Management of pediatric primary varicose veins

Original Article

Mahmoud Ali Abo Ghonim[1,2], Hassan Abdelaty Hassan[1], Mohamed Morsy ELwagih[1], Adel Husseiny Kamhawy[1]

Department of Vascular and Endovascular Surgery, [1]Faculty of Medicine, Tanta University, Tanta, [2]Damnhour Teaching Hospital, Damnhour, Egypt.

ABSTRACT

Background: In the past varicose veins managment was practiced with great caution in pediatric patients and there is limited studies for this topic in literatures that make us enthusiastic for this study.

Aim: To study management and outcome of primary varicose vein in pediatric age group.

Patients and Methods: A This is a prospective clinical single center study including 50 pediatric age group (below 18 years old) having primary varicose veins. Exclusion criteria: Patients older than 18 years old, children with secondary varicose veins and children with congenital vascular Malformations. All patients were evaluated clinically and by venous duplex. Sclerotherapy by foam in Double Syringe System, Accuvein AV400, Polidocanol 0.5,1%, and magnification loop 4×, surgical ablation, conservative, and endovenous laser ablation are the techniques used. Follow-up: patients were assessed for change in venous clinical severity score.

Results: Mean age 15.48 years, 24(48%) male and 26(52%) female. The complaints were pain, functional before marriage as cosmetic reason or hindering admission to military faculties, edema, thrombosis and bleeding. Family history was positive in 74%. Clinical presentation according to CEAP classification. Injection sclerotherapy done in 26(52%) patients, stab avulsion and perforators ligation done in 13(26%) patient combined in two cases with sclerotherapy in cases with bleeding VV, stripping done in five (10%) patients, stocking and conservative management in five (10%) patients and one patient operated with endovenous laser ablation. venous clinical severity score pre intervention was 5.70±2.53 improved to 0.32±0.55 after 3 months from intervention.

Conclusion: Varicose veins in pediatrics are rare. Pediatrics patients may present by dilated GSV as adult patient so there is no correlation with size of the vein however ostial reflux is less common than adult patients. Injection sclerotherapy is safe in pediatrics and it is the most used intervention in the study. Foam sclerotherapy during surgery as a treatment of acute bleeding reticular varicose veins.

Key Words: Pediatrics, Sclerotherapy, Varicose veins.

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Corresponding Author: Mahmoud Ali Abo Ghonim, MD, Department Vascular and Endovascular Surgery, Damnhour Teaching Hospital, Damnhour, Egypt. **Tel.:** 01008841832, **E-mail:** drmahmoudali2011@gmail.com

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INTRODUCTION

It is not common to see varicose veins in pediatric patients; on occasion these patients can find varicosities in the legs causing cosmetic disfigurement, edema or pain. The common thinking among most patients is that many years of standing at work without the ability to elevate the legs is the prime cause of venous disease[1].

Males (80%) and females (95%) with varicose veins in pediatric patients had a positive family history more frequently than both sexes without a positive family history. Although it is now known that varicose veins have a genetic component but this is not the only factor that causes varicose veins. The well-known risk factors—such as prolonged standing, prolonged sitting, excessive weight, hormone treatment, and females' elevated oestrogen release—also apply to pediatric patients and are crucial[2].

Pediatric patients exhibiting symptoms of varicose veins in the lower limbs have drawn more attention in recent years. According to screening tests, 10–15% of children in high-school exhibit symptoms of the illness[3]. Due to the high incidence of varicose veins in general and the fact that they first appeared in children in recent decades, there is increased interest in examining the connection between genetic alterations and the development of varicose veins in children in particular[3].

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Pediatric age in Egypt is considered to be anyone who has not reached 18 years of age according to Egyptian constitution[4].

Reviewing literature, there are limited studies for management of primary varicose vein in pediatric age group that make us enthusiastic for this study.

This is a prospective single center study looking for management and outcome of primary varicose veins in lower limb of pediatric age group.

PATIENTS AND METHODS:

Approval by the Local Ethical Committee was obtained before initiating this study by approval code (35144/12/21) and written informed consent was taken from patients parents before enrollment in the study in Arabic consent to each type of intervention as consent for injection sclerotherapy, varicose veins surgical ablation, and endovenous laser ablation.

This prospective analytical single center study included 50 pediatric patients with primary varicose veins referred to the Vascular and Endovascular Surgery Department in Tanta University Hospitals from the beginning of December 2021 to the end of November 2023. In this study 18 years or less was selected as the cut off age.

History taking from all patients, Clinical examination done and patients evaluated by venous duplex to assess reflux in saphenofemoral or saphenopopliteal junction or perforators reflux with marking of incompetent perforators and also to assess caliber of saphenous vein and tributaries and marking of dilated veins.

Each patient was classified according to CEAP classification[5] as regard clinical picture and preoperative, postoperative assessment according to venous clinical severity score (VCSS)[6] at 1 week, 1, and 3 months.

In pediatrics the complaints were pain, functional before marriage as cosmetic reason or hindering admission to military faculties, edema, thrombosis and bleeding and we cannot predict the caliber of GSV it may be the same in adults especially in adolescent period or it may be dilated to more caliber according to reflux and type of varicosities.

Procedures

According to guidelines plan of management was determined according to type, distribution of varicosities and duplex finding.

Types of interventions of varicose veins in this study were:

Injection sclerotheray

Cases with reticular veins varicosities or spider veins either diffuse or localized were managed by injection sclerotherapy.

Technique of procedure

Sclerotherapy by foam in Double Syringe System, Accuvein AV400, Polidocanol 0.5,1%, and magnification loop 4×, Sclerosant foam was prepared by agitation of a mixture of sclerosant and air between two syringes as in easy foam kit as in Figure (1) and injection of reticular and spider veins done by small caliber needle (gauge 25). The recommended dose of injected sclerosant did not exceed 10ml foam regardless to weight in pediatric patients.

Figure 1: Foam preparation by easy foam kit.

Stab avulsion of varicosities

The patient was operated in the supine position. A stab incision or puncture made and oriented horizontally. Orient the stab sites that would favor the dominant hand in a pulling fashion. We dissected the insertion site and elevated the vein on vein hook as in Figures [2].

Figure 2: Elevation of vein by hook and pull by hemostat.

Figure 3: A 16-year-old child presented with truncal varicosities at course of GSV of left lower limb.

After inserting the hook, we moved it in a sweeping motion from deep to superficial to grip the vein. To avoid ripping the vein and to remove as much length as possible, the vein that was difficult to draw up and came up as a loop should be grabbed with a hemostat and then gently pushed back and forth. Rotating the hemostat was similar to rotating spaghetti around a fork. In order to prevent the vein from re-entering the incision, two hemostats were used: one to draw the vein and the other to anchor it. After cleaning, sutures were put to the skin, following surgery, dressings were placed to stop any bleeding, and the legs were wrapped in soft bandages before being covered with crepe bandages.

Figure 4: Complete disappearance of varicosities and healing in standing position.

Figure 5: A 14-year-old child Presented with bleeding varicose veins from lateral aspect left leg with truncal varicose veins at medial aspect.

Figure 6: Injection sclerotherapy of bleeding varicosities at lateral aspect of lower leg.

Surgical ablation (Stripping)

Patient was positioned supine with arms out and the affected limb was sterilized from foot up to groin to lower abdomen then 2–4cm oblique groin incision was made centered over the saphenofemoral junction (SFJ), the femoral vein and SFJ as well as all tributaries of the SFJ and proximal saphenous vein must be identified then the SFJ was suture-ligated flush with the common femoral vein then exposure of GSV at knee and canulation of stripper to vein and passing stripper to vein at site of ligated SFJ and fixation of stripper to vein by ligation then closure of wounds by suture then application of compression to limb by creep bandage then the great saphenous vein is stripped.

Endovenous laser ablation

Management of varicose veins by ablation of GSV in pediatrics is the same in adult with respect to change in length of patient and nature of vein and subcutaneous fat so we care with amount of tumescent applied to avoid skin burns.

Statistical analysis of the data

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, New York, USA: IBM Corp released 2011). Categorical data were represented as numbers and percentages. Quantitative data were expressed as range (minimum–maximum), mean, SD, median and Inter quartile range. For not normally distributed quantitative variables Friedman test was used to compare between more than two periods. Significance of the obtained results was judged at the 5% level.

RESULTS:

The study was conducted on 50 pediatric patients (24 male and 26 female) who presented by primary varicose veins and study was on management of varicose veins in this pediatrics patients.

The age of study group ranged from 10 to 18 years old with mean age 15.48 years and there were 24(48%) male and 26(52%) female as in Table (1).

Table 1: Distribution of the studied cases according to demographic data:

	***N*(%)**
Sex	
Female	26(52.0)
Male	24(48.0)
Age	
Minimum–maximum	10.0–18.0
Mean±SD	15.48±2.03
Median (IQR)	16.0(14.0–17.0)

Twenty (40%) patients were working and 30(60%) patients not working, 37(74%) patients with positive family history and 13(26%) patients were negative family history, 18(36%) patients were playing sport [including 10(56%) male patients going to gym for body building as preparation for application to military academy] and 32(64%) patients not and 15(30%) patients were overweight and five (10%) patients were obese.

Clinical presentation 31(62%) patients were C1 according to CEAP classification, six (12%) patients were C2, 11(22%) patients were C3 and three (4%) patients were C4.

Twenty (40%) patients were complaining from pain, 10(20%) patients complaining as requirement of application to military acamdy, five (10%) patients complaining from cosmetic problems, two (4%) patients came with thrombosis (STP of GSV), 11(22%) patients presented with pain and lower limb edema and two patients presented with bleeding varicosities as in Table (2). Cases presented with different site of distribution of varicosities as 24 patients presented with diffuse distribution along lower limb, 16(32%) patients presented with varicosities at course of GSV as in Figure (3), 10(20%) patients presented with varicosities at below knee along course of SSV.

Table 2: Distribution of the studied cases according to complain:

Complain	*N*(%)
Pain	20(40.0)
Pain + LL edema	11(22.0)
Military requirement for application	10(20.0)
Cosmetic	5(10.0)
Thrombosis	2(4.0)
Bleeding	2(4.0)

In all, 27(54%) patients showed no reflux in duplex, 13(26%) patients showed perforator reflux, six (12%) patients showed ostial reflux (SFJ or SPJ), and four (8%) patients showed combined ostial and perforator reflux.

Injection sclerotherapy done in 26(52%) patients, stab avulsion and perforators ligation done in 13(26%) as in Figure (4), patient mixed in two cases with sclerotherapy in cases with bleeding VV as in Figures (5,6), classical stripping done in five (10%) patients, stocking and conservative management in five (10%) patients including two cases presented with superficial thrombophlebitis who managed conservative for three months of follow-up and one patient operated with endovenous laser ablation as in Table (3).

Table 3: Distribution of the studied cases according to type of intervention:

Type of intervention	*N*(%)
Injection sclerotherapy	26(52.0)
Stab avulsion + perforator ligation (of whom 2 patients presented with bleeding varicosities submitted to injection sclerotherapy)	13(26.0)
Classical stripping	5(10.0)
Stocking+Conservative	5(10.0)
Endovenous laser ablation	1(2.0)

VCSS score pre intervention and management of all cases the mean VCSS score was 5.70±2.53 improved to 1.84±0.79 at 1 week post and then improved to 0.92±0.57 after 1 month, also improved to 0.32±0.55 after 3 months from intervention as in Table (4).

Table 4: The mean VCSS score after 1 week, 1, and 3 months:

	Pre	1 week	1 month	3 months	Fr	*P*
VCSS						
Minimum–maximum	1.0–11.0	0.0–3.0	0.0–2.0	0.0–2.0	138.825*	<0.001*
Mean±SD	5.70±2.53	1.84±0.79	0.92±0.57	0.32±0.55		
Median (IQR)	6.0(3.0–8.0)	2.0(1.0–2.0)	1.0(1.0–1.0)	0.0(0.0–1.0)		

DISCUSSION

In the past, varicose vein therapy was practiced with great caution in children and adolescents but in our study we focused on management of varicose veins in pediatric age group and we managed 50 cases with varicose vein patient with different modalities of interventions or conservative management according to indication.

According to ESVS (2022)[7] clinical practice guidelines patients with superficial venous incompetence, management strategies mainly depend on clinical presentation (history, symptoms, signs) and detailed individual duplex findings, which are all mandatory for proper decision making. Management adopted in symptomatic patients according to CEAP classification, for patients with reticular veins and/or telangiectasias (CEAP clinical class C1) and/or varicose veins with mainly cosmetic concerns as when treatment is planned sclerotherapy is recommended as the first choice treatment. For patients with superficial

venous incompetence presenting with symptomatic varicose veins (CEAP clinical class C2) interventional treatment is recommended. For patients with superficial venous incompetence presenting with edema (CEAP clinical class C3) may be more likely to benefit from superficial venous intervention. For patients with superficial venous incompetence, presenting with skin changes as a result of chronic venous disease (CEAP clinical class C4, C6), interventional treatment of venous incompetence is recommended[7].

ESVS (2022) showed that surgery and the minimally invasive techniques are similar in terms of efficacy or safety in adult patients so we adopted the minimal invasive interventions in pediatrics patients in this study[7].

Despite scarcity of management of varicose veins in pediatrics in literature but we deal with that issue in this study group. And after reviewing of literature, our study considered from the first studies to deal with this number of pediatrics patients complaining from primary varicose veins in lower limbs as management unlike the study done by Studennikova *et al*.,[8] as regard lower extremities varicose veins screening in Russia in more than 125.000 child studies have revealed the signs of the disease in 10–15% of high-school children but it was screening study to show percentage of varicose veins in school-age pediatric patients not for management.

The patients demographics in study group were as age ranged from 10 to 18 years old with mean age 15.48 years, 24(48%) male and 26(52%) female which nearly similar to the study done by Patel *et al.*,[9] who studied 35 patients 17(44.7%) males and 24(68.5%) female. Median age at first treatment was 14 years (±2.00).

Also compared with the study done by AÇikel and İnan[10], who studied twenty-five patients were identified in this study and the median age of the patients was 12(4–17) years.

As regard risk factors of the study group, 20(40%) patients were working and 30(60%) patients not working, 37(74%) patients with positive family history and 13(26%) patients were negative family history, 18(36%) patients were playing sport including 10(56%) male patients going to gym for body building as preparation for application to military academy and 32(64%) patients not and 15(30%) patients were overweight and five (10%) patients were obese which compared with The risk factors in study done by Zierau[11] who found that Positive family history is more common in male (80%) as well as in female (95%) and the already known risk factors also apply to adolescents. Intense competitive sport, long-standing, long sitting, excessive weight, hormone therapy, and the increased hormone release (Estrogen) in female.

As regard clinical presentation in the study group was primary varicose veins in pediatrics patients classified as follow: 31(62%) patients were C1, six (12%) patients were C2, 11(22%) patients were C3 and two (4%) patients were C4 unlike Patel *et al*.,[8] who studied 35 cases as superficial venous reflux with varicose veins in five (14.2%) patients.

Also in comparison to study done by AÇikel and İnan[10], who detected that 10 patients had lesions showing varicose vein, nine patients had swelling (cases of pedal edema) in their patients of the study.

Regarding patients complains in the present study we had 20(40%) patients had pain, five (10%) patients had cosmetic problem including three female patients around age of marriage and complaining due to social requirement, 10(20%) patients for fulfilling requirement for application to military faculties, 11(22%) patients had pain and lower limb edema, two (4%) patients had bleeding varicosities and two (4%) patients had superficial thrombophlebitis. Unlike study done by Patel *et al*.,[9] who had five patients in study presented by primary varicose veins with three (60%) patients had pain, one (20%) patient had pain and swelling and one (20%) patient had cosmetic problem.

In the present study duplex finding was six (12%) patients had ostial reflux, 13(26%) patients had perforators reflux, 27(54%) patients had no reflux and four (8%) patients had combined ostial and perforators reflux.

In comparison to study done by Weindorf and Schultz-Ehrenburg[12] in Bochum prospective epidemiological study was to find the genesis of the same age group in 11 secondary schools of the town of Bochum which found that the incidence of venous disease in school-age children is 0.2–2.9% and the incidence of physiological venous reflux was ~13% in children aged between 14 and 16 years so this is comparable to our study where ostial reflux is less than recorded in adult patients.

As regard types of intervention and management of varicose veins in the present study were injection sclerotherapy was done in 26(52%) patients, stab avulsion and perforators ligation done in 13(26%) patient mixed in two cases with sclerotherapy in cases with bleeding VV, stripping done in five (10%) patients, stocking and conservative management in five (10%) patients and one patient operated with endovenous laser ablation and this is compared with rare studies as regard intervention to the issue of study but those

study characterized by small number of patients unlike the study group such as:

Zierau[11] managed 15-year-old competitive athletic boy with dilated GSV connected to muscular vein with vein glue VenaSeal in the same session and another 5 years old boy using sealing micro-foam for ablation of perforator vein and it's side tributaries .

And the study done by Patel *et al*.,[9] who managed five patients with primary varicose veins in their study by endovenous laser ablation, so we faced with this small number of interventions to varicose veins in pediatrics patients in literatures which not more than 10 patients unlike the number of cases managed in present study was 50 pediatric patients.

This study has several limitations. Most notably, scarcity of literatures dealing with the subject of study.

CONCLUSION

Varicose veins in pediatrics are rare. Pediatrics patients may present by dilated GSV as adult patient so there is no correlation with size of the vein however ostial reflux is less common than adult patients. Injection sclerotherapy is safe in pediatrics and it is the most used intervention in the study. Foam sclerotherapy during surgery as a treatment of acute bleeding reticular varicose veins. Stab avulsion and perforators ligation is effective in perforator reflux which is common in pediatric patients. Pediatrics patients may present by complication as superficial thrombophlebitis or bleeding.

CONFLICT OF INTEREST

There are no conflicts of interest.

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