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Letter to the Editor

LETTERS TO THE EDITOR

Comparative Versus Non-Comparative Dual Lumbar Medial Branch Blocks before Radiofrequency Neurotomy: Is There a Difference in Prognostic Value?

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Lumbar medial branch blocks radiofrequency neurotomy.

Dear Editor,

Should comparative or noncomparative dual medial branch blocks (MBBs) be used to select individuals with low back pain for medial branch radiofrequency neurotomy (MBRFN)? A recent systematic review considered the effectiveness of lumbar MBRFN stratified by diagnostic methods and procedural technique [1]. The utility of controlled, comparative MBBs, which theoretically investigate false-positive responses by comparing the patient-perceived duration of pain relief following blocks using a short-acting (lidocaine) versus a long-acting (bupivacaine) local anesthetic agent was discussed. The authors indicated that comparative blocks have been validated in a placebo-controlled study of cervical MBBs, but that the analogous study for lumbar MBBs has yet to be conducted [2]. To determine whether comparative or non-comparative dual MBBs are more appropriate for lumbar MBRFN patient selection, the original comparative cervical block studies were reviewed in light of recent data [2–4]. The MBB selection criteria utilized by two landmark studies that helped establish the efficacy of lumbar MBRFN were also considered [5, 6].

In 1993, Barnsley and colleagues studied 47 patients with chronic neck pain following whiplash injury [3]. The authors suggested that the primary shortcoming of cervical MBBs is the risk of false-positive responses given patients' subjective reporting. Ideally, the addition of placebo-controlled MBBs using normal saline would help reduce the false-positive rate. The first local anesthetic MBB would be followed by two additional MBBs using a local anesthetic and normal saline, randomly allocated. However, because of "logistic complexities" and "ethical" considerations regarding saline placebo controls, comparative local anesthetic MBBs were selected as a substitute. A strict definition of positive comparative MBBs stated that "only patients with longer responses to the longer-acting anesthetic would be considered true-positive responders, and hence be diagnosed with cervical, zygapophysial joint pain." Five possible patterns of patient response to comparative cervical MBBs emerged. "Discrepant" responses occurred when one of two blocks did not provide substantial or complete relief and were considered negative. "Discordant" responses were tallied when individuals reported shorter durations of relief with bupivacaine blocks or longer durations of relief with lidocaine blocks. "Concordant" responses were defined as responses to both MBBs consistent with the expected duration of the agents used and were considered positive blocks. Two other types of responses, "concordant prolonged" and "discordant prolonged" were also identified in which the duration of relief greatly exceeded the expected duration of anesthetic action. The authors noted that additional studies were needed "to determine whether or not prolonged responses are physiologically genuine and constitute true-positive responses."

In 1995, the same investigative group published a study that considered comparative versus "placebo-controlled" MBBs to determine the presence of cervical zygapophysial joint pain [2]. Fifty consecutive patients with chronic neck pain following a motor vehicle accident underwent the "three-block" paradigm previously described. Only those patients who responded to both

blocks and who obtained longer-lasting relief when the longer-acting agent was used were considered true-positive responders. Any other pattern of response was considered to be some form of placebo response and deemed negative. Comparative MBBs tested against placebo MBBs yielded a specificity of 88%, but only a marginal sensitivity of 54%. To improve sensitivity, the authors expanded the "comparative block criteria to include all patients with reproducible relief, irrespective of duration, increasing sensitivity to 100%, but lowering specificity to 65%." This introduced the concept that two positive responses to two consecutive blocks, irrespective of duration, may be a viable and more sensitive means of diagnosing zygapophysial joint pain, which they termed a "dual block" paradigm in lieu of a "comparative block" paradigm. Rephrased, the data indicated that a non-comparative "dual block" diagnostic paradigm offers improved sensitivity compared to a triple placebo-controlled block paradigm, which provides improved specificity with a reduced risk of false positive diagnoses.

In 2019, a prospective multicenter study of consecutive patients examined patient-perceived durations of effect following lidocaine and bupivacaine MBBs performed according to the Spine Intervention Society practice guidelines [4]. Pain relief duration following dual MBBs utilizing lidocaine or bupivacaine was compared in patients who reported at least 80% relief (defined as "successful"/positive). One hundred and fifty pain diaries from five centers were reviewed. The mean patient-perceived duration of pain relief with lidocaine and bupivacaine was 16.4 and 3.55 hours, respectively. These results indicated that the duration of relief following successful MBBs did not correlate with the pharmacologic half-life of the local anesthetic utilized. These new data appear to confirm the high likelihood of "discordant" and "prolonged discordant" responses to lidocaine MBBs and may help explain the marginal sensitivity of comparative MBBs observed in the earlier studies.

In addition, landmark studies that established the effectiveness of the lumbar MBRFN procedure opted not to use a true comparative block protocol for patient selection, but either a modified comparative or noncomparative block paradigm [5, 6]. For lumbar MBRFN selection, Dreyfuss and colleagues did not compare durations of relief following lidocaine and bupivacaine MBBs but only required that pain relief after lidocaine MBBs last at least 1 hour and that relief following subsequent bupivacaine MBBs last at least 2 hours [5]. Interestingly, the authors reported a median (range) duration of relief from lidocaine and bupivacaine blocks of 4.4 (1.3–6) and 4.9 (2–6) hours, respectively, consistent with the multicenter study indicating that patients may often report similar or even longer durations of relief with lidocaine blocks than with bupivacaine blocks [4]. While MacVicar and colleagues utilized both lidocaine and bupivacaine MBBs for lumbar MBRFN selection, they notably state that "duration of relief following each block was not a criterion for treatment" [6].

The current foundation of literature regarding a two-block paradigm for lumbar MBRFN patient selection is primarily composed of two cervical spine studies, one that describes a true "comparative block" paradigm and another that introduces the concept of a "dual block" paradigm [2, 3]. Both approaches are limited by unexpected "prolonged" responses. Lumbar MBRFN effectiveness literature has primarily utilized the "dual block" paradigm [5, 6]. There is no foundational or outcome literature in the lumbar spine that directly supports the use of a true "comparative block" paradigm. In addition, recently published abstract data highlighting the number of discordant and prolonged responders seen in clinical practice have cast considerable doubt on the utility of comparative lumbar blocks [4]. Based on all of the above evidence, it is possible that noncomparative, dual MBBs without consideration of "concordant" or "discordant" responses may provide adequate prognostic validity for successful patient selection for therapeutic lumbar MBRFN.

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