**Original Research Article**

**Outcome of Conventional Surgery in the Management of Primary Varicose Vein: A Single Centre experience**

**Abstract**

**Background:** Varicose veins are a common vascular condition characterized by dilated, tortuous veins, most often affecting the lower extremities. They are caused by venous insufficiency due to valve dysfunction, leading to blood pooling and increased venous pressure. Symptoms include pain, swelling, heaviness, and in severe cases, skin changes and ulcers. Conventional surgery, particularly high ligation and stripping of the affected veins, has long been a standard treatment for primary varicose veins.

**Objective:** To evaluate the outcome of conventional surgery in the management of primary varicose vein in perspective of recovery.

**Methods:** This prospective observational study was conducted at the Department of Vascular Surgery, National Institute of Cardiovascular Diseases (NICVD), Dhaka, Bangladesh, from September 1, 2019, to August 30, 2020. Preoperative findings, intraoperative procedures, and postoperative outcomes were assessed and compared. Follow-up evaluations were conducted at 1 week and 1 month, and the results were analyzed.

**Result:** A total number of 40 who patients underwent conventional open surgery were included in the study. SFJ incompetence was observed in 62.5% of cases, and no deep vein thrombosis was detected. Mean duration of operation (min) time was 2 32.14 ± 6.18 mins. Mean duration of hospital stay was 30.29 ± 6.82 hrs. The surgery was primarily unilateral (80.0%), with minimal complications such as hyperpigmentation (32.5%) and hematoma (20%) resolving over time. Pain decreased significantly, and 92.5% of patients reported no pain by the first month, with an average return to work within 2.45 days.

**Conclusion:** The study emphasizes that conventional surgery is an effective and relatively minimally invasive option for treating primary varicose veins. Patients experienced notable improvements, minimal postoperative complications, fast recovery, and an early return to work. These results highlight the effectiveness of conventional surgery in managing primary varicose veins.

Key words: *Conventional Surgery, Primary Varicose Vein, Chronic venous insufficiency*

**Introduction**

Varicose veins (VV) are veins, typically in the legs, that lose their elasticity and become swollen with blood. This occurs when the valves in the veins weaken, allowing blood to flow backward. Over time, the veins expand to accommodate the excess blood, eventually leading to a loss of elasticity. Individuals with VV may experience pain in the affected area, tiredness in the legs, swelling, changes in skin appearance, and the development of ulcers in the region.1

Chronic venous insufficiency (CVI) of the lower limbs is a prevalent condition, affecting 25% of women and 15% of men. The most common cause of varicose veins (VV) is venous reflux at the Sapheno-Femoral Junction (SFJ). Prolonged CVI can lead to skin alterations such as eczema, pigmentation, lipodermosclerosis, and ulceration. Concerns often arise regarding the cosmetic appearance of VV and any related skin changes. For many years, surgical intervention has been considered the gold standard for treating VV.²

Over the years, several techniques have been developed to treat saphenous reflux, including high ligation of the saphenous vein, saphenous vein stripping, ultrasound (US)-guided sclerotherapy, endovascular methods and combinations of these methods.³

The treatment of varicose veins focuses on preventing complications, relieving symptoms, and enhancing patients' quality of life. Open surgery, first introduced by W. Keller over 10 years ago, remains the most common approach. However, the past decade has witnessed the rapid development and evolution of endovenous therapies.4,5

During a surgical procedure, the saphenofemoral junction is disconnected from the venous system via ligation in the case of the great saphenous vein disease or the sapheno-popliteal junction is ligated in the case of the small saphenous vein damage. The ligation is usually followed by the great or the small saphenous vein removal (stripping). The surgical intervention usually alleviates the symptoms and yields the desired results, yet some-times the postoperative period is aggravated by the development of complications such as pain, bleeding, infection (inguinal or popliteal), thrombophlebitis, saphenous nerve damage, or impaired lymph drainage. Furthermore, the procedure leaves postoperative scars and there is a risk of hyperpigmentation.5,6,7

These preliminary results confirm the early success of endovenous treatment of the long saphenous system (96%success) and indicate that these results can be replicated in the short saphenous system (97.3% success). These data support the view that endovenous treatment of varicose veins is superior to the reported results for conventional surgery in the short-term; long-term data are awaited.8 No study has been done to conventional surgery in the treatment of VV in NICVD. The objective of this study is to evaluate efficacy and patient-reported outcomes of conventional surgery of VV.

**Material and method**

This prospective observational study was conducted at the Department of Vascular Surgery, National Institute of Cardiovascular Diseases (NICVD), Dhaka, Bangladesh, from September 1, 2019, to August 30, 2020. The study population included patients admitted for operative management of varicose veins. A total of 40 patients were included in the study who were assigned by non-random convenient sampling method.

**Inclusion criteria**

Patients to have varicose veins necessitating surgical intervention due to venous reflux resulting from incompetent SFJ or perforator incompetence. Ultrasound criteria for venous reflux at the sapheno-femoral junction (SFJ) typically involve assessing retrograde flow (reflux) after a valsalva maneuver or calf compression. Reflux lasting longer than 1 second in the deep venous system (including the common femoral vein) or longer than 0.5 seconds in the superficial venous system is often considered significant. For perforating veins, a reflux time of 0.3-0.5 seconds is used.

**Exclusion criteria**

* Isolated short saphenous vein
* Deep venous incompetence,
* Re-do surgery or emergency conditions.

Data collection involved demographic and clinical characteristics, preoperative duplex scan findings, intraoperative details, and postoperative outcomes. Pattern of varicose veins were described according to CEAP classification.9 (Table-1)

**Table-1: CEAP (Clinical, etiological, anatomical and pathological) Classification of varicose vein**

|  |  |  |  |
| --- | --- | --- | --- |
| **Clinical** | **Etiological** | **Anatomical** | **Pathological** |
| * **C0** No visible or palpable signs of venous disease
* **C1** Telangiectasies or reticular veins
* **C2** Varicose veins;
* **C3** Edema
* **C4** Changes in skin and subcutaneous tissue secondary to CVD
* **C4a** Pigmentation or eczema
* **C4b** Lipodermatosclerosis
* **C5** Healed venous ulcer.
* **C6** Active venous ulcer.

S: SymptomaticA: Asymptomatic | **Ec:** Congenital**Ep:** Primary**Es:** Secondary**En:** No venous cause identified | **As:** superficial veins**Ap:** perforating veins**Ad:** deep veins**An:** no venous location identified | **Pr:** Reflux**Po:** obstruction**Pr,o:** reflux and obstruction**Pn**: no venous pathophysiology identifiable |

All Procedures were performed under regional anaesthesia. Patients underwent SFJ disconnection and GSV stripping. Phlebectomy and ultrasound-guided sclerotherapy were performed as needed. Postoperative assessments included pain evaluation, complications such as hyperpigmentation, hematoma, nerve injury, and skin burns, as well as the duration of hospital stay. Visual Analogue Scale (VOC) was used for post-operative pain evaluation. Follow-up was conducted at one week and one month to monitor symptoms and return-to-work time. Data were analyzed using SPSS version 26.0.

**Results**

The majority of patients were male (70%), with a mean age of 39.50 ± 11.50 years, and 45% had a normal BMI (Table 1). Preoperative symptoms predominantly included visible varicose veins (97.5%) and heaviness (52.5%), with 42.5% of patients classified in CEAP category C2 (Table 3). Duplex scan findings revealed SFJ incompetence in 62.5% of cases, while no deep vein thrombosis was detected (Table 4). Most surgeries were unilateral (87.5%), with a mean operation duration of 32.14 ± 6.18 minutes and hospital stays averaging 30.29 ± 6.82 hours (Table 5). Postoperative pain significantly decreased over time, with 92.5% of patients reporting no pain by the first month. Complications such as hyperpigmentation (32.5%) and hematoma (20%) were minimal (Table 6). and resolved by the follow-up period, allowing patients to return to work in an average of 2.45 ± 1.12 days,

**Table 2: Demographic characteristics of the study subject (n=40)**

|  |  |  |
| --- | --- | --- |
| **Demographic variables** | **Frequency**  | **Percentage (%)** |
| Age in years  |  |  |
| <20 | 4 | 10.0 |
| 21-40 | 15 | 37.5 |
| 41-60 | 15 | 37.5 |
| >60 | 6 | 15.0 |
| Mean ± SD | 39.50 ± 11.50 |  |
| Gender  |  |  |
| Male | 28 | 70.0 |
| Female | 12 | 30.0 |
| BMI |  |  |
| Underweight | 3 | 7.5 |
| Normal | 18 | 45.0 |
| Over weight | 18 | 45.0 |
| Obese | 1 | 2.5 |
| Mean ± SD | 23.90 ± 4.38 |  |

**Table 3: Preoperative clinical symptoms**

|  |  |  |
| --- | --- | --- |
|  | **Frequency**  | **Percentage (%)** |
| **Symptom**  |  |  |
| Heaviness  | 21 | 52.5 |
| Visible varicose vein | 39 | 97.5 |
| Skin discoloration | 15 | 37.5 |
| Night cramps | 21 | 42.5 |
| Bleeding | 3 | 7.5 |
| Itching | 13 | 32.5 |
| **Clinical categories**  |  |  |
| C2(varicose vein) | 17 | 42.5 |
| C3 (varicose vein with edema) | 5 | 12.5 |
| C4 (skin changes) | 15 | 37.5 |
| C5 (Healed ulcer) | 1 | 2.5 |
| C6 (non healed ulcer) | 2 | 5.0 |

**Table 4: Duplex scan findings of varicose vein**

|  |  |  |
| --- | --- | --- |
| **Duplex scan**  | **Frequency**  | **Percentage (%)** |
| SFJ |  |  |
| Competent  | 15 | 37.5 |
| Incompetent  | 25 | 62.5 |
| Perforator  |  |  |
| Competent  | 31 | 77.5 |
| Incompetent  | 9 | 22.5 |
| Both SFJ and perforator incompetence  | 2 | 5.0 |
| Deep vein thrombosis  |  |  |
| Present  | 0 | 00 |
| Absent  | 40 | 100.0 |

**Table 5: Distribution of patient according to per-operative variables and hospital stay (n=40)**

|  |  |  |
| --- | --- | --- |
| **Variables**  | **Frequency**  | **Percentage (%)** |
| **Peroperative variables** |  |  |
| Treated limb |  |  |
| Unilateral | 35 | 80.0 |
| Bilateral | 5 | 20.0 |
| Duration of operation (min)  | 32.14 ± 6.18 |  |
| Sclerotherapy |  |  |
| Given | 32 | 80.0 |
| Not given | 8 | 20.0 |
| **Duration of hospital stay(hours) (mean± SD)** | 30.29 ± 6.82 |  |
|  |  |  |
| **Back to work (days)** |  |  |  | 2.45 ±­ 1.12 |

**Table 6: Post-operative follow up of the patients**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **1st 24 hours** **N (%)** | **After 1 week****N (%)** | **After 1 month****N (%)** |
| Pain scale |  |  |  |
| 0 (No pain) | 0(00) | 20 (50) | 37 (92.5) |
| 1-3 (mild) | 4 (10) | 16 (40) | 3 (7.5) |
| 4-6 (moderate) | 15 (37.5) | 0 | 0 |
| 7-9 (severe) | 20 (50) | 0 | 0 |
| 10 (worst pain) | 0 (0) | 0 | 0 |
| Mean ± SD | 5.22 ± 2.72 | 1.37 ± 1.13 | 0.075±0.025 |
| Hyperpigmentation | 13 (32.5) | 9 (22.5) | 1(5) |
| Hematoma | 8 (20) | 0 | 00 |
| Nerve injury | 0(00) | 0 | 00 |
| Skin burn | 0 (00) | 0 | 00 |
|  |  |  |  |

**Discussion**

This prospective observational study was conducted in 1st September 2019 to 30th August 2020 in the department of vascular surgery NICVD, Sher-e-Bangla Nagar, Dhaka, Bangladesh. Total 40 patients enrolled in this study based on inclusion and exclusion criteria. Patients underwent conventional surgical treatment for varicose vein. Perioperative data were recorded and analysed where p value (<0.05) considered statistically significant.

Sociodemographic and anthropometric data were analysed. Majority of the patients were in 21-40 years age range. A study conducted by Carroll and his associates shows that, primary varicose vein were seen mostly in younger age group. Mean ± SD age of his study population were 38.75 ± 10.43 years.10 These findings were similar to our study.Majority of varicose vein was seen in male (70%). Darwood et al.4 shows that, male genders are more susceptible to varicose vein of lower limb which correlates with our study. Mean BMI of group A was 23.90 ± 4.38 which also correlates with findings by Darwood and his colleagues.4

Anatomy of varicose veins were analysed from duplex scan of lower limb veins. SFJ incompetency were seen in most of the patients (62.5%). Perforator incompetency were found 22.5% patients. Both SFJ and perforator incompetency were seen only in 2 (5%) patients. This findings showed similarities with the study conducted by James and Berger.11

Unilateral varicose vein treated in 35 (80%) patients. Spinal anaesthesia given in all (100%) patients. Mean duration of operation (min) time was 32.14 ± 6.18min. Jin and his associates performed 142 varicose vein surgery.11 where mean duration of surgery was 28±4.25 min which is almost similar to our study.

Hyperpigmentation was seen in 13 (32.5%) patients while hematoma was formed in 8(20%) patients which were reduced to 5% and 0% after one month. Mean duration of hospital stay was 30.29 ± 6.82 hrs. All these findings coincides with study conducted by Jin and his associates.12

Post-operative pain score were also recorded were most of the patients (50%) experienced mild pain after one week. The study conducted by Gohel, Epstein and Davies12 showed that, patients underwent open surgery showed less pain post operatively after one week. The current study also showed similar findings. After 1 month of follow up, only 3 patients (7.5%) of had mild pain. Lurie and his colleagues conducted a study where 44 patients underwent conventional surgeries for varicose vein who experienced minimal pain after one month of follow up14 which coincides with our findings.

This study had several limitations. The sample size was relatively small, and the study period was limited due to the COVID-19 pandemic, which may have impacted patient enrollment and follow-up. Additionally, as a single-center study conducted in Bangladesh, the findings may not be generalizable to a broader population or other healthcare settings. The sample represents only a small fraction of patients undergoing vascular surgery, which may limit the applicability of the results to diverse patient groups.

**Conclusion**

The study highlights that convention surgery is an effective and minimally invasive treatment for primary varicose veins. Patients showed significant improvement with minimal postoperative complications, rapid recovery, and quick return to work. These findings underscore the efficacy of conventional surgery in managing primary varicose veins. However, further multicenter studies with larger sample sizes are recommended to validate and generalize these results.

**CONSENT:**

Patient’s informed written consent was taken to publish her/his case for academic purpose.

**ETHICAL APPROVAL:**

An ethical approval has been obtained from Institutional ethical committee of NICVD and preserved by the authors.

**DISCALIMER (ARTIFICIAL INTELLEGENCE):**

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

**References**

1. Rautio T, Ohinmaa A, Perälä J. Endovenous obliteration versus conventional stripping in the treatment of primary varicose veins: a randomized controlled trial with comparison of the costs. J Vasc Surg. 2021;35:958–965.
2. Marsden G, Perry M, Kelly K. Diagnosis and management of varicose veins in the legs: summary of NICE guidance. BMJ. 2023;54:146–152.
3. Gohel S, Epstein M, Davies H. Which treatments are cost-effective in the management of varicose veins? Phlebology. 2013;28:153–157.
4. Desluki A, Mohammed E, Kamal K, Ahmed K. Comparative Study between Endovenous Laser Ablation and Conventional Surgery of Primary Varicose Veins of Lower Limbs. The Medical Journal of Cairo University. 2021;89:2339-45.
5. Kieves M., Veltica L. and Keturuna V.A comparison of endovenous laser ablation and conventional surgery in patients with varicose veins of the lower limbs, Acta. Angiologica, 2016; 21: 107-115
6. Gang C, Han-cheng GU.Comparison of endovenous laser treatment and high ligation in treatment of limb varicosity: A meta-analysis Int Wound J.2019;4:1-7.
7. Van A.M., Jiang P., Solomon C., Hill G.B.: Recurrence after varicose vein surgery: A prospective long-term clinical study with duplex ultrasound scanning and air plethys-mography. J. Vasc. 2013;38: 935-943,.
8. Edwards AG, Baynham S, Lees T, Mitchell DC. Changing practice from conventional surgery to endovenous treatments produces excellent results for both long and short saphenous varicose veins. Ann R Coll Surg Engl. 2010;92:85-90.
9. Eklöf B, Rutherford RB, Bergan JJ, Carpentier PH,, Smith PC, Wakefield TW. Revision of the CEAP classification for chronic venous disorders: consensus statement. J Vasc Surg. 2014;40(6):1248
10. Carroll C, Hummel S, Leaviss J. Clinical and cost effectiveness of minimally invasive techniques to manage varicose veins: a systematic review and economic evaluation. Health Technol Assess. 2013;17:11–16.
11. James WD, Berger TG. Andrews' Diseases of the Skin: Clinical Dermatology. 10th ed. Saunders Elsevier; 2006.
12. Jin YH, Ohe HJ, Hwang JK, Kim DS, Kim JY, Park SC, et al. Radiofrequency ablation of varicose veins improves venous clinical severity score despite failure of complete closure of the saphenous vein after 1 year. Asian J Surg. 2016;20:1–7.
13. Gohel S, Epstein M, Davies H. Which treatments are cost-effective in the management of varicose veins? Phlebology. 2013;28:153–157.
14. Lurie F, Creton D, Eklof B. Prospective randomized study of endovenous radiofrequency obliteration (closure) versus ligation and vein stripping (EVOLVes): two-year follow-up. Eur J Vasc Surg. 2015;29:67–73.