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## CLINICAL AND HEMODYNAMIC CHANGES IN VARICOSE VEIN AFTER *SIRAVEDHA* – A CASE REPORT

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### Abstract

Background: Varicose vein is a common surgical problem affecting Quality of life (QoL). Alteration of vein wall is the primary abnormality occurring in it. Hypoxia is considered as the main factor causing vein wall derangement in varicose vein.

Case Presentation: A 41 year old male patient with varicose vein for the last 8 years was treated with *siravedha* (venesection). The symptoms were assessed using Clinical Etiologic Anatomic Pathophysiologic classification, Venous Clinical Severity Score, Aberdeen Varicose Vein Questionnaire and scoring symptoms of *raktadushti* (vitiation of blood). Arterial blood gas (ABG) test was done before and after procedure to evaluate the effect of *siravedha* on hypoxia in varicose vein blood.

Conclusion: *Siravedha*, a simple and economical procedure was found to be highly effective in improving hypoxia in varicose vein blood causing subsequent increase in the QoL of the patient.

**Keywords:** Varicose vein, *Siravedha*, Hypoxia, QoL, *Ayurveda*, Arterial Blood Gas test

## INTRODUCTION

Varicose vein can be correlated to the disease *siragranthi* in Ayurveda. Main treatment indicated for *siragranthi* is a type of bloodletting, *siravedha* (venesection). Worldwide prevalence of varicose vein varies widely up to 2% - 56% in male and <1% - 70% in female.[1] This variation in prevalence is due to the contribution of multiple etiological factors in the development of varicose vein. [2] Hypoxia due to blood stasis in veins induce vein wall remodelling leading to the formation of varicose vein. On the other hand, hypoxia may cause vein relaxation leading to blood stasis in varicosities. Thus, hypoxia either causes or contributes in the development of varicose vein. [3] Estimation of blood gases in varicose vein blood was done before and after *Siravedha* in the patient to find out the effect of *Siravedha* on hypoxia. A disease specific quality of life (QoL) along with venous clinical score measurement was done to assess the effect of *siravedha* on varicose vein.

## CASE PRESENTATION

### Chief complaints

41 year old male patient with bulging of veins on the calf of left lower limb (Figure: 1) came to the Government Ayurveda College Hospital, Kannur on 24/7/2017. He had started noticing lower extremity swelling about 8 years ago. For 1 year, this married Gulf returnee was suffering from complaints like pain, weakness, numbness and itching.

### History of present illness

A history of present illness revealed that the patient was normal 8 years back. For 5 years, he was a painter, standing for 8 hours per day. For another 10 years, he was a head-load worker. According to the patient, varicosity started as mild dilatation over the calf of left lower limb 8 years back. Gradually, veins became more tortuous and dilated and he developed aching pain. He also developed weakness on prolonged standing. Due to the increased pain and weakness he had to quit his job as a head-load worker and returned to India. Now he is working as an auto rickshaw driver. This lean patient was complaining of itching medially over ankle joint and lower one third of calf, developed within 1 year. He also had numbness of left lower limb on prolonged standing developed almost 1 year back.

***Figure 1: Dilated and tortuous veins before Siravedha***



*Figure was taken by the corresponding author herself before siravedha in the Out Patient Department (OPD).*

### **History of past illness**

There was nothing relevant to reveal in the history of past illness

### **Treatment history**

Patient approached an Allopathic hospital for the management. There, the case was diagnosed as varicose vein and suggested surgery. As he was reluctant to undergo surgery he approached the OPD of Government Ayurveda College, Kannur.

### **Family history**

Family history revealed that both of his sisters were suffering from varicose vein.

### **Personal history**

Patient was with reduced appetite even though he used to follow a mixed diet. He had regular bowel and micturition habit. He used to have asleep of 4 to 5 hours only.

## Examination of patient

The general examination of the patient showed vitals being: Pulse rate of 72/min., respiratory rate of 20/min. body weight of 56 kg, height 176.5 cm and blood pressure of 118/80 mm Hg on supine position. BMI of the patient calculated is 18 kg/m<sup>2</sup> suggesting that the patient is slightly underweight. *Prakriti* (body constitution) of the patient was assessed using a validated questionnaire [4] and he was recognized as a *Vatakapra prakriti* person.

## Local examination

On physical examination, tortuous and dilated veins were seen starting posterior to the left knee joint extending laterally to the anterior of calf. Pigmentation was found limited to perimalleolar area of ankle joint.

The patient was clinically assessed before and after *Siravedha* using Clinical Etiologic Anatomic Pathophysiologic [CEAP] classification [5], Venous Clinical Severity Score [VCSS] [6], Aberdeen Varicose Vein Questionnaire (AVVQ) [7] and scoring symptoms of *raktadushti*(vitiation of blood) [8]. Grading the varicosity of the patient was done using CEAP classification. This unilateral varicose vein of left lower limb was in C4 grade. Clinical symptoms were also scored using another quantitative questionnaire –VCSS. VCSS in the left lower limb before *siravedha* was 5.

QoL of the patient was assessed using a validated disease specific questionnaire for varicose vein –AVVQ. In order to overcome the difficulty in recording the details of manikin diagram and to obtain maximum precision, data from manikin diagram were recorded separately as percentage of area affected (AVVQ percentage) and the number of area affected (AVVQ Area). Also, scoring of 12 questions (AVVQ) were done by giving a score of 0 to 3 for each question. Initial AVVQ score obtained was 17. Signs and symptoms of *Raktadushti* was scored using a questionnaire and the score obtained was 10.

## Investigations

On Laboratory examination, patient's hemoglobin percentage (14.8g/dL), bleeding time (1 minute 15 seconds) clotting time (5 minutes) and fasting blood sugar (86 mg %) were

found to be within normal limit. So, the patient was found to be fit for *siravedha*. Routine blood examination and Arterial blood gas (ABG) test [9] was done before and after *Siravedha* using blood collected from varicose vein. Automatic hematology analyzer (Mindray BC 3000 plus using principles of Electrical impedance and light scattering) was used for Routine blood examination was done at the laboratory of Govt. Ayurveda College, Kannur. ABG test was done at the intensive thoracic unit (ITU) of Academy of Medical Sciences Pariyaram, Kannur using automated blood gas analyzer (cobas b 221 – Roche diagnostics corp.). Samples were carried for ABG test by maintaining the temperature below 4°C after ice packing in the 2ml heparinized syringe

### **Intervention**

Patient was not a contraindicated person for *Siravedha* [10]. Before performing *siravedha*, informed consent was taken from him. He was carefully observed for vital parameters before, during and for 1 hour after the procedure. The patient was made to stand and varicose vein was palpated. Below the knee joint, approximately 7cm above the site for *siravedha*, a tourniquet was tied neither too tight nor too loose on the palpated vein so that it becomes prominent. Blood Sample for ABG test was collected from here using heparinized syringe. *Siravedha* was done by introducing needle of a sterile scalp vein set of size 20 G into the vein near the first prick. Blood was collected from other end of the scalp vein set into a measuring jar. To perform blood routine examination, first few drops of blood were collected into an EDTA vial. It took 20 minutes to let out 150 ml blood from the patient. After taking out the needle area was bandaged with sterile cotton pad.

### **Follow up**

During follow up, after 15 days reassessment of subjective parameters - CEAP, VCSS, AVVQ and *raktadushti* were done. Also blood was collected from the same site on varicose vein for routine blood examination and ABG test.

### **OUTCOME OF INTERVENTION AND DISCUSSION**

On the 15<sup>th</sup> day after *siravedha*, there was remarkable improvement in the condition of patient. Complaints like pain, itching, pigmentation and weakness were cured. *Siravedha*

resulted in considerable reduction in the size of dilated and tortuous vein on the left calf (Figure: 2).

**Figure 2: On the 15<sup>th</sup> day after Siravedha**



*Dilatation in varicose vein was reduced after siravedha. Figure was taken by the corresponding author herself on the 15<sup>th</sup> day after siravedha in the Out Patient Department (OPD).*

All these changes contributed in the reduction of scores CEAP, VCSS, AVVQ and *raktadushti* after *siravedha*. Data obtained before and after *siravedha* for subjective parameters are given in Table 1. Even after 6 months, patient was leading a better life than before *siravedha* and there was no increase in the size of varicose vein.

**Table 1: Effect of Siravedha on subjective assessment parameters**

Sl. No.	Parameter	Before procedure	During follow up
1	CEAP <sup>b</sup>	4	2
2	VCSS <sup>c</sup>	5	2
3	AVVQ <sup>d</sup> percentage	25	12.5
4	AVVQ Area	5	4
5	AVVQ Score	17	5
6	<i>Raktadushti</i> score	10	0

<sup>a</sup> Before and after *siravedha* the patient was clinically assessed using Clinical Etiologic Anatomic Pathophysiologic classification <sup>b</sup>, Venous Clinical Severity Score <sup>c</sup>, Aberdeen Varicose Vein Questionnaire <sup>d</sup> and scoring symptoms of *raktadushti* (vitiation of blood).

Increase of pH after *Siravedha* is suggestive of decrease in CO<sub>2</sub> content in plasma. Here reduction of bicarbonate level after *Siravedha* may be due to decrease in carbon dioxide content in plasma. Bicarbonate level contributes about half portion of base excess value in ecf. So, a decline in the bicarbonate level made the BE<sub>ecf</sub> value lower. As chloride ion is exchanged with bicarbonate during chloride shift, there occurred a compensatory increase in chloride level. A decrease in pCO<sub>2</sub>, an increase in pO<sub>2</sub> and SO<sub>2</sub> in varicose vein blood are indicative of increased oxygen carrying capacity of blood.

In Varicose vein, deranged endothelium stimulates recruitment of WBCs to the site. During *siravedha*, the removal of blood causes release of pressure at the site with an improvement in the blood flow and WBCs more effectively removed from the site. Decreased WBC count post intervention is indicative of improved blood flow and more patent endothelium. Increase in neutrophil percentage in the varicose vein blood is indicative of increased tissue repair occurring at deranged vessel wall. As the neutrophil percentage is increased, lymphocyte percentage is decreased proportionately.

Even though there was decrease in RBC count due to blood loss, increase in MCV, MCH and MCHC values suggested functional improvement of individual RBCs with increase in the amount of hemoglobin present. A rise in platelet count, PDW and PCT after *Siravedha* indicates a progressive repair of tissue at the site of varicosity.

All these changes in ABG results were suggestive of improvement in oxygenation and ventilation. Data obtained for objective parameters before and after *Siravedha* were given in Table 2.

**Table 2: Effect of *Siravedha* on objective assessment parameters**

Sl. No.	Parameter	Before procedure	During follow up
1	pH	7.294	7.32
2	pO <sub>2</sub> <sup>b</sup> (mmHg)	23.6	24.1
3	pCO <sub>2</sub> <sup>c</sup> (mmHg)	65.3	60.2
4	HCT <sup>d</sup> (%)	46.4	46.5

5	Hemoglobin (g/dL)	14.4	14.3
6	HCO <sub>3</sub> <sup>e</sup> (mmol/L)	31	30.3
7	BE <sup>f</sup> (mmol/L)	2.5	2.6
8	BEecf <sup>g</sup> (mmol/L)	4.5	4.2
9	BB <sup>h</sup> (mmol/L)	50.3	50.3
10	AG <sup>i</sup> (mmol/L)	17.9	15.2
11	Osmolarity (mOsm/kg)	282	280
12	SO <sub>2</sub> <sup>j</sup> (%)	43.6	45.3
13	Sodium (mmol/L)	141.7	140.2
14	Potassium (mmol/L)	3.49	3.54
15	Calcium (mmol/L)	0.920	1.037
16	Chloride ion (mmol/L)	96.3	98.3
17	WBC <sup>k</sup> (× 10 <sup>3</sup> cells/μL)	8.3	7.9
18	Neutrophil (%)	62	68
19	Lymphocyte (%)	34	28
20	Eosinophil (%)	4	4
21	Basophil (%)	0	0
22	Monocyte (%)	0	0
23	RBC <sup>l</sup> (× 10 <sup>6</sup> cells/μL)	4.89	4.86
24	MCV <sup>m</sup> (fL)	79.1	80.1
25	MCH <sup>n</sup> (pg)	27.4	28.1
26	MCHC <sup>o</sup> (g/dL)	34.7	35.2
27	RDW – CV <sup>p</sup> (%)	13.7	14.1
28	RDW – SD <sup>q</sup> (fL)	39.7	38.7
29	Platelet (× 10 <sup>3</sup> cells/μL)	215	233
30	MPV <sup>r</sup> (fL)	8	7.9
31	PDW <sup>s</sup>	15.4	15.5
32	PCT <sup>t</sup> (%)	0.172	0.184
33	ESR <sup>u</sup> (mm/hr)	10	5

<sup>a</sup> Before siravedha, blood was taken from the varicose vein of subject. Routine blood examination and Arterial blood gas test were done using the sample. On the 15<sup>th</sup> day after Siravedha, again blood was drawn from varicose vein and repeated the blood tests.

<sup>b</sup> Partial pressure of oxygen, <sup>c</sup> Partial pressure of carbon dioxide, <sup>d</sup> Hematocrit, <sup>e</sup> Bicarbonate, <sup>f</sup> Base excess, <sup>g</sup> Base excess in ecf, <sup>h</sup> Buffer Base, <sup>i</sup> Anion Gap, <sup>j</sup> oxygen saturation, <sup>k</sup> White blood cell, <sup>l</sup> Red blood cell, <sup>m</sup> Mean corpuscular volume, <sup>n</sup> Mean corpuscular Hemoglobin, <sup>o</sup> Mean corpuscular Hemoglobin Concentration, <sup>p</sup> Red cell distribution width – coefficient of variation,



<sup>q</sup> Red cell distribution width – standard deviation, <sup>r</sup> Mean platelet volume, <sup>s</sup> Platelet distribution width, <sup>t</sup> Plateletcrit, <sup>u</sup> Erythrocyte sedimentation rate

## CONCLUSION

The results of this study suggest that *Siravedha* can improve hypoxia occurring in varicose vein. This improvement in oxygenation had contributed in the progress in QoL and venous clinical scores.

## Author contribution statement

Jayasree R. Kartha carried out the investigation and wrote the manuscript with support from Abhilash M. Abhilash M. contributed to the interpretation of the result. Both the authors have accepted responsibility for the entire content of this submitted manuscript and approved submission.

## Author disclosure statement

No conflict of interest between the authors to disclose.

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