Ultrasound-Guided Aspiration and Polidocanol Foam Sclerotherapy of Cystic Lesions: Study of 20 Cases

Objectives To perform a retrospective study to evaluate the aspiration and polidocanol sclerotherapy in the management of various cystic lesions in the body.

Materials and Methods Twenty patients with symptomatic cystic lesions in the body were aspirated and injected with Polidocanol foam under ultrasound guidance. Thyroid cyst (2), intraabdominal lymphatic cyst (1), epididymal cyst (1), urachal duct remnant cyst (1), simple liver cyst (1), cystic liver metastasis (1), simple renal cyst (4), adrenal cyst (1), congenital funicular hernia (1), encysted hydrocele of spermatic cord (1), hydrocele (2), ovarian cysts (2), angular dermoid cyst (1), and hydronephrotic kidney secondary to PU junction obstruction (1). All patients were followed up by ultrasonography up to 6 months after treatment.

Results In all the patients, sclerotherapy was performed on an outpatient basis under local anesthesia and none of the patients needed postoperative analgesia or admission. Nineteen out of 20 patients had complete regression of the lesions, one patient with multiple cystic liver mets in postoperative case of jejunal gastrointestinal stromal tumor (GIST), approximately 70–80% regression of the size of cystic lesions in the liver was noted. None of the patients had any complication and none required analgesia. All the patients were discharged 1 hour after the procedure.

Conclusion Ultrasound-guided aspiration and foam sclerotherapy with polidocanol is an effective, safe, and minimally invasive therapeutic option for symptomatic cystic lesions in the body with equal efficacy and lower morbidity and hospital stay as compared with surgical options.

KEYWORDS ultrasound, cystic lesions, polidocanol, sclerosants

INTRODUCTION

Incidence of cystic lesions in our practice was 10–15%. The traditional approach for treatment of various cystic lesions in the body is surgical marsupialization, which can be either open surgery or laparoscopic procedure. Aspiration–sclerotherapy is a minor invasive option with low morbidity. The technique was first described in 1985.1 Advantages of ultrasound-guided procedures are speed and versatility, lack of ionizing radiation, real-time guidance and the ability to clearly identify vessels2. Efficacy of various sclerosants is being proved from literature. We are presenting the first study which includes sclerotherapy of cystic lesion with polidocanol in various systems done in single centre by interventional radiologist.

OBJECTIVES

This is a retrospective study to evaluate ultrasound guided aspiration and polidocanol foam sclerotherapy in the management of various cystic lesions in the body.

MATERIALS AND METHODS

This is retrospective study of 20 patients with symptomatic cystic lesions in various parts of body who were referred for ultrasound-guided aspiration and sclerotherapy over the span of 2 years from April 2012 to March 2014. All patients who had symptomatic cysts were included in the study (Table 1).
The cases according to organ system are thyroid (2), intra-abdominal lymphatic cyst (1), epididymal cyst (1), urachal duct remnant cyst (1), simple liver cyst (1), cystic liver metastasis (1), simple renal cyst (4), adrenal cyst (1), congenital funicular hernia (1), encystic hydrocele of spermatic cord (1), hydrocele (2), ovarian cysts (2), angular dermoid cyst (1), and hydronephrotic kidney secondary to PU junction obstruction (1) (Table 1). Informed consent of the patients was taken before the procedure. After preparation of the puncture site with betadine and spirit the puncture site was infiltrated with 2% xylocaine. Sterile Xylocaine jelly was used as coupling agent. Under ultrasound guidance (Toshiba Nemio 30, Japan) the lesions were punctured with 18 G × 89 mm TOP spinal needle (MEDITOP Corporation, Malaysia) in real time. The fluid content of the lesions was aspirated slowly. The sclerosing foam was produced by the Tessari technique using two syringes and one three-way connector with a 4:1 air/liquid sclerosant ratio\(^3\) (Fig 1). The foam was injected in the lesions slowly (Fig. 2a–c). In patients with PU junction obstruction with hydronephrosis 12F PCN catheter (Suretech, India) was put in and after 3 days the foam was injected into the pelvicalyceal system through the catheter and on ultrasound confirmed the absence of foam migration into surrounding vessels. The total sclerosant dose used for each lesion per session and the presence and severity of any complications were documented. The patients were called up for follow-up after 15 days, 1 month, and 2 months interval up to 6 months.

### RESULTS

Complete regression of the lesion was noted in 19 patients (Fig. 3a–c, Fig. 4a–c) and partial regression was noted in one patient (Table 2). In all the cases, we used 60 mg of 3% polidocanol. Nineteen patients required single injection. The case with partial regression was a case of operated jejunal GIST who developed multiple cystic metastasis in the liver 1 year after the surgery (Fig. 5). Chemotherapy was started but cystic lesions were same in size so we did aspiration of the cysts and foam injection. This patient required 4 settings at intervals of 8–12 months (Fig. 6a, b). The patient was symptomatically improved and still surviving 5 years down the line. All the patients were treated on OPD basis. None of the patients had complication. No patient required postprocedure analgesia or admission.

### Table 1 Patients with symptomatic cysts.

<table>
<thead>
<tr>
<th>Location of the lesion</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thyroid cyst</td>
<td>2</td>
</tr>
<tr>
<td>Intra-abdominal lymphatic cyst</td>
<td>1</td>
</tr>
<tr>
<td>Epididymal cyst</td>
<td>1</td>
</tr>
<tr>
<td>Urachal cyst</td>
<td>1</td>
</tr>
<tr>
<td>Simple liver cyst</td>
<td>1</td>
</tr>
<tr>
<td>Cystic liver metastasis</td>
<td>1</td>
</tr>
<tr>
<td>Simple renal cysts</td>
<td>4</td>
</tr>
<tr>
<td>Adrenal cyst</td>
<td>1</td>
</tr>
<tr>
<td>Congenital funicular hernia</td>
<td>1</td>
</tr>
<tr>
<td>Encysted hydrocele of spermatic cord</td>
<td>1</td>
</tr>
<tr>
<td>Hydrocele</td>
<td>2</td>
</tr>
<tr>
<td>Ovarian cyst</td>
<td></td>
</tr>
<tr>
<td>Hydronephrotic kidney secondary to PU junction obstruction</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>20</strong></td>
</tr>
</tbody>
</table>

**Fig. 1** Tessari technique of foam preparation.

**Fig. 2** a: Lymphatic cyst at the hilum of liver; b: Spinal needle in the cyst seen on axial ultrasound image, c: Cyst was aspirated and foam was injected, air is seen in the cyst.
DISCUSSION

Foam formulations of polidocanol mixed with room air are used commonly to treat varicose veins in the extremities because several randomized trials have shown higher efficacy rates and lower recurrence rates with foam than with liquids. One pathological study in vivo showed that a sclerosant in a foam vehicle completely destroyed the intimal barrier after 2-min exposure, leading to endothelial edema and exfoliation from the tunica media causing thrombogenesis in the tunica media over 30 min. Polidocanol is alcohol ethoxylate. It causes sclerosant effect by causing concentration dependent differential cell injury. Cellular calcium signaling and nitric oxide pathways become activated by the administration of the sclerosant, followed by cell death. The maximum permissible dose is 2 mg/kg/day. Polidocanol is a relatively weak sclerosant compared with conventional liquid sclerosants, such as ethanol or EO but foam formulations have the same immediate pathological effect on the endothelium as liquid sclerosants.

Polidocanol foam sclerotherapy has several potential advantages over conventional liquid sclerotherapy. The foam displaces the intravascular blood and is not diluted. It causes homogeneous distribution of the sclerosant. Foam increases the surface area of the therapeutic agent.
in contact with the wall of lesion\textsuperscript{4}. It permits delivery of a known drug concentration for a controllable duration to achieve sclerosis of the lesion\textsuperscript{5}. Injection is generally painless and easily repeated.

Since the mid-2000s, several studies have shown that 5\% ethanolamine oleate (EOI) is an efficient and safe alternative to ethanol for liquid sclerotherapy of symptomatic hepatic cysts. One single-center, nonrandomized study of three simple hepatic cysts and four simple renal cysts with an average volume of 328 ml (range 64–636 ml) reported a mean reduction rate of 93\% (range 89–99\%) 3 months after a single session of 5\% EOI sclerotherapy, with no major complication\textsuperscript{7}. The mean reduction rate for the targeted cyst following polidocanol foam sclerotherapy was 97.9\% (97.7–98.3\%) coated by Itou et al., which is in no way inferior to that of previous reports\textsuperscript{8}. Polidocanol foam sclerotherapy is more cost-effective than 5\% EOI sclerotherapy.

In the phlebology field, reversible cardiac arrest\textsuperscript{9} and transient neurological defects\textsuperscript{10,11} are rare but severe complications is associated with foam sclerosants because of overdose and subsequent leakage to the systemic veins. No such complications were observed in the present study. Injected sclerosant is easily identified by computed tomography (CT) after injection as the air density within the cyst. This also confirms the absence of migration into the surrounding hepatic vessels. In our study we had not done CT and confirmed intravasation of foam on Doppler only. No intraprocedure or postprocedure complication was noted in any of the patients in our study.

We completed sclerotherapy in single setting in 19 patients, one patient with cystic liver metastasis required multiple sessions. This is the only study which included cystic lesions in various organ systems\textsuperscript{11–16}.

The limitations of our study are (1) small number of cases of various organ systems and (2) relatively short follow-up.

CONCLUSION

Ultrasound-guided aspiration and foam sclerotherapy with polidocanol is an effective, safe, and minimally invasive therapeutic option for symptomatic cystic lesions in the body with equal efficacy and lower morbidity and hospital stay as compared with other surgical options. Further studies to determine the optimal dose and timing of polidocanol foam sclerotherapy relative to cyst volume are warranted.

REFERENCES


Fig. 6  a: Axial ultrasound image shows spinal needle in the cystic lesion, b: follow-up after 6 months the lesion is significantly reduced in size.
US-guided aspiration and foam sclerotherapy for cystic lesions