

**INTRODUCTION AND OBJECTIVE** Aneurysmal bone cyst (ABC) of the spine is a locally aggressive benign lesion which can be treated by en bloc resection with wide margin to reduce the risk of local recurrence. To avoid morbidity associated with surgery, selective arterial embolization (SAE) can be considered the first-line treatment for ABCs of the spine. Other emerging treatments for ABCs include bisphosphonates, percutaneous doxycycline, sclerotherapy and Denosumab. In addition, we previously introduced the use of autologous bone marrow concentrate (BMC) injection therapy to stimulate bone healing and regeneration in ABC of the spine. One of the potential advantages of such a method is that surgical treatments are not necessary, thus allowing for both a minimally invasive approach and the treatment of poorly accessible lesions. In this prospective study we described the clinical and radiological outcomes of percutaneous injection of autologous BMC in a series of patients affected by ABCs of the spine and followed for at least one year.

**METHODS** Fourteen patients (6 male, 8 female) were treated between June 2014 to December 2019 with BMC injection for ABC of the spine. The mean age was 17.85 years. The mean follow up was 37.4 months (range 12- 60 months). The dimension of the cyst and the degree of ossification were measured by Computed Tomography (CT) scans before the treatment and during follow-up visits.

**RESULTS** Six patients received a single dose of BMC, five patients received two doses and in three patients three doses of BMC were administered. The mean ossification of the cyst (expressed in Hounsfield units) increased statistically from  $43.48 \pm 2.36$  HU to  $161.71 \pm 23.48$  HU during follow-up time and the ossification was associated to an improvement of the clinical outcomes. The mean ossification over time was significantly higher in patients treated with a single injection compared to patients treated with multiple injections. No significant difference in ossification was found between cervical and non-cervical localization of the cyst. Moreover, the initial size of the cyst was not statistically associated with the degree of ossification during follow-up. We also observed that five out of six female patients (83.3%) were less than sixteen years old and four of these (66.7%) were managed with a single dose of BMC injection, while a higher percentage of male patients (6/8, 75%) were more than sixteen years old and more than one injection was administered to them.

**CONCLUSIONS** The results of this study reinforce our previous evidence on the use of BMC as a valid alternative for spinal ABC management when SAE is contraindicated or ineffective. The initial size of the cyst and its localization does not influence the efficacy of the treatment. However, BMC injection could be indicated as treatment of choice for spinal ABC in young adolescent women.