Archives of Anesthesiology and Critical Care (Autumn 2022); 8(4): 339-342.

Available online at http://aacc.tums.ac.ir

Case Report

Necrosis of the Right Hallux Secondary to Local Anesthesia by Lidocaine 2% with Adrenaline: A Rare and Preventable Complication

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ARTICLE INFO

Article history:
Received 26 January 2022
Revised 16 February 2022
Accepted 28 February 2022

Keywords:
Necrosis of the right hallux;
Local anesthesia;
Adrenaline;
Preventable complication

ABSTRACT

Recent scientific studies support the safe use of lidocaïne with adrenaline for anesthesia of the extremities (fingers, toes, nose, ear, penis), these studies push back the myth that advises against the use of local anesthetic substances with adrenaline in these areas [1-3]. Ingrown toenail is a common condition of the big toe. Surgery is often necessary. Ingrown toenail surgery is relatively straightforward and is usually performed under local anesthesia [3]. We report here a rare case of hallux necrosis secondary to local anesthesia by lidocaine 2% with adrenaline. The objective of this presentation is to warn practitioners about the observance of precautions before using local anesthetics with adrenaline for anesthetic procedures of the extremities.

Ingrown toenail is a common condition of the big toe. Surgery is often necessary. This surgery is preferably performed under local anesthesia. The objective of this local anesthesia is to facilitate the surgical procedure. Recent scientific literature supports the safe use of lidocaine with adrenaline for anesthesia of fingers and toes, thus dethroning the myth that advises against the use of local anesthetic substances with adrenaline in these areas [1-3]. We report here a rare case of necrosis of the right hallux, secondary to local anesthesia with lidocaïne 2% adrenaline. The interest of this presentation is to draw particular attention to the risk of complications to which the use of adrenaline anesthetic substances exposes the extremities with terminal vascularization.

Case Report

This is an 18-year-old teenager, a student in a college in the city of Yaounde. In his history, there were no complications such as neuropathy, cardiovascular disease and previous amputation. She was not taking chronic medication or toxic substances. The anamnesis revealed no notion of trauma. She was referred to the emergency department of the Essos-Yaounde hospital center for treatment of right hallux necrosis associated with right plantar metatarsalgia. The pain was daily and intense. She

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underwent surgical treatment of an ingrown nail of the right big toe under local anesthesia by lidocaïne 2% with adrenaline, six days earlier. The initial clinical examination revealed ischemic necrosis of the right big toe and inflammation of the dorsum of the foot (Figure 1 and 2).

Figure 1- Inflammation of the back of the foot (Red arrow)

Figure 2- Right hallux necrosis (Red arrow)

The pedal pulse was weakly perceived on the right side due to edema. The posterior tibial lice were well palpated. an absence of fever was noted. Hemodynamic parameters were stable. Laboratory analyzes showed: a biological inflammatory syndrome with a CRP of 130 mg/l. Kidney function and glycaemia were within physiological limits. Arterial Doppler ultrasound of the lower limbs showed no stenosis of the common femoral arteries. The triphasic flow was of good quality in the common iliac, external iliac and common femoral, superficial femoral and popliteal arteries. The arterial flow of the anterior and posterior tibial arteries was satisfactory both on the left and on the right. The ECG showed a regular sinus rhythm at 74 beats per minute. The transthoracic echocardiography was normal, the left ventricular ejection fraction estimated at 75% according to Simpson biplane. CT angiography of the lower limbs found bilateral permeability of the femoro-popliteal vascular axes and the leg tripods. The definitive diagnosis was ischemic necrosis of the right hallux due to the infiltration of lidocaine 2% adrenaline. The surgeon decided on necrosectomy of the right big toe (Figure 3). The procedure was performed under spinal anesthesia, with no reported incident. The patient left the hospital after being placed under observation for 24 hours. Dressings were performed daily on an outpatient basis. The postoperative course was simple: regression of inflammatory signs and good healing.

Figure 3: Right hallux necrosectomy (White arrow)

Discussion

Local anesthesia corresponds to the loss of sensitivity at the site of administration of the anesthetic solution, by interruption of nerve conduction. The ingrown toenail is a relatively frequent pathology of the big toe which mainly affects young adults [1]. Ingrown toenail surgery is usually performed under local anesthesia. The addition

of adrenaline to the local anesthetic substance has the advantage of reinforcing and prolonging the quality and duration of analgesia. For several years, it has been taught not to infiltrate local anesthetic solution containing adrenaline into parts of the body with terminal vascularization, such as the fingers and toes. Adrenaline can cause vasoconstriction of arteries and reduce blood supply to these organs [1-3].

The immediate consequence is ischemia of the affected region [2,4]. Before any surgery on the toes and fingers, it is recommended to palpate the peripheral pulses in order to exclude a possible underlying arteriopathy which could compromise the healing and vitality of the region concerned [2,4-5]. A Doppler examination is recommended in case of doubt [5]. Patients with an ankle/arm pressure index below 0.5 or with a big toe blood pressure below 40 mmHg are at risk of ischemia [5]. Many authors support the safety of injecting lidocaine with adrenaline into the extremities [4-6]. In a literature review by Finsen et al in 2013, which looked at necrosis of fingers and toes after local anesthesia with lidocaine adrenaline, it appears that five review articles on necrosis of fingers after local anesthesia concluded that lidocaine with adrenaline did not lead to the risk of ischemic injury [4]. Over a quarter of a million reports have been made of operations on feet, hands, fingers, and toes anesthetized with lidocaine and adrenaline without resulting necrosis [4]. The authors concluded that there is no reason to caution against the use of lidocaine-adrenaline in the fingers and toes [4]. Nielsen LJ et al come to the same conclusion in a literature review identifying 24 articles that investigated the use of local anesthetic solution with adrenaline or epinephrine in the fingers, toes, nose and ears, including more than 15,000 patients [5]. Multiple studies involving thousands of patients support the hypothesis that the use of lidocaine adrenaline is safe for fingers and toes [6-9].

Some studies describe ischemia associated with the use of lidocaine-adrenaline in the extremities [2,10-12]. Jacques X. Zhang et al present in their publication, a case of finger necrosis and subsequent amputation in a patient after injection of 1% lidocaine with 1/100,000 epinephrine into the fat and flexor sheaths of the palm for 3-finger release [2]. Almiro Dos Reis et al think that the benefits of adding epinephrine to the anesthetic solution are minor compared to the risks of the procedure, and it seems dangerous to use a vasoconstrictor in the fingers and toes [10]. Several research groups also share this point of view, and recommend the urgent use of phentolamine, an adrenaline antidote, in the event of persistent inadequate perfusion of the extremities due to the injection of lidocaine with adrenaline [11-13].

The debate around the use of adrenaline anesthetic solutions for local anesthesia of the extremities remains topical. In our case, the careless use of 2% lidocaine with adrenaline for anesthesia of the right hallux, as part of ingrown toenail surgery, resulted in necrosis of this toe. The identification of the etiology of the ischemia is unclear for this case. Lidocaine adrenaline induces transient vasoconstriction with a slight decrease in systolic digital arterial pressures during the first 10 minutes [14-15]. Anesthetic complications such as extremity necrosis related to the injection of lidocaine with adrenaline in the toes and fingers are rare [4,16]. Considering the absence of any particular ground favorable to the occurrence of this type of accident in our case, the probable hypotheses which could explain the ischemia of the right big toe are: the injection of a large volume of the solution of lidocaine with adrenaline which could lead to compression of the digital vessels, an injection of the anesthetic solution into the flexor sheath or the use of a highly concentrated solution of lidocaine adrenaline. Caution is still advised, despite the advantages of adrenaline in this anesthetic procedure. Phentolamine, an alpha-adrenergic blocker, which allows early removal of adrenaline-induced vasospasm is not marketed in Cameroon. Its use is recommended in case of doubt about the delay in recolouring of a toe after injection of the adrenaline solution of local anesthetic [16]. The technique of antagonization consists of the infiltration of phentolamine on the site of the injection of the local anesthetic substance adrenaline. The absence of this antidote is a strong argument for abandoning the use of adrenaline anesthetic substances for extremity anesthetic procedures in poor African countries.

Conclusion

Complications such as ischemic necrosis of the extremities, linked to the injection of local anesthetic solutions containing adrenaline, are rare. The use of lidocaine with adrenaline is strongly discouraged for local anesthesia of the extremities, and in patients with a vascular history. This proposition is strongly supported by the lack of commercialization of the adrenaline antidote, phentolamine, in poor African countries. A careful clinical examination remains the prerequisite for any injection of lidocaine with adrenaline in the toes and fingers. This clinical examination may possibly be supplemented by a doppler ultrasound.

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