**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 cross-sectional study included a total of 40 patients who met the eligibility criteria. All patients underwent conventional open surgery. 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:** The study demonstrates that conventional surgery for primary varicose veins is effective in reducing symptoms and improving outcomes. Most patients were male (70%), with a mean age of 39.50 years, and nearly half (45%) had a normal BMI. Common preoperative symptoms included visible varicose veins (97.5%), heaviness (52.5%), and night cramps (42.5%). SFJ incompetence was observed in 62.5% of cases, and no deep vein thrombosis was detected. The surgery was primarily unilateral (87.5%), 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 a 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*

**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, 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 and compare the 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 who underwent conventional surgery. Inclusion criteria required patients to have varicose veins necessitating surgical intervention, while exclusion criteria included cases with isolated short saphenous or deep venous incompetence, unsuitable GSV anatomy, thrombus presence, pacemaker implantation, peripheral arterial disease, pregnancy, re-do surgery, or emergency conditions. Ethical approval was obtained, and informed consent was secured before patient enrollment.

Data collection involved demographic and clinical characteristics, preoperative duplex scan findings, intraoperative details, and postoperative outcomes. Procedures were performed under general, regional, or tumescent local anesthesia with routine clinical monitoring. Patients randomized to the conventional surgery group 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. 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 2). Duplex scan findings revealed SFJ incompetence in 62.5% of cases, while no deep vein thrombosis was detected (Table 3). 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 4). 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 and resolved by the follow-up period, allowing patients to return to work in an average of 2.45 ± 1.12 days (Table 5).

**Table 1: 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 2: 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 | 17 | 42.5 |
| C3 | 5 | 12.5 |
| C4 | 15 | 37.5 |
| C5 | 1 | 2.5 |
| C6 | 2 | 5.0 |

**Table 3: 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 4: 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 | 12.5 |
| Duration of operation (min) Mean ± SD | 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 |  |

**Table 5: Comparison of patients by post-operative follow in different follow up**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **1st 24 hours complications** | **After 1 week** | **After 1 month** | **P value** |
| Pain scale |  |  |  |  |
| 0 (No pain) | 0(00) | 20 (50) | 37 (92.5) | 0.001 |
| 1-3 (mild) | 4 (10) | 16 (40) | 3 (7.5) | 0.001 |
| 4-6 (moderate) | 15 (37.5) | 0 | 0 | 0.001 |
| 7-9 (severe) | 20 (50) | 0 | 0 | 0.001 |
| 10 (worst pain) | 0 (0) | 0 | 0 | - |
| Mean ± SD | 5.22 ± 2.72 | 1.37 ± 1.13 | 0.075±0.025 | 0.001 |
| Hyperpigmentation | 13 (32.5) | 9 (22.5) | 1(5) | 0.003 |
| Hematoma | 8 (20) | 0 | 00 | 0.001 |
| Aesthetic perception | 9 (22.5) | 7 (17.5) | 00 | 0.259 |
| Nerve injury | 0(00) | 0 | 00 | - |
| Skin burn | 0 (00) | 0 | 00 | - |
| Back to work (days) |  |  | 2.45 ±­ 1.12 |  |

**Discussion**

This cross-sectional 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. Preoperative, peroperative and postoperative data were recorded and analysed where p value (<0.05) considered 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.9 This findings were similar to our study.

Majority of varicose vein was seen in mal (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 of both groups. Perforator incompetency were found 22.5% patients. Both SFJ and perforator incompetency were seen only 2 (5%) patients of group B. This findings matched with study conducted by James and Berger.10

Unilateral varicose vein treated in 35 (80%) lower limb of group B. Spinal anaesthesia given in all (100%) patients. Mean duration of operation (min) of group was 2 32.14 ± 6.18 min respectively. Jin and his associates performed 142 varicose vein surgery with RFA.11 Mean duration of surgery was 18±4.25 min which is almost similar to our study.

Post-operative findings within 1st 24 hours were recorded were in mild pain 20 (50%) post-operatively. Only 1 patient showed worst pain. The study conducted by Gohel, Epstein and Davies12 showed that, patients underwent RFA shows less pain than patients underwent conventional surgery. This supports our study.

Hyperpigmentation was seen in 13 (32.5%) patients. Hematoma was formed in 8(20%) patients. Aesthetic perception were changed in 9 (22.5%) patients of group B. Mean ± SD duration of hospital stay of group were 30.29 ± 6.82 hours which is statistically significant (p=0.001). This study coincides with study conducted by Jin and his associates.11

After 1 week follow up, only 4 patients of group had moderate pain. 16 (40%) patients of group had mild pain. Similarly complains about hyperpigmentation, aesthetic complains were less in RFA group. The difference by mean of hyperpigmentation of the groups were statistically significant (p<0.05). Lurie and his colleagues conducted a study where 44 patients underwent RFA and 54 patients underwent conventional surgery for varicose vein. Follow up results showed that, pain, hyperpigmentation, aesthetic perception was lesser than conventional surgery group on 1 week follow up.13 Similarly 1 month’s follow-up showed that, pain regression in both groups, and also hyperpigmentation of the skin reduced in both group. These changes was statistically insignificant (p<0.05). Group A returned back to work quicker than group B (p<0.05)

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:**

As per international standards or university standards written ethical approval has been collected from Institutional ethical committee 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. 2011;35:958–965.
2. Marsden G, Perry M, Kelly K. Diagnosis and management of varicose veins in the legs: summary of NICE guidance. BMJ. 2013;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. DESOUKI AA, MOHAMED E, KAMAL MK, AHMED AK. Comparative Study between Endovenous Laser Ablation and Conventional Surgery of Primary Varicose Veins of Lower Limbs. The Medical Journal of Cairo University. 2021 Dec 1;89(December):2339-45.
5. KIEVIS˘AS M., VELIC˘KA L. and KETURAKIS V.: A comparison of endovenous laser ablation and conventional surgery in patients with varicose veins of the lower limbs, Acta. Angiologica, Vol. 21, No. 4 pp. 107-115, 2016.
6. GANG CAO, HAN-CHENG GU, et al.: Comparison of endovenous laser treatment and high ligation in treatment of limb varicosity: A meta-analysis Int Wound J., 1-7, 2019.
7. VAN RIJ A.M., JIANG P., SOLOMON C., CHRISTIE R.A. and HILL G.B.: Recurrence after varicose vein surgery: A prospective long-term clinical study with duplex ultrasound scanning and air plethys-mography. J. Vasc. Surg., 38: 935-943, 2003.
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. 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;17:1–16.
10. James WD, Berger TG. Andrews' Diseases of the Skin: Clinical Dermatology. 10th ed. Saunders Elsevier; 2006.
11. 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.
12. Gohel S, Epstein M, Davies H. Which treatments are cost-effective in the management of varicose veins? Phlebology. 2013;28:153–157.
13. 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.