



Treatment with Osteo Sclerosing Agent (Polydochonol) for Aneurysmal Bone Cyst: Experience of West- Southern Area of Bangladesh

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Abstract

Background: The ideal treatment of aneurysmal bone cysts (ABC) stays dubious. Surgery has for quite some time been considered as the treatment that yields the best results. A few authors presently are showing interest toward involving less intrusive options as the essential treatment. The aim of this study was to determine if treatments that are less invasive than surgery, such as Osteo Sclerosing Agent, are also effective in curing the Aneurysmal Bone Cyst (ABC). **Material & Methods:** Alcoholic zein (Polydochonol) injection, a commonly used osteo sclerosing agent, is used in this trial. In this clinical trial, 120 patients with ABC aged between 4 and 22 years were selected. These patients with aneurysmal bone cysts were treated with CT-guided percutaneous injection of Polydochonol into the cyst cavity. Polydochonol injection was used as primary treatment in 50 patients. 40 patients had recurrence following previous curettage and bone grafting and one patient had not responded to injection into the lesion of autologous iliac crest bone marrow aspirate. 29 patients needed a second injection. The median follow-up was 12 months. This study was conducted in 250 Bed General Hospital, Khulna, Bangladesh between June 2021 and May 2022. **Results:** During this study, at imaging, 70 patients had resolution of the lesion and 50 had partial response at the most recent follow-up. Complications consisted of a local transitory inflammatory reaction in 2 patients and an aseptic abscess in one patient. **Conclusions:** This comparatively simple, minimally invasive procedure makes an operation unnecessary by stopping the expansion of the cyst and inducing endosteal new bone formation. By using this technique, primary management may be possible of aneurysmal bone cysts excluding spinal lesions.

Keywords:- Aneurysmal bone cyst, Percutaneous, Polydochonol, Alcoholic zein, Osteo Sclerosing agent

INTRODUCTION

Aneurysmal bone cyst (ABC) was perceived and described as a particular

clinicopathological entity by Jaffe and Lichtenstein in 1942.^[1] It is a benign, generally growing lesion of bone, containing blood-filled spaces and is seen, most often, in teens. While

this is a harmless condition, the lesion might act in a functioning and aggressive fashion. ABCs can happen in any bone in the body, both inside the axial, like the spine or pelvis, or appendicular skeleton.^[2] While most ABCs present in the metaphyses of long bones, they commonly emerge in the spine.^[3,4] ABCs anywhere in the body can be challenging to treat, with dynamically detailed repeat risk after surgical treatment of up to 30%.^[5,6] The most widely recognized destinations are the metaphysis of the long bones and the spine. Customarily the treatment of choice for an ABC has been careful,^[2,3] yet repeat is an issue. The pace of repeat after curettage regardless of bone joining shifts from 18% to 59%.^[4,5,6,7,8,9] Phenol,^[10] fluid nitrogen,^[11,12] and bone cement,^[13] have all been utilized to limit repeat following the curettage of harmless cystic cancers of bone. Surgery can be difficult, especially in the event that the spine, pelvis or an epiphysis is involved. Embolisation with gelfoam either alone or followed by a difficult is useful in the spine,^[14] and huge pelvic cysts.^[15] Complete resection has been the treatment of decision in specific destinations, for example, the proximal fibula, distal ulna, ribs, pubic ramus, metacarpals and metatarsals.^[8] Despite the fact that radiation has been viewed as powerful,^[16,17,18] it has likewise been related with a high pace of inconveniences,^[7,8] and is not generally suggested. An elective way to deal with treatment, the percutaneous infusion of Polydochonol (Ethnor Research centers, Ethicon, Norderstedt, Germany), a fibrosing specialist, has been accounted for.^[19] The current study aims to investigate that Osteo Sclerosing agents can be used as the primary

treatment of ABCs in order to avoid the surgical procedure.

Objective of the study

- General objective: The aim of the study is to find the alternative treatment of aneurysmal bone cyst instead of surgery.
- Specific objective: The purpose of the study is to observe the effectiveness of osteo sclerosing agents in case of ABC treatment.

MATERIAL AND METHODS

This prospective observational study was conducted in 250 Bed General Hospital, Khulna, Bangladesh during June 2021 to May 2022. Patients with ABC, aged 4–22 years were selected for this study.

Inclusive criteria: Patients with ABC aged between 4-22 years (June 2021 to May 2022) with the ability to do radiographs and CT for the treatment purpose and who signed the written consent paper were included in this study.

Exclusion criteria: Any individuals who were unable or unwilling to do radiographs and CT were excluded of this study. Patients who were pregnant, have diabetes, cardiovascular, or with history of bone fracture or disorder, and patients who were unwilling to give informed medical consent were also excluded.

Polydochonol, a kind of Osteo Sclerosing agent, contains an alcoholic solution of 210 mg zein (corn protein), 145 mg oleum papaveris (to provide a soft consistency), 162 mg diatrizoate (as a radiopaque marker) and 6 mg propylene glycol (to provide sterility) per millimetre of alcohol, sterilised 7.5-ml syringes

were used. The lesions were all imaged by CT on a separate occasion before starting the procedure. The Polydochonol injection was performed under general anaesthesia using an aseptic technique. The lesion was localised by a fine needle (21-22 gauge) under CT control where, a larger needle (16 gauge) was inserted into the cyst and aspiration of blood supported the diagnosis. In some cases, biopsy with a Jemshidi needle was attempted. Depending on the size of the cyst, contrast medium was injected to ensure the intracavitary location of the needle with no leakage into the soft tissues, and following this 4-8 ml of Polydochonol was injected.

Ethical clearance was taken from the ethics committees as required. Signed informed consent was obtained from patients prior to their enrollment.

RESULTS

Out of 120 patients, 70 patients treated with Polydochonol had resolution of the lesion, and 30 had partial response at the latest follow-up. Of the 70 successfully healed patients, 15 patients needed two injections due to their partial response to the first injection. Radiographs as a progressive decrease in the radiolucency, remineralisation, ossification and consolidation of the cyst and reconstitution of the bone [Figure 2, 3] was counted as repair evident. The CT scan confirmed the presence of endosteal new bone formation at the site of the lesion and, even though this process was slow, there was progressive thickening of the cortex, shrinkage of the lesion and endosteal ossification [Figure 1]. In some cases a response to the Polydochonol (Osteo Sclerosing agent) injection was evident but a residual cystic

component remained. These were counted as representation of partial response.

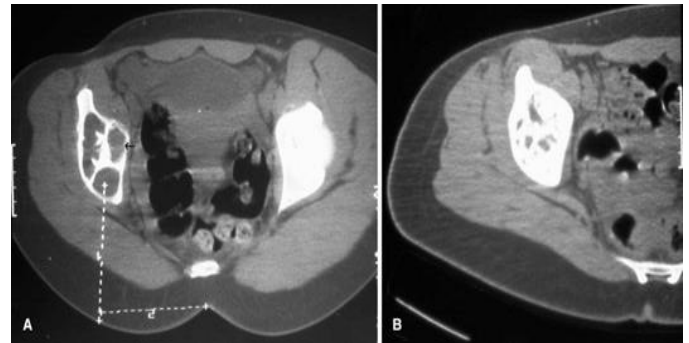


Figure 1: A Preoperative CT scan showing an aneurysmal bone cyst of the ilium with fluid-on-fluid levels. B 11 months after the second Polydochonol (Osteo Sclerosing agent) injection showing endosteal new bone formation with nonprogressive residual lytic areas.

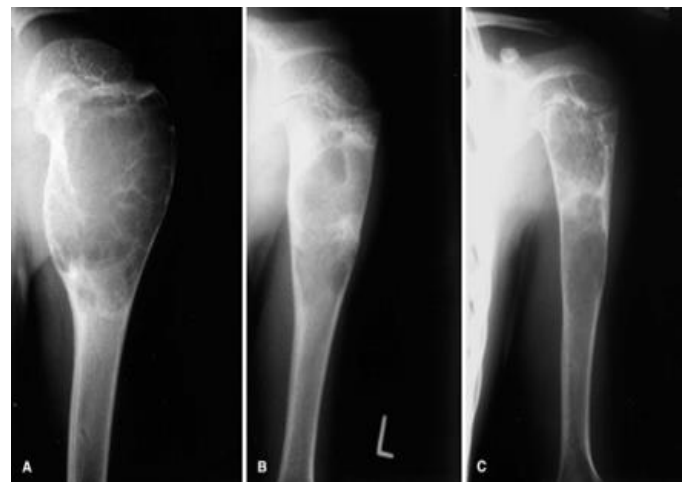


Figure 2: A Preoperative radiograph showing an aneurysmal bone cyst of the proximal humerus. B Radiograph 4 months post-operatively showing remineralisation and the beginning of reconstitution of the bone. C Radiograph 12 months post-operatively showing further resolution of the lesion with some residual lucency.

Transitory local inflammatory reactions occurred in two patients and were controlled by oral analgesics. One significant complication took place during this treatment procedure. A 15 years old male patients presented with an abscess 7 days after an uneventful injection of a distal tibial cyst. Resulting the management included incision and drainage on two occasions and antibiotics. Each time, sterile pus was drained and no organisms were grown. It is likely that local leakage of Polydochonol from the cyst into the soft tissues occurred establishing a foreign body reaction with inflammation and sterile abscess formation.



Figure 3: A Aneurysmal bone cyst of the upper tibia. B Radiograph showing the recurrence following the curette and bone grafting (arrowheads). C The cyst healed completely following two Polydochonol (Osteo Sclerosing agent) injections (Radiographs were taken at 9 and 12 months).

DISCUSSION

The pace of repeat of ABC after curettage regardless of bone uniting changes from 18% to 59%.^[4,5,6,7,8,9] The high pace of recurrence following the surgical management of ABCs has stimulated researchers to involve different treatment modalities related to curettage to limit local repeat. Marcove et al,^[12] have effectively utilized adjuvant fluid nitrogen cryotherapy after curettage and revealed about 82% fix rate after the main treatment; all cases were at last controlled after recurrent cryosurgery. Capanna et al,^[10] utilized phenol to clean the depression left in the bone after curettage of harmless bone tumors to lessen the local recurrence. The repeat rate was 41% in patients treated with straightforward curettage and 7% in patients treated by cavity followed by the use of phenol. Ozaki et al,^[13] loaded the depression with bone cement after broad curettage and contrasted this methodology and curettage and bone joining. They found that the nearby repeat rate after curettage and concrete was 17% as contrasted and 37% after curettage and bone grafting. Surgery can be troublesome, especially assuming the spine, pelvis or an epiphysis is involved. Embolisation with gelfoam either alone or followed by a surgery is useful in the spine and enormous pelvic cysts.^[14,15]

Total resection has been suggested for ABCs situated in expendable bones, for example, the proximal fibula, distal ulna, ribs, pubic ramus, metacarpals and metatarsals.^[8,20] Halfway resection is demonstrated for subperiosteal ABCs. Aggregate or fractional resection ensures recuperating in all cysts. Radiotherapy has been utilized for inoperable cases however huge difficulties have been accounted for

including development plate and gonadal damage in childhood,^[8,21] as well as the advancement of secondary sarcoma.^[7] Radiotherapy is not generally suggested.

It has been shown that extraction stays the best type of surgical treatment,^[8] yet typically this prompts a few morbidity and impairment in the capability of the furthest points. There are numerous potential issues related with surgical treatment, including disease and growth plate injury, moreover, a troublesome surgical methodology at certain sites. Immobilisation is essential following all surgeries and may should be prolonged in larger lesions, bringing about difficulties for the child and the family. An option insignificantly obtrusive treatment would offer critical advantages.

One analysis of the current review is the shortfall of a tissue determination in 8 of the 10 cases. Determination in these eight depended on clinical show and average imaging qualities, which included plain radiographs, CT and X-ray checks. Aspiration of blood from the cyst at the hour of Polydochonol (Osteo Sclerosing agent) injection supported the diagnosis, and in spite of the fact that biopsy with a Jemshidi needle was endeavored at times, no helpful material could be recovered by this means. Open or a more obtrusive biopsy would have defeated the entire target of a negligibly intrusive methodology. Polydochonol has been used successfully for the treatment of soft tissue venous malformations and lymphangiomata.^[22,23,24] The precise mechanism of action of Polydochonol is not known. It is probable that it is the thrombogenic effect of

the ethanol which achieves vessel thrombosis and thus eliminates the presumed cause of an ABC.^[25] The zein (Osteo Sclerosing agent) component then excites endosteal repair, eventually leading to the successful resolution of the cyst.^[26] Another study found that, percutaneous Polydochonol infusion might be principally utilized for the nearby control of all essential ABCs excluding spinal lesions. We don't as of now suggest infusing into spinal ABCs due to the chance of coincidental break into the surrounding tissues or spinal vessels.^[28]

This moderately basic, less invasive system makes an operation unnecessary by stopping the development of the cyst and inducing endosteal repair. Polydochonol (Osteo Sclerosing agent) infusion can be suggested as the primary management for aneurysmal bone cysts.

Limitations of the study

The study has some limitations. As it studied only the people of West- Southern area of Bangladesh and the fact that no attempt was made to measure more bone cysts study or multiple bone cyst study.

CONCLUSIONS

In conclusion, the present study provides the evidence showing that less invasive steps might be a way to avoid surgery in the primary stage of ABCs and Osteo Sclerosing agent injection can be recommended. For a better knowledge on overall country's scenario, multicenter study is recommended.



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