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CASE REPORT

Sodium Tetradecyl Sulphate Direct Intralesional Sclerotherapy of Venous Malformations of the Vulva and Vagina: Report of Five Cases

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Abstract We report five cases of female patients affected by symptomatic focal external genital venous malformations treated with percutaneous direct intralesional injection of sodium tetradecyl sulphate (STS). All patients were referred because of discomfort and pain when sexual intercourse was attempted. Direct sclerotherapy with 3% STS was performed on a day-hospital basis with the patient under local anesthesia. Complete resolution of the symptoms was achieved in all cases. No major adverse effects were reported. Direct intralesional sclerotherapy with STS may be considered a safe and effective method for the treatment of female external genital malformation without the necessity of general anesthesia for pain control.

Keywords Sodium Tetradecyl Sulfate · Vaginal and vulvar venous malformations · Sclerotherapy

Introduction

Vascular malformations are developmental errors that do not regress spontaneously. They are composed of dysmorphic vessels with normal endothelial turnover and normal mast cell count [1]. The most common are venous vascular malformations, which account for two thirds of such abnormalities [2]. Venous malformations involving the external genitals are rare and may be aesthetically and functionally disabling [3].

Direct intralesional sclerotherapy of vulvar and vaginal malformation has been described in the past with the use of other sclerosant agents [3]. We describe a small series of cases in which sodium tetradecyl sulphate (STS) was successfully used.

Case Reports

Five young female patients (mean age 18 years; age range 17 to 24 years) with external genital venous malformations were referred to our department by dermatologists for further investigation and treatment. All patients expressed symptoms, such as swelling, dysmenorrheal, and a sensation of heaviness. The patients were without previous relevant medical history, and the lesions were congenital, presenting difficulties from adolescence onward. Severe discomfort and pain were exacerbated during any attempt at sexual intercourse, creating severe psychological and social problems.

The malformation was located in the vulva in four cases and in the vagina in one case. In all four vulvar cases, the malformation extended to both the major and minor labrum, and in two cases the clitoris was also involved.

All patients underwent B-mode color Doppler ultrasound (US) to measure blood flow velocity within the lesion and to exclude any arterial component. The procedure was explained in detail to all prospective candidates, and written informed consent was obtained from all patients before the intervention.

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Local anaesthesia (3–5 ml 1% lidocaine) was injected around the lesion. Direct puncture of the lesion with a 23-gauge butterfly needle was performed, and a venogram was performed after slow injection of low-osmolarity nonionic contrast agent under fluoroscopic guidance for the exclusion of any arterial component. The systemic drainage of the lesion was documented in the venogram (Fig. 1A, B). The volume of the injected contrast media required to fill the entire lesion was measured accurately to determine the mount of sclerosant mixture needed.

After ensuring that there was no arterial component in the lesion, another 3–5 ml 1% lidocaine was injected into the lesion before the sclerosant mixture was injected. The sclerosant was then mixed with the contrast agent in a 1:1 ratio. In all patients, 3% STS (Trombovar; Bouty Laboratories, Milan, Italy) was used. The angiographic table was tilted in reverse Trendelenburg position prior to sclerosant injection in order to avoid systemic drainage. Slow injection of the mixture through the butterfly needle followed. The volume of the solution varied from 2 to 4 ml between the five cases. When the entire volume of the mixture was injected, the needle was retracted, and the injection spot was compressed for 15 min. Pain during and after the procedure was bearable for all five patients, and in none of the cases was conscious sedation necessary. All patients were discharged the same day with instructions and oral therapy consisting of betametazone 2 × 0.5 mg for 2 days, cefuroxime 2 × 750 mg for 4 days, and serrapeptasis 2 × 3 mg for 2 weeks.

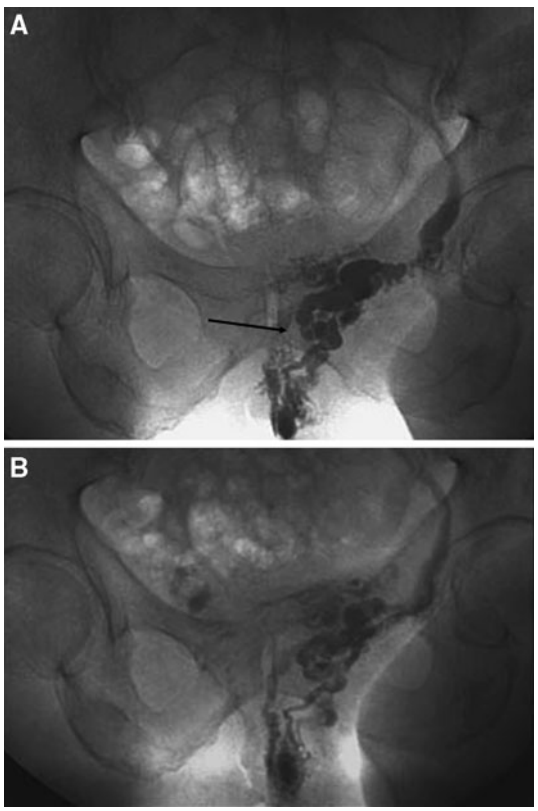

Fig. 1 **A** Direct venogram demonstrates the vaginal venous malformation (*arrow*) before STS injection. **B** Gradual shrinkage of the malformation is noted at the end of the procedure

In all patients, swelling occurred immediately after the procedure. The duration of swelling was 8–10 days and it involved the perilesional skin area. Minor erythema and ulceration also occurred in all patients and were resolved with local application of povidone iodine cream for 7 days. No other complications were noted. Follow-up was performed with color Doppler US and outpatient physician visits. At a mean follow-up of 21 months (range 5–37), four of five patients were completely free from symptoms and all had normal sexual intercourse 3 months after the procedure. One patient complained of a sensation of heaviness and blunt pain 4 months after treatment. Post-procedural magnetic resonance imaging (MRI) was then performed, which showed an additional lesion in the pelvis. Presence of minor residual flow was also noted in the treated lesion, and a second session was necessary with the injection of another 2 ml of sclerosant mixture (Fig. 2). The patient is now feeling better and has been able to normal sexual intercourses; the sensation of heaviness has heaviness diminished, and therefore she refused further treatment of the additional pelvic malformation.

Discussion

Vascular malformations are developmental abnormalities in which a net of vascular channels is formed. They must be differentiated from hemangiomas, which are tumour-like abnormalities based on endothelial cell proliferation [1].

Vascular malformations can be divided into subtypes based on channel content or flow characteristics. Low-flow vascular malformations include capillary, lymphatic, and venous malformations. Venous vascular malformations are low-flow lesions that account for two thirds of all such abnormalities [2].

In the region of the external female genitalia, venous malformations may occur and must be differentiated from the more frequent vulvar varicosities. Vulvar varicosities are typical complications of pregnancy resulting from pelvic venous hypertension associated with the lack of valves in the perineal veins, and they usually appear at clinical examination as a grapelike cluster of veins on the vulva [3].

Female external genital venous malformations are present at birth, often appearing in childhood with symptoms of pain, swelling, and thrombosis [4]. They are usually bluish, easily compressible, nonpulsatile masses that increase in size with maneuvers that increase venous

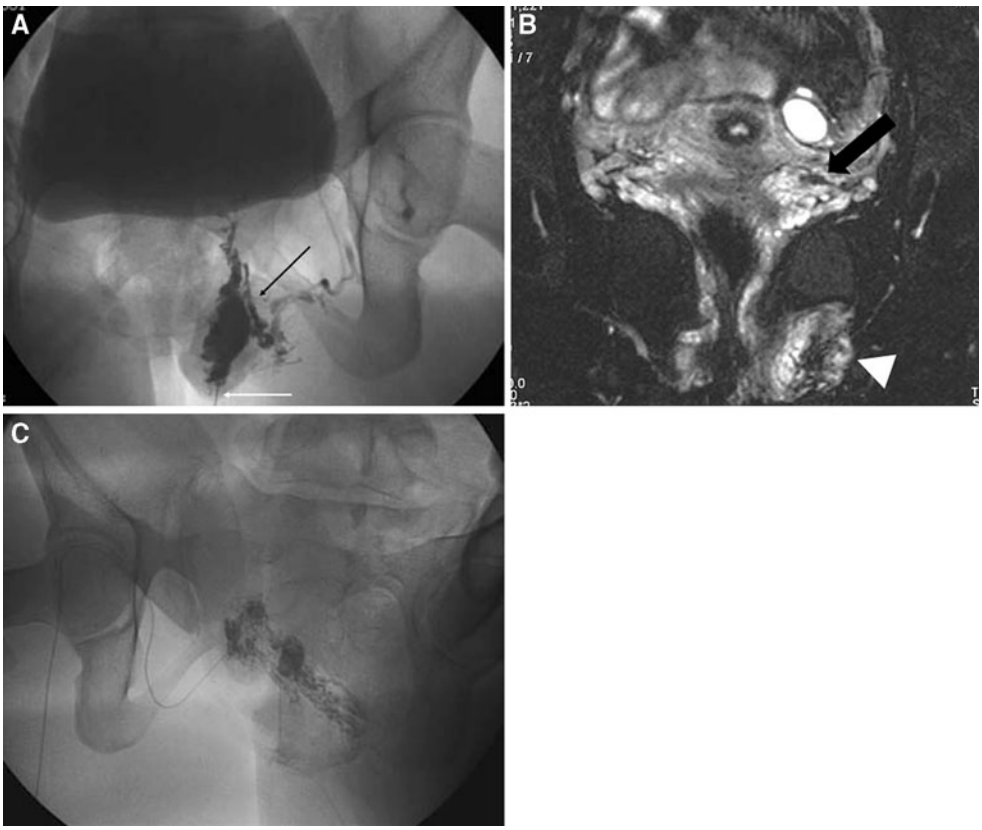

Fig. 2 **A** Direct venogram of vulvar venous malformation (*black arrow*) before treatment. Note the position of the butterfly needle (*white arrow*). **B** Postprocedural MRI (coronal T2 weighted) 4 months after treatment showed an additional malformation in the pelvis (*arrow*). High signal is noted also in the treated vulvar malformation (*arrowhead*). **C** Treatment of the additional vulvar lesion, which appears diminished in volume

pressure. They are characterized by abnormal development of the vein wall, thinning, and asymmetric disruption of the smooth muscle layer of the vein [5]. The deficient smooth muscle layer results in the inability of the affected veins to constrict normally after distension from increased volume. In the case of female external genitals, associated absence or insufficiency of conducting venous valves aggravates the swelling. The affected channels become progressively enlarged, and the resulting stagnation of blood causes thrombosis, swelling, and pain.

Venous malformations are especially responsive to percutaneous sclerosant injection because much of their volume consists of stagnant intraluminal fluid. The goal of sclerotherapy is to obliterate the channel lumens by causing damage to the endothelium with subsequent inflammation and fibrosis.

There are few reports of direct sclerotherapy of female external genital venous malformations. In a report of one 11-year old patient by Herman et al. [6], the patient had referred pain after a trauma. Sclerotherapy with ethanol was successfully performed with the patient was under general anesthesia; there were no complications. In another report of five patients with symptomatic venous malformations, Marrocco-Trischitta et al. [3] used ethanol in two and polidocanol in three patients, who were also under general anesthesia. Apart from skin necrosis, which resolved within 2 weeks after local debridement and transient hemoglobinuria, no major complications occurred in this series. In one of the cases treated with polidocanol, recurrence occurred, and a second session was necessary.

Ethanol is a rather strong sclerosant that causes necrosis of vessel walls with sludging of red blood cells, subsequent thrombosis, and production of intimal fibrosis [7]. It is extremely effective, but its injection can produce severe pain, tissue edema, necrosis, and nerve damage [3].

STS is a synthetic surface-active substance, the sodium salt of a long-chain fatty acid (sodium 2-methyl-7-ethyl-undecyl sulfate-4) containing 2% benzyl alcohol and buffered to pH 7–8. Since it was described by Reiner in 1946 [8], STS has been known to cause endothelial surface damage, which in turn induces an inflammatory reaction, which leads to vessel sclerotization. Small quantities of

STS entering into the venous circulation causes no harmful effect due to its rapid dilution, but reflux of STS into the arterial circulation may result in serious complications; therefore, an arterial component of the malformation should always be excluded before injection.

In our series, all five patient tolerated STS well without major complications and with effective results. We used local anesthesia, contrary to previously reported cases, in which general anesthesia was necessary for the pain control. We believe the use of general anesthesia classifies the procedure as "minimally invasive." In our study, pain was also controlled by injection of a small amount of local anesthesia into the lesion before sclerosant injection.

According to our experience, STS is safe and effective for the treatment of external genital venous malformations with direct-puncture sclerotherapy and may be used in a day-clinic setting with the patient under local anesthesia.

Conflict of interest statement The authors declare that they have no conflict of interest.

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