REV BRAS ORTOP. 2016;xxx(xx):xxx–xxx

SOCIEDADE BRASILEIRA DE ORTOPEDIA E TRAUMATOLOGIA

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Original Article

Can ethanol be used as an adjuvant to extended curettage in order to reduce the recurrence rate of aneurysmal bone cyst?☆

*Saeed Solooki, Yaghoob Keikha, Amir Reza Vosoughi**

Bone and Joint Diseases Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Article history:
Received 20 December 2015
Accepted 28 April 2016
Available online xxx

Keywords:
Aneurysmal bone cyst
Ethanol
Alcohol
Neoplasms

ABSTRACT

Objective: The best treatment of aneurysmal bone cyst (ABC) is still unclear. This study aimed to evaluate the usefulness of extended curettage and ethanol as an adjuvant to reduce local recurrence of ABCs.

Methods: Retrospectively, 68 cases treated for primary and secondary ABCs caused by benign tumors from 2003 to 2013 were enrolled to a follow-up visit between one to ten years after the surgery. The treatment protocol was en-bloc resection, biopsy and curettage, extended curettage consisted of curettage, high-speed burring, ethanol 96%, and electrocauterization (combined four-step alcohol-using approach) followed by defect filling, consecutively.

Results: Among 36 patients with primary ABCs (16 male, 20 female, mean age of 16 years, range 3–46 years), 29 cases were treated with the combined four-step alcohol-using approach, four patients with resection, and three with biopsy and curettage. Thirty-two cases had secondary ABCs on benign lesions (17 male, 15 female). The recurrence rate was 5.88 in all primary and secondary ABC cases; two recurrences among 29 patients with primary ABCs (6.9%) and one recurrence among the 22 cases with secondary ABCs (4.5%).

Conclusions: It could be suggested that the combined four-step alcohol-using approach may result in a very low recurrence rate of primary and secondary ABC lesions.

O etanol pode ser usado como adjuvante na curetagem ampla a fim de reduzir a taxa de reincidência de cisto ósseo aneurismático?

Palavras-chave:
Cisto ósseo aneurismático
Etanol

RESUMO

Objetivo: Ainda não se sabe qual o melhor tratamento para cistos ósseos aneurismáticos (COA). Este estudo teve como objetivo avaliar a utilidade da curetagem estendida e do etanol como adjuvante para reduzir a reincidência local de COAs.

☆ Study was carried out in Bone and Joint Diseases Research Center, Shiraz University of Medical Sciences, Shiraz, Iran.

* *Corresponding author.*
E-mail: vosoughiar@hotmail.com (A.R. Vosoughi).

http://dx.doi.org/10.1016/j.rboe.2016.04.007

Please cite this article in press as: Solooki S, et al. Can ethanol be used as an adjuvant to extended curettage in order to reduce the recurrence rate of aneurysmal bone cyst? Rev Bras Ortop. 2016. http://dx.doi.org/10.1016/j.rboe.2016.04.007

Álcool
Neoplasmas

Métodos: Retrospectivamente, 68 casos que receberam tratamento para COAs primários e secundários causados por tumores benignos entre 2003 e 2013 foram chamados para uma consulta de seguimento, em um intervalo entre um e dez anos após a cirurgia. O protocolo de tratamento foi ressecção em bloco, biópsia e curetagem; a curetagem estendida consistiu em curetagem, broqueamento em alta velocidade, etanol 96% e eletrocauterização (abordagem combinada em quatro etapas usando álcool), seguida do preenchimento do defeito, de forma consecutiva.

Resultados: Entre os 36 pacientes com COAs primárias (16 do sexo masculino, 20 do sexo feminino, idade média de 16 anos, intervalo 3-46 anos), 29 casos foram tratados com a abordagem combinada em quatro etapas usando álcool, quatro pacientes com ressecção e três com biópsia e curetagem. Trinta e dois casos apresentavam COAs secundárias em lesões benignas (17 do sexo masculino, 15 do sexo feminino). A taxa de reincidência foi de 5,88 em todos os casos de COAs primárias e secundárias; duas reincidências foram observadas entre 29 pacientes com COAs primária (6,9%) e uma reincidência entre os 22 casos (4,5%) de COAs secundária.

Conclusão: Sugere-se que a abordagem combinada em quatro etapas usando álcool pode resultar em uma taxa de reincidência muito baixa em lesões COAs primárias e secundárias.

Introduction

Aneurysmal bone cyst (ABC), a rare benign and locally aggressive bone lesion, is a blood-filled cavity within an expanded region of the bone with thinning of the surrounding cortex.[1] It was first described by Jaffe and Lichtenstein[2] in 1942. It may present as a primary bone cyst or a secondary lesion arising from other osseous conditions like giant cell tumor, chondroblastoma, fibrous dysplasia, osteoblastoma, non-ossifying fibroma, telangiectatic osteosarcoma.[3,4] Although precise pathogenesis of ABC remains unclear, multiple theories have been proposed. They have been described that specific translocational events on chromosome 16 and 17 as the main etiology of primary ABCs,[5,6] and intraosseous or subperiosteal hemorrhage because of abnormal venous circulation as a cause of secondary ABCs.[7] ABC tumors are frequently seen in the first two decades of life with slight female predominance. It may occur in all bones, but metaphysis of the long bones and dorsal elements of the vertebrae are the most common sites.[8,9]

Treatment of ABC lesions in the long bones commonly is extended curettage with bone grafting or wide en-bloc resection of tumor.[3,8,10] Some authors have used adjuvants inducing hydrogen peroxide,[8] phenol,[11] polymethylmethacrylate bone cement,[12] liquid nitrogen,[13] argon beam,[14] and high-speed burring[15] in order to decrease the recurrence rate of ABC lesions.[1] The main purpose of this study is to evaluate the usefulness of ethanol as an adjuvant in a combined four-step procedure including curettage, high-speed burring, ethanol 96% and electrocauterization followed by grafting to reduce local recurrence of primary and secondary ABCs developed on benign tumors.

Methods and materials

After approval of the study by the ethic committee of our university, a retrospective review of medical clinical records was performed on cases treated for ABC from 2003 to 2013 by the senior author at the main orthopedic center of south of Iran. After exclusion of cases with secondary ABCs arising from malignant tumors, 68 patients, with range of follow-up visit of 1 to 10 years, signed the prepared written consent form. They consisted of 36 cases with primary ABCs and 32 patients with secondary ABCs on benign tumors. Demographic data (age at the time of the surgery, gender), primary symptom of the patient, exact location of ABC lesion, pathologic reports, and further surgeries were reviewed according to the medical records and available images. The most recent taken X-ray radiographs were considered to evaluate curing or recurrence.

Suspicious lesions were treated with biopsy and curettage to determine the exact pathology. En-bloc resection was carried out in ABC lesions in expandable parts of the bones like proximal fibula. Our approach, called the combined four-step alcohol-using approach, consisted of extended curettage, high-speed burring, ethanol 96%, and electrocauterization of the lesion, consecutively. Extended curettage was performed to remove all abnormal tissues. After using high-speed burr on the walls of the lesion, the defect was irrigated by normal saline. In the third step, ethanol 96% was carefully poured in the lesion with syringe to fill it completely. Any possible spill of ethanol in the surrounding tissues was suctioned immediately. After one minute, ethanol was evacuated by suction tube followed by irrigation with normal saline. This cycle was repeated three times. Following irrigation to eliminate the risk of explosion, electrocauterization of the lesion with monopolar coagulation diathermy set to 50 W was performed on the whole wall of the lesion. The protocol of combined four-step alcohol-using approach was carried out in lesions of any bone of the body irrespective of size or location except in the spinal region. Finally, the void would be filled by autograft, allograft, or bone cement. We routinely used autograft from iliac crest to fill the defect but allograft should be used for larger defects in the children. Also, bone cement was used to fill the

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