

Aiming is not enough: you must hit

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A number of slightly different approaches for posterior lumbar plexus block have been described¹⁻⁶ but it is questionable if the optimal approach is amongst them. Peripheral nerve blocks offer advantages such as earlier hospital discharge, less postoperative pain, nausea, emesis, hypotension, and urinary retention.⁷⁻¹⁰ Besides sciatic nerve block knee joint replacement requires block of both, the femoral and the obturator nerve. Intraoperative pain scores were lower and patient satisfaction was higher when using posterior lumbar plexus blocks as opposed to “3-in-1 block” during knee arthroscopy.¹¹ In the postoperative setting morphine consumption was significantly lower if an obturator block had been added to a femoral nerve block.¹² However, even with the posterior lumbar plexus block, the obturator nerve block is not consistently blocked.¹³ Thus, a number of slightly different approaches for posterior lumbar plexus block have been described to improve the quality of blocks.¹⁻⁶ However new problems arose such as retroperitoneal hematoma¹⁴ or accidental renal puncture¹⁵ caused by too lateral or too cranial puncture. Too medial injection of local anesthetics increases the risk of their epidural spread,^{16, 17} subarachnoid puncture,¹⁸ or even catheter placement.¹⁹

Traditional methods for determining the insertion site rely on surface landmarks, *e.g.*, the spinous processes, iliac crests, and the posterior superior iliac spine (PSIS) from which “construction lines” are made to determine the point of needle entry.¹⁻⁵ These construction lines intersect at one precise location, and the proximity of this intersection is not always a good reflec-

tion of the actual location of the lumbar plexus. Thus, small deviations in the needle insertion point from medial to lateral will result in large deviations between the needle tip and the actual plexus location. Further, Broadbent²⁰ impressively demonstrated the failure of anesthetists to identify the intended vertebral level by using the intercrestal line for orientation. This resulted in deviations of up to four levels.

Borghetti *et al.* present an insertion site reflected by a perpendicular line to the spinal column passing the skin depression at the iliac crest prominence at defined distances.²¹ Traditional surface landmarks¹⁻⁵ place the entry points for lumbar plexus block significantly away from the average location of the course of the lumbar plexus.⁶ The method described by Capdevila¹ is the least problematic in his regard, but still places the entry point, on average, 6 mm lateral to the course of the nerve. Such landmarks prone to deviation may increase patients’ risk by repetitive attempts, and prolong block performance time which is usually 4-12 min.²² In comparison to Chayen’s⁴ approach Borghetti *et al.*²¹ demonstrated faster block performance time with a lower necessity of needle re-advancement in particular in obese patients with the new method.

Fixed metric surface landmarks as suggested by Parkinson,² Pandin,³ and Chayen⁴ may not fit to the individual patients course of the lumbar plexus⁶ and are, likewise, prone to deviation from perpendicular needle direction and, thus, result in too medial advancement.¹⁹ A too caudad approach for lumbar plexus block³ additionally may

fail to block the femoral nerve due to its variable exit off the major psoas muscle.²³ Borghi's approach compensates for the fixed metric landmark of 3.8 cm in men and 2.8 cm in women along the described construction line by individual height adaptation related to the patients' skin depression. Thus superiority of Borghi's approach over the metric accesses²⁻⁴ with regard to puncture precision or block performance time is sound. Anesthetists frequently fail in identifying the intended vertebral level by using the intercrestal line for orientation,²⁰ the higher the vertebral level aimed at, the higher is the probability of error. This error will be avoided by Borghi's approach as opposed to the Chayen control group relying on identification of the spinous process of L4.

It was demonstrated that the Capdevila's¹ landmark, which uses an individually adapted distance to identify the site of puncture (2/3 of the distance PSIS-vertebral column) brings improved proximity. In this regard it was superior to all other traditional approaches (Parkinson,² Pandin,³ and Chayen⁴ but inferior to diagonal vector [DIVE] blocks⁶). So the hardest control group to challenge Borghi's technique would have been the Capdevila's or the DIVE approach, which might have exerted lower attempts for successful blocks than the Chayen's method, which was actually used. If Borghi's approach could be even improved when using relative measures such as Capdevila¹ or diagonal vector (DIVE) blocks⁶ instead of the fixed distances of 28 or 38 mm, respectively, should be subject of further research.

Borghi's approach is one step further to find an ideal insertion point for the lumbar plexus block. When developing new approaches to the lumbar plexus, however, we have to keep in mind that too medial injection of local anesthetics favors their epidural spread.^{16, 24} A too high and too lateral access bears the risk of renal puncture. Clinical practice will show the utility risks and benefits of the new approach in this regard.

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