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AMPUTATION DUE TO INADVERTENT INTRA-ARTERIAL DIAZEPAM INJECTION

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• ABSTRACT

A case of limb gangrene secondary to accidental intra-arterial (I.A.) diazepam injection in an infant is described. Hazards of I.A. diazepam injection, the possible mechanisms leading to this injury, the preventive measures and the therapeutic modalities are discussed.

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Key Words • Diazepam • convulsion • gangrene • amputation • angiography

Introduction

Intravenous diazepam is widely used for treatment of convulsive disorders, as a premedication for minor surgery and as a sedative drug. Convulsions are quite common in infants and it might be difficult to access a vein in emergency states, so accidental intra-arterial injection may occur. Schneider for the first time reported gangrene of a limb following intravascular injection of diazepam.¹ Subsequently, a few reports of similar events emerged in the medical literature.²⁻⁵ In this report a case of limb loss due to accidental I.A. diazepam injection is described.

Case Report

An eight-month-old girl was admitted to the emergency department of the hospital because of febrile convulsion. The patient was in apparently good health until one day prior to admission when she developed fever. A few hours prior to admission she experienced a convulsive episode. In order to stop the seizure, several attempts were made by the nurse in-charge to administer diazepam parenterally. Assuming the tip of the needle had entered a vein at the medial aspect of the right antecubital fossa, 2.5 mg (0.5 ml) diazepam was injected. The needle was then connected to the i.v. tubing and bottle. Gushing of bright red blood through the connecting tube made it clear that the tip of the needle was in the lumen of an artery. The needle was withdrawn immediately and the I.V. fluids were given from another site. The next morning it was noted that the right hand, distal to the injection site was pale, edematous, and tender. Cubital artery at the wrist was not palpable. The radial artery was palpable, though weaker compared to the opposite side. Five ml of 1% lidocaine was injected subcutaneously in the antecubital fossa around the brachial artery and repeated at 4 hour intervals for several times. The patient was also heparinized. Twenty-four hours later no pulse was palpable distal to the right brachial artery and blue discoloration of the 4th and 5th fingers was evident despite the said medication. On the third day after admission some blisters appeared on the affected forearm and the blue discoloration progressed, with no discernable tenderness or warmth in the area. On the fifth day, since gangrene of the limb distal to the arm was established, above- elbow amputation appeared mandatory and was carried out.

Discussion

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As seen in this patient, the I.A. injection of diazepam can be seriously hazardous. There have been several reports of tissue damage resulting in loss of digits or even limbs.^{1,3,4} Extravasation of the drug and perivascular infiltration may also lead to severe local reaction and such major complications as compartment syndrome.^{5,6} The tissue damage occurs very fast within minutes to hours after the injection. Barbiturates, phenothiazines and narcotics are most famous groups of drugs which are known to cause the similar reactions.^{2,3,7} Spasm of the artery and crystallization of the drugs are among the many suggested mechanisms that cause the reactions.³ Knill and Evans⁷ showed an immediate direct lytic action on arterial and capillary endothelial cell membranes after I.A. injection of diazepam in rabbit ears. This effect was not seen after injection of non-lipid soluble drugs, the solvent fluid of diazepam or normal saline. Their work suggested that the extent of tissue damage and the time of its appearance depended on the concentration of the drug to which the endothelial cells were exposed. Reported treatment of seizures following injection of contrast media during an angiographic procedure⁸ makes administration of diazepam in such instances questionable. As a preventive measure, great care must be taken to make sure that the tip of the needle is in the lumen of a vein, before injection of diazepam is allowed to proceed. Although an injection rate of 1 ml/min is considered safe,⁷ at a rate of less than 0.5 ml/min an error may be recognized earlier.³ If the injection requires considerable pressure it must be stopped immediately and the nature of the vessel carefully established. Injection of diazepam in an artery causes severe burning pain distal to the site. However, this finding is not helpful in infants specially during the convulsive states. The drug should not be diluted but following the injection, administration of boluses of saline is recommended.

As a technical error, I.A. injection of diazepam may happen, but so far, there is no approved method for the management of its complications. Periarterial sympathetic block, I.A. streptokinase, I.A. dexamethasone, I.A. washing with saline, I.A. papaverine or procaine and I.V. low molecular weight dextran all have been used with some claims of efficacy. It seems that systematic investigation to standardize methods of therapy deserve attention.

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