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CLINICAL INFORMATION

Amaurosis and contralateral cranial nerve pairs III and VI paralysis after peribulbar block -- Case report

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KEYWORDS
Peribulbar anesthesia;
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Abstract
Background and objectives: Peribulbar anesthesia has emerged as a safer option compared with intraconal retrobulbar block. Still, peribulbar anesthesia may not be considered without risk. Numerous complications have been described when performing this technique. This report aims to describe a rare case of amaurosis and contralateral paralysis while attempting to perform a peribulbar anesthesia.
Case report: Male patient, 75-year old, physical status ASA II, undergoing cataract surgery by phacoemulsification with intraocular lens implantation. Sedated with fentanyl and midazolam and subjected to peribulbar anesthesia. There were no complications during surgery. After finishing the procedure, the patient reported lack of vision in the contralateral eye. Akinesia of the muscles innervated by the cranial nerve pairs III and VI, ptosis, and medium-sized pupils unresponsive to light stimulus were observed. Four hours after anesthesia, complete recovery of vision and eyelid and eyeball movements was seen in the non-operated eye.
Conclusions: During peribulbar anesthesia, structures located in the intraconal space can be accidentally hit leading to complications such as described in the above report. Following the technical guidelines and using appropriate size needles may reduce the risk of such complication, but not completely.
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PALAVRAS-CHAVE
Anestesia peribulbar;
Bloqueio retrobulbar;
Complicações;
Amaurose;
Paralisia;
Contralaterais

Amaurose e paralisia do III e do VI pares cranianos contralaterais após bloqueio peribulbar – Relato de caso

Resumo
Justificativa e objetivos: A anestesia peribulbar surgiu como uma opção mais segura quando comparada com o bloqueio retrobulbar intraconal. Ainda assim, a anestesia peribulbar não pode ser considerada isenta de riscos. Inúmeras complicações foram descritas quando da aplicação dessa técnica. O presente relato tem como objetivo descrever um caso raro caracterizado por amaurose e paralisia contralaterais quando da tentativa de se fazer a anestesia peribulbar.
Relato de caso: Paciente masculino, 75 anos, estado físico ASA II, submetido à facectomia por facoemulsificação com implante de lente intraocular. Sedado com fentanil e midazolam e submetido a anestesia peribulbar. Não houve intercorrências durante a cirurgia. Após o término do procedimento o paciente relatou ausência de visão no olho contralateral. Foram observadas acinesia da musculatura inervada pelo III e VI pares cranianos, ptose palpebral e pupilas de tamanho médio, não responsivas ao estímulo luminoso. Após quatro horas da anestesia, houve recuperação completa da visão, da movimentação das pálpebras e do globo ocular não operado.
Conclusões: Durante a anestesia peribulbar, estruturas localizadas no espaço intraconal podem ser atingidas acidentalmente levando a complicações como a descrita no relato acima. O respeito às diretrizes técnicas e o uso de agulhas com o tamanho adequado podem reduzir o risco de tal complicação, mas não de forma completa.
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Introduction

Despite the increasing popularity of topical local anesthesia rather than other technical procedures, such as retrobulbar or peribulbar block for surgical repair of cataract, there are still indications for anesthesia with the needle introduction into the orbital cavity, despite the risks associated with such procedures, as this technique is blindly performed because the needle tip exact position cannot be confirmed after it pierces the skin. In this context, the peribulbar anesthesia (PBA) has emerged as a safer option compared with intraconal retrobulbar anesthesia, as the anesthetic solution injection occurs in the muscle cone foramen, avoiding risks associated with the presence of the needle close to the optic nerve and ophthalmic artery.[1,2] Still, PBA may not be considered without risk. Numerous complications have been described with the use of this technique.[3] One of them is the local anesthetic injection after puncturing the meninges surrounding the optic nerve, which allows the spreading of anesthetic solution into the central nervous system (CNS) and causes hemodynamic changes and respiratory depression by acting in the brainstem.[4] Recently, Kriles et al.[5] described a case characterized by amaurosis and third cranial nerves partial loss of function after contralateral PBA, but without CNS involvement. According to the authors, it is likely that the injection was intraneural; that is, after the perforation of the meningeal sheaths surrounding the optic nerve, which allowed the anesthetic spreading by the nerve path to the contralateral side without passing through the cerebrospinal fluid.

We report a case characterized by amaurosis and contralateral cranial nerve pairs III and VI complete loss of function, without CNS involvement, when attempting a PBA.

Case report

Male patient, 75 years, physical status ASA II, with history of systemic hypertension and right eye cataract. The patient underwent cataract surgery by phacoemulsification with implantation of intraocular lens. After venous puncture with a 22G catheter, 0.9% saline infusion was started. The patient was monitored with continuous cardioscopy, blood pressure (BP), and non-invasive pulse oximetry. Initial BP was 160 × 90 mmHg and heart rate (HR) 70 beats per minute. He received face mask oxygen (5 $L.min^{-1}$), and sedation was performed with intravenous fentanyl (50 μg) and midazolam (1 mg). After the periorbital region antisepsis with povidone–iodine, PBA was performed using the double injection technique with a 23G needle of 25 mm. The first 3 mL of local anesthetic solution (1% ropivacaine associated with hyaluronidase 20 $UI.mL^{-1}$) were deposited by injection just lateral to the supraorbital foramen and the additional 3 mL by injection at the junction of the lateral third with the two medial thirds of the orbital rime. The patient's eye gaze was kept in a neutral position during both injections. After 5 min, a complete ocular akinesia was observed and the beginning of the procedure was authorized. The surgery was uneventful and lasted approximately 60 min. Immediately after the procedure and removal of surgical fields, the patient reported lack of vision in the contralateral eye.

Akinesia of the muscles innervated by the cranial nerves III and VI, ptosis, and medium-sized pupils non-responsive to light stimulus were observed. The patient was taken to the post-anesthesia recovery room, where he remained lucid and hemodynamically stable. Four hours after the anesthesia, there was complete recovery of vision and movements of eye and eyelid in non-operated eye. The ophthalmological examination of both eyes performed the day after surgery showed no change beyond the expected for the first day after surgery.

Discussion

This report describes a case of contralateral amaurosis associated with cranial nerves III and VI complete loss of function while attempting to perform a PBA. There are descriptions, although rare, of cases in which temporary loss of vision in the contralateral eye was observed after retrobulbar anesthesia.[6–8] The additional involvement of the third contralateral cranial nerve was also reported after the use of this anesthetic technique.[7,9] However, only one author reports the occurrence of this complication after PBA.[5] No article reports the contralateral involvement of the II, III and VI cranial nerves, as in the present case. The optic nerve is surrounded by the three meningeal layers, characterized as an extracranial extension of the subarachnoid space. The inadvertent puncture of the meninges surrounding the optic nerve enables the spread of local anesthetics to the subarachnoid space and, therefore, the CNS intoxication.[10] Although we have used the PBA technique, which assumes that the injection occurred in the extraconal retrobulbar space, according to the changes observed in the present report, it appears that there was an inadvertent penetration of the intraconal space. Only this condition would explain the injury caused in the meningeal layer surrounding the optic nerve, whose path is through the central portion of the cone formed by the eye extrinsic muscles. The absence of signs, such as confusion, sympathetic hyperactivity, or respiratory depression, strengthens the hypothesis that the needle has also perforated the optical nerve sheath, allowing the anesthetic solution to pass through the nerve path and optic chiasm and go to contralateral orbit, with no significant increase in LA concentration in the cerebrospinal fluid. Likely, the solution spread allowed an additional blockade of the cranial nerve pairs III and VI. Another possible explanation for the occurrence of transient amaurosis would be the central retinal artery occlusion after the intraneural injection or even after PBA, the result of a vasospasm after LA administration.[11,12] In the present report, the local anesthetic used was ropivacaine. Experimental animal studies have shown the direct vasoconstriction action induced by this agent in the arterial vessels.[13,14] Two frequently cited and adopted guidelines in this report were not sufficient to prevent the occurrence of an advertent puncture of the meninges surrounding the optic nerve. The first was the size of the needle used. A better understanding of the orbit anatomy allowed the observation that smaller needles (30 mm maximum) enable a safer PBA induction.[15,16] The second orientation adopted was performing the blockade with the eye in a neutral position. It is known that the position of adduction and upward facilitates the optic nerve exposure to accidental puncture.[17] Therefore, during peribulbar anesthesia, structures located in intraconal space, such as the optic nerve, may be inadvertently compromised. The current trend (not adopted in this report) for peribulbar block is the single puncture (inferoexternal), avoiding the superointernal due to increased risk of globe and orbit vessel perforation, as well as local anesthetic injection in the superior oblique and trochlear muscles, a potential cause of postoperative strabismus.[18,19] Following the technical guidelines and using proper size needles can reduce the risk of this complication, but not completely.

Conflicts of interest

The authors declare no conflicts of interest.

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