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SCIENTIFIC ARTICLE

Evaluation of brachial plexus fascicles involvement on infraclavicular block: unfixed cadaver study

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KEYWORDS
Regional anesthesia;
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Abstract
Background and objectives: This study shows how the diffusion of the anesthetic into the sheath occurs through the axillary infraclavicular space and hence proves the efficacy of the anesthetic block of the brachial plexus, and may thereby allow a consolidation of this pathway, with fewer complications, previously attached to the anesthesia.
Materials and methods: 33 armpits of adult cadavers were analyzed and unfixed. We injected a solution of neoprene with latex dye in the infraclavicular space, based on the technique advocated by Gusmão et al., and put the corpses in refrigerators for three weeks. Subsequently, the specimens were thawed and dissected, exposing the axillary sheath along its entire length.
Results and discussion: Was demonstrated involvement of all fasciculus of the plexus in 51.46%. In partial involvement was 30.30%, 18.24% of cases the acrylic was located outside the auxiliary sheath involving no issue.
Conclusions: The results allow us to establish the infraclavicular as an effective and easy way to access plexus brachial, because the solution involved the fascicles in 81.76% partially or totally, when it was injected inside the axillary sheath. We believe that only the use of this pathway access in practice it may demonstrate the efficiency.

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PALAVRAS-CHAVE
Anestesia regional;
Plexo braquial;
Bloqueio infraclavicular

Avaliação do envolvimento dos fascículos do plexo braquial no bloqueio por via infraclavicular: estudo em cadáveres não fixados

Resumo
Justificativa e objetivos: Procuramos demonstrar como ocorre a difusão do anestésico no interior da bainha axilar, quando se utiliza o bloqueio por via infraclavicular, através da fossa infraclavicular e, consequentemente, provar a eficácia dessa via, podendo, com isso, permitir uma consolidação da utilização desse acesso, com redução das complicações.
Materias e método: Foram utilizadas 33 axilas de cadáveres adultos não fixados. Injetamos uma solução de neoprene látex com corante na fossa infraclavicular, baseando-se na técnica preconizada por Gusmão e col, e colocamos os cadáveres em geladeiras por três semanas. Posteriormente, as peças foram descongeladas e dissecadas, expondo a bainha axilar em toda sua extensão.
Resultados e discussão: Foi demonstrado envolvimento de todos os fascículos do plexo em 51,46%. Em 30,30% houve envolvimento parcial, e em 18,24% dos casos o acrílico foi localizado fora da bainha axilar, não envolvendo nenhum fascículo.
Conclusões: Os dados obtidos permitem estabelecer a via infraclavicular como uma via eficaz e de fácil acesso ao plexo braquial, visto que a solução injetada envolveu os fascículos em 81,76% parcialmente ou totalmente, quando era injetada dentro da bainha axilar. Acreditamos que apenas a utilização desta via de acesso na prática poderá demonstrar a eficiência da mesma.

Introduction

Over the years, brachial plexus blockade by supraclavicular and axillary routes has presented a number of complications and failures, bringing back the use of the infraclavicular route.[1]

The infraclavicular brachial plexus block was initially advocated by Hirschel[2] in 1913. In 1917, Bazy[3] introduced a needle below the clavicle, in a ''anesthetic line'' drawn between the anterior tubercle of the sixth cervical vertebra and the coracoid process. In 1918, Babitsky[4] injected the anesthetic between the angle formed by the 2nd rib and the clavicle.

In 1922, Labat[5], after injecting the anesthetic at the same point recommended by Bazy, flexed the arm toward the chest and performed another injection of the same solution.

In 1924, Balog[6] modified Bazy's technique, but the needle was introduced toward the rib cage, until it touches the second rib, and he retreated the needle a little and deposited the anesthetic.

In 1973, Raj et al.[7] introduced the needle at a midpoint of the clavicle, turning it to the side to prevent puncturing the chest wall.

Sims[8], 1977, modified the technique by Raj et al. using a standard 3.8 cm needle which directed downward, outward, and backward reached the brachial plexus 2–3 cm after having passed the skin. He emphasizes that it is a rapid, easy and consistent access route for blockade performance.

Whiffler[9], 1981, drew a line between the subclavian and axillary arteries, and the puncture was made at the point that this line crossed the coracoid process and reported success in 92.5% of cases and arterial puncture in 50%.

In 1995, Kilka et al.[10] reported that the infraclavicular brachial plexus block have lower risk of pneumothorax and low incidence of phrenic nerve block.

In 2001, Imbelloni et al.[1] determine that the injection should be at a point 1.5 cm below the site of union between the lateral third and the medial two-thirds of the clavicle, succeeding in 94% of cases.

Although there were fewer complications, cases of vascular and chest wall punctures with consequent pneumothorax were still reported.[11]

In 2002, Gusmão et al.[11] used one hundred fixed cadavers and performed infraclavicular fossa dissection, which was present in 96% of cases, determining that brachial plexus block by this route should be performed after finding the angle formed by the junction of the anterior margin of the deltoid muscle and the clavicle, draw a bisector from the angle to the fossa center, measuring about 2.21 cm, and enter the needle perpendicular to the skin at this site with a depth of 3.0–3.5 cm, piercing the axillary sheath and reaching the brachial plexus, which are located at this level, laterally to the axillary vessels.

Verifying that brachial plexus in most cases lies within the infraclavicular fossa and that the blockade by this access route reaches the brachial plexus fasciculi with few failures and without the complications described in the interscalene, supraclavicular, and axillary techniques, it remained to be demonstrate how the anesthetic spread behaves by using the above described route.

Materials and methods

Complying with what determines the Federal Law N° 8501, November 30, 1992 (Annex), and after institutional