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Internal resistance to injection varies among needles of different manufacturers

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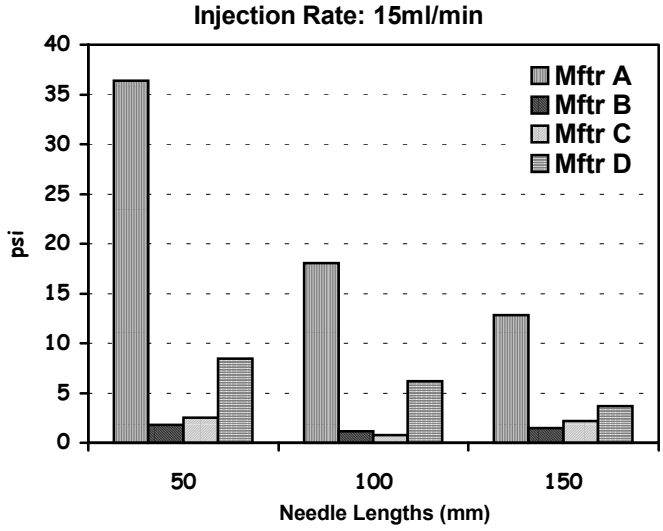
Introduction: High injection pressure during initiation of a nerve block may herald intraneural injection. Many anesthesiologists rely on subjective evaluation of resistance to injection ("feel") in order to alert them to the potential for intraneural injection. However, this may be influenced by needle design. The purpose of this study was to determine pressure characteristics of needles with similar internal resistances.

Methods: From each of 4 manufacturers, three nerve block needles at gauges of (50mm/22g; 100mm/21g; 150mm/20g) where tested at injection speeds of 10, 15, 20, and 25 ml/min. The needles were connected via flexible tubing to an automated programmable infusion pump (PHD 2000, Harvard Apparatus, Holliston, MA). The data were acquired using a manometer (PG5000, PSI-Tronics Technologies Inc., Tulare, CA) coupled to a computer via an analog digital device (DAQ 6023, National Instruments, Austin, TX) and analyzed using data analysis software package (BioBench 1.2 version, National Instruments, Austin, TX). One-way ANOVA was used to detect if there were differences in injection pressure at varying injection speeds.

Results: Pressure required to inject substantially varied among the tested needles. The figure below illustrates the difference in injection pressures using an injection speed of 15ml/min ($p<0.05$).



Discussion: The pressure required to inject through a needle was related to the rate of injection and differences in needle design. More importantly, the injection pressure substantially varied among the four manufacturers. Not surprisingly, injection pressure varied by needle length, even for needles from the same manufacturer. Anesthesiologists should be aware of such differences and may want to "test" the resistance to injection before using a specific needle.

References:

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