks instead of the medial branch blocks. Moreover, Leclaire *et al.*⁶ judged the intraarticular block with local anesthetic and corticosteroid to be positive when the patient reported “significant” pain relief during 24 h within the week after the injection. The 92% inclusion rate may reflect the high false-positive rate. The NNT in this study was 11.9 in the radiofrequency group. In a controlled study using single diagnostic medial branch blocks, where the outcome of the block was assessed by the patient with the help of a study nurse within 30 min after the injection, the prevalence of facet joint pain was 31%.⁵ The NNT in the radiofrequency group was 1.6. In a nonrandomized but high-quality prospective study, Dreyfuss *et al.*¹¹ included patients after two positive controlled blocks with lidocaine and bupivacaine. The prevalence of facet joint pain was 10.8% and of NNT 1.1. In conclusion, the use of diagnostic intraarticular facet joint blocks cannot be recommended anymore, and better patient selection with medial branch diagnostic blocks improves the outcome of radiofrequency facet denervation.

However, there are two concerns regarding a future standard recommendation for controlled diagnostic blocks. First, by increasing the number of diagnostic blocks, the false-positive rate will be reduced, but unfortunately the false-negative rate will increase, thus increasing the risk of withholding an active treatment from patients. Moreover, aberrant medial branch innervation was demonstrated in 11%, demonstrating an additional risk for false-negative blocks.¹² The second concern is related to the balance of the burden of multiple interventions *versus* the potential benefit. The study by Cohen *et al.* published in this issue adds another piece of information to this complicated puzzle. The

◆ This Editorial View accompanies the following article: Cohen SP, Williams KA, Kurihara C, Nguyen C, Shields C, Kim P, Griffith SR, Larkin TM, Crooks M, Williams N, Morlando B, Strassels SA: Multicenter, randomized, comparative cost-effectiveness study comparing 0, 1, and 2 diagnostic medial branch (facet joint nerve) block treatment paradigms before lumbar facet radiofrequency denervation. ANESTHESIOLOGY 2010; 113:395–405.

Accepted for publication April 8, 2010. The authors are not supported by, nor maintain any financial interest in, any commercial activity that may be associated with the topic of this article.

Table 1. Details on Diagnostic Blocks Used in Randomized Controlled Trials on Radiofrequency Facet Denervation

Study	Type of Block	No.	Levels	Products	Evaluation	Cutoff
Gallagher <i>et al.</i> ⁴	In and around joint	1	?	Bupivacaine 0.5%, 0.5 ml	Pain relief over 12 h	Clear and equivocal pain relief
van Kleef <i>et al.</i> ⁵	MMB	1	Minimum 3: L3, L4, and L5	Lidocaine 1%, 0.75 ml	Patient scores pain relief on a four-step Likert scale	50% Pain reduction
Leclaire <i>et al.</i> ⁶	Intraarticular	1	?	Lidocaine 2%, 0.5 ml Triamcinolone 40 mg, 0.5 ml	Patient assessment of pain relief during 1 week	Minimum 24-h "significant" pain relief
van Wijk <i>et al.</i> ⁷	Intraarticular	1	2: Th12–L2, L2–L4, and L4–S1	Lidocaine 2%, 0.25–0.5 ml	VAS 30 min postprocedure	50% Pain reduction
Tekin <i>et al.</i> ⁸	MBB	1	3: L3, L4, and L5	Lidocaine 2%, 0.3 ml	Patient	50% Pain reduction
Kroll <i>et al.</i> ⁹	MBB	2	Minimum 2: ?	Bupivacaine 0.5%, 1 ml	Patient—3 h postprocedure	50% Pain reduction after two blocks
Nath <i>et al.</i> ¹⁰	MBB	2–3	Minimum 2 standard targets	Screening: bupivacaine 0.5%, 1 ml Later phase: one test with lidocaine and one test with bupivacaine	Patient reported reduction of a consistent component of pain followed up to 6 h	80% Pain reduction after each block for duration of action of LA

LA = local anesthetic; MBB = medial branch block; VAS = Visual Analogue Scale.

authors try to identify the most beneficial strategy for selecting patients for a radiofrequency facet denervation by calculating the cost per successful radiofrequency procedure based on three strategies for patient selection: (1) clinical examination alone, (2) clinical diagnosis followed by one diagnostic block, and (3) clinical diagnosis followed by two diagnostic blocks. Radiofrequency treatment of patients selected on clinical examination has the lowest cost per successful treatment, whereas the highest costs per successful radiofrequency treatment is generated when performing this procedure after one single diagnostic block. The price of the global management will vary from one country to another, and the authors also suggest that changes in the decisions of third-party payers may change the monetary outcome of this study. This study confirms the statement made earlier that a better patient selection by means of increasing the number of diagnostic blocks will result in a better treatment outcome because of fewer false-positive responders.

Besides the costs of the different interventions, it is worth considering the extra burden for the patient related to extra visits and interventions associated with controlled blocks. In the study by Cohen *et al.*, 64% of the patients treated after two diagnostic blocks and 39% of the patients treated after one block had a successful outcome. This means that for a 25% increase in successful outcome after radiofrequency treatment, 100% more diagnostic interventions are needed. Furthermore, by increasing the number of diagnostic blocks,

the risk of false-negative blocks is also increased, thus withholding potential responders from the treatment. In the study by Cohen *et al.*, each group contained 50 or 51 patients. Patients were allocated randomly to one of the treatment groups to create homogeneous populations in the three study groups. When looking at the number of patients who had 3 months of pain relief, we noticed the following: group 0, $n = 17$; group 1, $n = 8$; and group 2, $n = 11$. These differences suggest that a number of patients were excluded from treatment in groups 1 and 2 based on false-negative blocks and thus withholding patients from prolonged pain relief. Thus, the question arises as to whether the relative small gain in success justifies the extra burden for the patient, higher costs, and possible side effects of an additional treatment session. Moreover, only minor and transient side effects are reported in the literature after radiofrequency facet denervation.¹³

In conclusion, standardization and scientific validation of (controlled) diagnostic medical branch blocks is highly needed to identify its real value in clinical practice.

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