

## Sclerotherapy by Pilodocanol as the new treatment modality for aneurysmal bone cysts

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Received: 21-08-2020 / Revised: 01-10-2020 / Accepted: 29-10-2020

### Abstract

**Objective:** To ascertain the effectiveness of percutaneous sclerotherapy in the management of aneurysmal bone cyst. **Material and method:** Ten patients with aneurysmal bone cyst were treated by the percutaneous approach with pilodocanol in our institution Rohilkhand medical college and hospital Bareilly, from May 2018 to September 2020. The cysts were present in the lower limb. Under general anesthesia percutaneous sclerotherapy was done using computed tomography and fluoroscopy. 12 to 24 months (avg18 months) follow up for clinical and imaging was done and the outcomes were tabulated. **Results:** In five patients therapy was repeated 2-5times. No failure was found in our series. There were some complications which included: local skin colour change, small blister and discharge. All patients got relieved. **Conclusion:** Percutaneous sclerotherapy of aneurysmal bone cyst with Polidocanol is fruitful and harmless. Thus a substitute to operative procedures, especially when it is unfeasible or not suggested in co-morbidity associated patients. Sclerotherapy is better than other treatment modality. If we can use sclerotherapy for non-reassessable sites then why we cannot use sclerotherapy in reassessable sites.

**Keywords:** Sclerosant, Pilodocanol, ABC(aneurysmal bone cyst)

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### Introduction

An eccentrically situated, cortical thin: lytic, expansile lesion in the metaphysis with and a subperiosteal thin shell of bone is considered to be classical of ABC. Aneurysmal bone cyst is infrequent tumour-like lesion which are seen during adolescence. Our focus was to ascertain the potency of giving Sclerotherapy by percutaneous intralesional 3% polidocanol (hydroxyl-polyethoxydodecan)[1].Numerous modalities of management have been reported like radiation therapy, intralesional injection, subtotal or complete resection with or without reconstruction, sclerotherapy and selective embolus therapy. Biopsy and fracture healing has also been found to reduce lesion spontaneously[2].

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In aneurysmal bone cyst management Percutaneous sclerotherapy with polidocanol is a safe alternative to traditional procedures. It can be done on an OPD basis and can be done on those sites which cannot be accessed[3].

Recently percutaneous sclerotherapy has come out as an excellent method of treatment for ABC, and prevents the complication like decrease in limb length and joint stiffness which are often seen in other type of management[4]. Clinical and radiological results were reported using a modality of sclerotherapy using 3% polidocanol (hydroxypolyethoxydodecan); [2 ml ampoules]; each millilitre contains 30 mg of polidocanol.(Fig 1)



Fig 1: Polidocanol injection

### Material and method

From May 2018 to September 2020, we managed 10 patients with ABC. Our study is a prospective assessment of these cases. We performed biopsy along with injection administration. There were 10 lesions, all in the lower limb. Follow-up was averagely 18 months (12 to 24). None of our patient were lost till

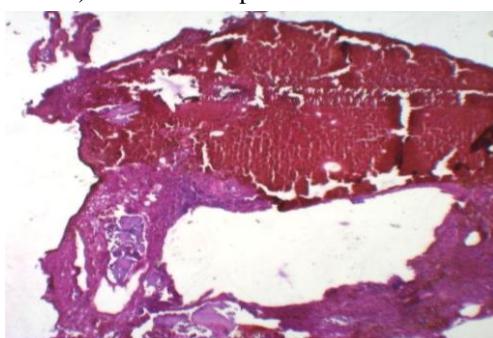


Fig 2: Histology- Blood filled cavity surrounded by an endothelium.

By multiplying the length and the breadth of the cyst on the AP view and the depth on the lateral film the volume of the lesion was calculated before surgery. On measurement a magnification factor of 10% was used. For small and spherical lesions this method was suitable. 2% xylocaine local anaesthetic with sedation was used in older patients whereas general anaesthesia for patients less than 11 years of age. Polidocanol was injected intralesionally under the assistance of fluoroscopy using a 16G needle. About 1 ml of 3% polidocanol was administered per 1 cm<sup>3</sup> volume of the cyst. Flushing with 0.5 ml of normal saline was done when back flow of the sclerosant happened. In any of the cyst not more than 10 ml of sclerosant was administered. The amount of drug to be administered into larger and irregular lesions were almost same, therefore measurement using USG and complex mathematical calculations was not considered to be necessary. Further at 6 and 12 weeks and 24 weeks interval subsequent assessment was undertaken. When the cortical thickness of the wall of the cyst had started

the follow-up. Pre-surgical assessment included clinical, radiological and histopathological evaluation (fig.2). Roentographs and MRI scans (fig.3) were taken for all the cases with lesions. All patients of secondary ABC were removed from the study.



Fig 3: MRI -Fluid filled multiseptate cavities are seen suggestive of ABC.

reforming, the pain had reduced and the cyst had stopped expanding, this is the end-point of management. In the initial phase of management if any one or a combination of the previously mentioned parameters was not found useful a second dose of sclerosant was given. Until the cyst healed, patients were suggested to not perform contact sports and strenuous activity. 1 case with a cyst in patella was given complete bed rest for twenty one days. Two cases of extensive tibial lesion were prescribed removable splints till the completion of management. By our own system, we graded cyst roentigraphically- Type I (residual cyst < 25% of the initial cyst), Type II (residual cyst 25% to 49%), Type III (residual cyst 50% to 74%), and Type IV (residual cyst 75% or more).

In reference to the method of Enneking et al. the complications, the acceptability of treatment, and a functional assessment were also recorded at each follow-up visit



Fig 4(a):Clinical pictures

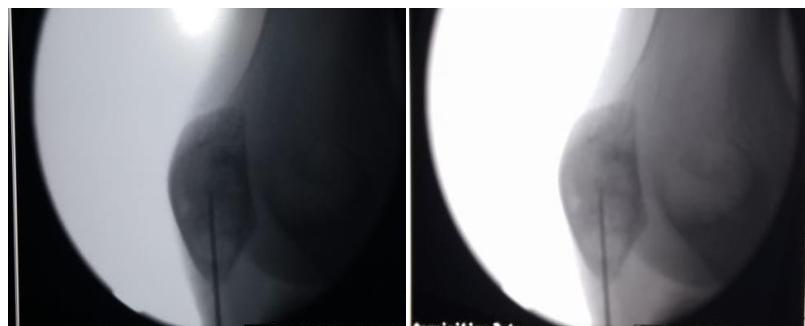


Fig 4(b):Pictures showing autopsy

#### Statistical analysis.

Chi-square method, Fischer's exact method, and Student's *t*-test had been taken to analyse the outcome. A *p* value < 0.05 was considered significant[5].

#### Illustrative case



Fig 5:PRE-OP X -Ray



Fig 6:POST- OP 6 Weeks X- Ray



Fig 7:POST- OP 12 Weeks X - Ray



**Fig 8:POST- OP 24 Weeks X-Ray**

**Fig 9:Full Flexion**

**Fig 10:Full Extension**

## Results

The results are summarized.

The mean number of injections was 3 (1 to 5) per patient, whereas 1 was required in 5 cases. The mean length of treatment was 9 months (6 to 18). The average remaining size of the lesion at final follow-up was 23.3% (6.8% to 39.1%).

Type-I healing was found in 6patients (60.0%),

Type -II in 3 (30.0%) and

Type -III in one patient (10.0%).

The mean overall rating was 75% (60% to 86.7%) at the end of treatment and 84.5% (73.4% to 100%) at the last follow-up as assessed by the method of Enneking et al. Improvement in the functional score correlated positively with the reduction in size of the lesion.

$N = 10$  was used as a valid evaluation to compare all the results at the end of treatment and at the last follow-up. Paired samples ( $t$ -test) were compared and the result was found to be highly significant ( $p = 0.002$ ). The functional score at the end of the starting management (9 months; 6 to 18) were poor than that at the end of the final follow-up (18 months; 6 to 24). The results were not influenced by the site of the lesion as there was no correlation between the site managed and the length of management.

## Discussion

ABC is a lesion which attracts argument mainly due to its characterisation and treatment. It has been traditionally considered as an AV fistula, but some consider it to be a *de-novo* lesion and others post-traumatic in origin[6]. Venous impedance is also considered to be a cause[7]. Because of the term 'benign vascular tumour of bone' it is thought to be some type of vascular malformation. They can be of two types either a primary cyst or associated with

another cyst[8].Sclerosants, work on the principle of direct injury to the endothelial lining, coagulation cascade triggering and blood vessels thrombosis[9]. Zein is the most popular sclerosing agent to be used. Polidocanol has been effectively used in the management of telangiectases, varicosity, venous malformations, gastro-oesophageal varices, and testicular hydrocele. Other agents which are often used are Methylprednisolone acetate, calcitonin and radionucleides [10].Till now only one previous study has described the use of polidocanol for the management of ABC. Polidocanol was used due to its known effectiveness in the management of vascular malformations at different sites with a little adverse effect [11]. The outcome was satisfactory in over 90% of our cases. The remaining cyst size was at a mean of only 23.3% of the initial cyst. The recovery rate was 75% at the end of management that increased to 84.5% at the last follow-up. This is similar to the value of 90% (63% to 100%) estimated by Marcove et al who performed cryotherapy and curettage[12]. A mean of 3 shot (one to five) was required. An ongoing healing process was confirmed over clinical and radiological examinations[13]. Within 1 year of completion of management only one patient (10%) complained of recurrence which was further managed by sclerotherapy effectively. The method was found to be harmless and efficacious with little complications [14].Cases with type-II healing do not need lengthy follow-up as almost all are relieved by twelve months after management. As the treatment is cosmetically better and can be performed on an out-patient basis the patient acceptance was excellent[15].

Contraindications to the use of Polidocanol were; cases with skin lesions at the injection site, cardiovascular disease, asthma or a pregnant lady, especially in the first three months. Injection should never be injected

intra-arterially as it may cause severe necrosis and if the lesion causes neurovascular compression requiring operative procedure. Polidocanol was not used intracranially.

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**Conflict of Interest: Nil**

**Source of support:Nil**