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SCIENTIFIC ARTICLE

# A comparison of three different needles used for spinal anesthesia in terms of squamous epithelial cell transport risk☆

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**KEYWORDS**
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**Abstract**
*Background and objectives:* To investigate the differences in the number of squamous epithelial cells carried to the spinal canal by three different types of spinal needle tip of the same size.
*Methods:* Patients were divided into three groups (Group I, Group II, Group III). Spinal anesthesia was administered to Group I ($n = 50$) using a 25G Quincke needle, to Group II ($n = 50$) using a 25G pencil point spinal needle, and to Group III ($n = 50$) using a (non-cutting) atraumatic needle with special bending. The first and third drops of CSF samples were taken from each patient and each drop was placed on a slide for cytological examination. Nucleated and non-nucleated squamous epithelial cells on the smear preparations were counted.
*Results:* There was statistically significant difference between the groups in respect to the number of squamous epithelial cells in the first drop ($p < 0.05$). Group III had lower number of squamous epithelial cells in the first drop compared to that of Group I and Group II. Mean while Group I had higher number of squamous epithelial cells in the third drop compared to the other groups. The number of squamous epithelial cells in the first and third drops was statistically similar in each group respectively ($p > 0.05$ for each group).
*Conclusions:* In this study of different needle tips, it was seen that with atraumatic needle with special bending a significantly smaller number of cells were transported when compared to the Quincke tip needles, and with pencil point needles.
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**PALAVRAS-CHAVE**
Raquianestesia;
Líquido cefalorraquidiano;
Agulhas espinhais;
Células epiteliais

**Comparação de três agulhas diferentes usadas para raquianestesia em relação ao risco de transmissão de células epiteliais escamosas**

**Resumo**
*Justificativa e objetivo:* Investigar as diferenças no número de células epiteliais escamosas transmitidas para o canal medular por três tipos diferentes de pontas de agulhas espinhais do mesmo tamanho.
*Métodos:* Os pacientes foram divididos em três grupos (Grupo I, Grupo II, Grupo III). Raquianestesia foi administrada aos pacientes do Grupo I (n = 50) com agulha Quincke de 25G, do Grupo II (n = 50) com agulha espinhal ponta de lápis de 25G e do Grupo III (n = 50) com agulha atraumática (não cortante) de curvatura especial. A primeira e terceira gotas de LCR foram colhidas de cada paciente para amostra e cada gota foi colocada em lâmina para exame citológico. As células epiteliais escamosas nucleadas e não-nucleadas sobre as lâminas de esfregaço foram contadas.
*Resultados:* Houve diferença estatisticamente significativa entre os grupos em relação ao número de células epiteliais escamosas na primeira gota ($p < 0,05$). O Grupo III apresentou um número menor de células epiteliais escamosas na primeira gota, em comparação com os grupos I e II, enquanto o Grupo I apresentou um número maior de células epiteliais escamosas na terceira gota, em comparação com os outros grupos. Os números de células epiteliais escamosas na primeira e terceira gotas foram estatisticamente semelhantes em cada grupo, respectivamente ($p > 0,05$, para cada grupo).
*Conclusões:* Neste estudo de pontas de agulha diferentes, verificamos que com a agulha atraumática de curvatura especial o número de células transmitidas foi significativamente menor, em comparação com as agulhas Quincke e ponta de lápis.
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## Introduction

During spinal anesthesia, the tip of the needle acts as a bistoury and causes epidermal fragments to be implanted into the spinal canal.[1] Epidermoid tumors are extremely rare tumors of the central nervous system.[2] Intraspinal epidermoid tumors are known to develop as a result of the transport of epidermal squamous epithelial cells by trauma, spinal anesthesia, surgery and lumbar puncture.[3–5] Previous studies have shown that the use of smaller diameter needles and allowing a few drops of CSF flow during lumbar puncture reduces the number of transported cells.[6]

In this study, through cytological examination of the first and third drops of cerebrospinal fluid collected during spinal anesthesia, it was investigated if there were any differences in the number of squamous epithelial cells carried to the spinal canal by spinal needles of the same size but with three different tip types (25G atraumatic, 25G pencil tip, 25G Quincke).

## Methods

Following the approval of the Ethics Committee, 150 patients undergoing surgery using spinal anesthesia, aged between 18 and 65 years, ASA I-II were divided into three groups of 50 (Group I, Group II, Group III). The study included only the subjects whose first puncture was successful.

Spinal anesthesia was administered using a 25G Quincke needle to the 50 patients in Group I, using a 25G pencil point spinal needle to the 50 patients in Group II and using a (non-cutting) atraumatic needle with special bending to the 50 patients in Group III.

Written informed consent was obtained from all patients. After taking the patients to the operating room, Intravenous (IV) access was established and heart rate, non-invasive arterial blood pressure, and peripheral oxygen saturation ($SpO_2$) were monitored routinely.

Sedation was administered as Intravenous (IV) 0.05 mg/kg midazolam. With the patient in a seated position, the spinal needle was inserted through the L4-5 or L5-S1 interspace and the arrival of cerebrospinal fluid was observed. 0.5% hyperbaric bupivacaine was administered. In all the groups, the first and third drops of CSF samples were taken and each drop was placed onto a separate slide. The CSF samples were smeared to the surface of the slide by touching another slide to the first slide. As a result, two slides were prepared for each drop for cytological examination. The slides were stained with hematoxylin&eosin in the Medical Pathology Laboratory and evaluated under light microscope by a pathologist blinded to the study groups. The total number of nucleated and non-nucleated squamous epithelial cells derived from the layers of epidermis were counted on the whole surface of the two slides of each drop and recorded.

Data analysis was performed using SPSS 21.0 statistical software package. The compliance of data with normal distribution was evaluated with the Kolmogorov–Smirnov test. The Kruskal–Wallis test was used for comparisons between the groups. To determine from which group the difference originated, the Tukey HSD test was applied. The values with

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