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CLINICAL INFORMATION

Inadvertent injection of succinylcholine as an epidural test dose

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KEYWORDS
Succinylcholine;
Epidural administration;
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Neuromuscular blocking agents;
Fasciculations;
Diazepam

Abstract
Background and objectives: Epidural action of neuromuscular blocking agents could be explained under the light of their physicochemical characteristics and epidural space properties. In the literature there are few cases of accidental neuromuscular agent's epidural administration, manifesting mainly with neuromuscular blockade institution or fasciculations.
Case report: We report a case of accidental succinylcholine administration as an epidural test dose, in a female patient undergoing scheduled laparotomy, under combined general and epidural anesthesia. Approximately 2 min after the succinylcholine injection the patient complained for shortness of breath, while mild fasciculations appeared in her trunk and face, managed by immediate general anesthesia institution. With the exception of a relatively longer duration of neuromuscular blockade compared with intravenous administration, no neurological or cardiovascular sequelae or other symptoms of local or systemic toxicity were observed.
Conclusions: Oral administration of diazepam seems to lessen the adverse effects from accidental epidural administration of succinylcholine. The meticulous and discriminative labeling of syringes, as well as keeping persistent cautions during all anesthesia procedures remains of crucial importance.

PALAVRAS-CHAVE
Succinilcolina;
Administração epidural;
Acidental;

Injeção inadvertida de succinilcolina como uma dose teste epidural

Resumo
Justificativa e objetivos: A ação epidural de agentes bloqueadores neuromusculares pode ser explicadas à luz de suas características físico-químicas e propriedades do espaço epidural. Na

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Agentes bloqueadores neuromusculares;
Fasciculações;
Diazepam

literatura existem poucos casos sobre a administração acidental em espaço epidural de agente neuromuscular, manifestando-se principalmente com a instituição de bloqueio neuromuscular ou fasciculações.
Relato de caso: Relatamos um caso de administração acidental de succinylcholine como uma dose teste epidural em uma paciente submetida à laparotomia programada, sob anestesia combinada geral e peridural. Aproximadamente dois minutos após a injeção de succinylcholine, a paciente queixou-se de falta de ar, enquanto fasciculações leves apareceram em seu tronco e rosto, tratadas com a instituição imediata de anestesia geral. Exceto pela duração relativamente longa do bloqueio neuromuscular em comparação com a administração intravenosa, sequelas neurológicas ou cardiovasculares ou outros sintomas de toxicidade local ou sistémica não foram observados.
Conclusões: A administração oral de diazepam parece diminuir os efeitos adversos da administração epidural acidental de succinilcolina. A meticulosidade e discriminação dos rótulos das seringas, bem como os cuidados persistentes mantidos durante todos os procedimentos de anestesia continuam sendo de importância crucial.

Background and objectives

In the history of regional anesthesia techniques, a variety of anesthetic drugs and other substances have been accidentally injected into epidural space, with consequences ranging from no clinical symptoms to irreversible neurological deficit.[1–4] In the literature there are few reports of accidental epidural administration of different types of non-depolarizing neuromuscular blocking (NMB) agents, treated properly and thus the patients had an uneventful course.[5–8]

In the unique case of accidental epidural administration of succinylcholine, 125 mg of the depolarizing NMB agent have been injected during a combined spinal and epidural anesthesia. This was implicated with the appearance of spasms, which were initially located at the lower limbs and thereafter were expanded in the rest of the trunk, up to the patient's face.[9] We report a case of accidental epidural administration of succinylcholine, which has obscure pharmacokinetics and pharmacodynamics after epidural administration, as well as for high or low accidentally administered doses.

Case report

A 63-yrs-old, 64 kg, ASA physical status I, female patient was scheduled to undergo elective total abdominal hysterectomy due to uterine fibroids. The anesthesia plan involved combined general and epidural anesthesia. Patient was informed appropriately and had given consent to receive the specific model of anesthesia. She received orally 5 mg of diazepam the night before operation and was premedicated with 10 mg (peros) of the same agent 1 h before being transported to the operation room.

Following the application of standard monitoring equipment, the patient was placed in the lateral decubitus position. Then the epidural space was located at L3-4 interspace using an 18 gauge Tuohy needle and the ''loss of resistance to air'' technique and a 20 gauge catheter was inserted into it. After stabilizing the catheter, the administration of a test dose of 3 mL lidocaine 2% was planned, but accidentally 3 mL of succinylcholine (75 mg) were injected, as the depolarizing NMB agent availability is a standard practice in our department. Succinylcholine and lidocaine 2% solutions were alike, both prepared in 5 mL syringes.

Approximately 2 min after the succinylcholine administration the patient complained for shortness of breath and feeling of discomfort, while mild fasciculations appeared in her trunk and face. At this point the mistake was perceptible and assisted ventilation was instantly initiated via facemask with 100% oxygen. In order to assess the depth of the possible neuromuscular blockade a train-of-four (TOF) ulnar nerve stimulation was applied, which showed 40% reduction in TOF response. Thereafter, we proceeded to induction to general anesthesia, achieved by 200 μg fentanyl and 140 mg propofol administration, without any additional NMB agent. Maintenance of anesthesia was achieved by 1 MAC of sevoflurane. Up to this point, the patient's vital signs remained stable. To accelerate systemic absorption of succinylcholine, 2 mL (8 mg) of dexamethasone in 8 mL 0.9% NaCl were injected through the epidural catheter.[10] After epidural succinylcholine injection, complete recovery of the TOF response occurred at 5 min. As soon as the mistake was apparent the surgeons and the patient's relatives were informed and it was decided to continue the operation. Consequently 12 mg of intravenous cisatracurium were administered in order to conduct the operation. Epidural anesthesia plan was discarded and substituted by intravenous opioid administration.

By the end of the operation, 115 min later, TOF examination indicated complete recovery from neuromuscular blockade. The extubation of the trachea was performed with the patient fully awake with adequate spontaneous ventilation.

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