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Research Article

Clinical Profile, Indications and Outcomes of Therapeutic Phlebotomy: A Retrospective Study from a Tertiary Care Teaching Hospital

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ABSTRACT

Background: Therapeutic phlebotomy is a well-established treatment modality for conditions associated with iron overload and increased red cell mass. It remains the first-line treatment for hereditary hemochromatosis and polycythaemia vera and has applications in secondary polycythaemia and porphyria cutanea tarda[1-3]. **Objectives:** To evaluate the clinical profile, indications, procedural characteristics and outcomes of therapeutic phlebotomy in patients managed at a tertiary care teaching hospital, Chamarajanagar. **Materials and Methods:** A retrospective observational study was conducted on 50 patients who underwent therapeutic phlebotomy between January 2022 and December 2025. Demographic details, indications, laboratory parameters, number of phlebotomy sessions, adverse events and clinical outcomes were analysed. **Results:** Among 50 patients, males constituted 68% and females 32%. The commonest indication was polycythaemia vera (10%) followed by secondary polycythaemia (30%), hereditary hemochromatosis (16%), porphyria cutanea tarda (8%) and others (6%). Significant reductions in mean haematocrit (56.2±4.8% to 46.3±3.2%, $p<0.001$) and serum ferritin (1180±540 ng/mL to 320±180 ng/mL, $p<0.001$) were observed. Symptomatic improvement was reported in 88% of patients. Minor adverse events occurred in 12% of procedures. **Conclusion:** Therapeutic phlebotomy is a safe, effective, and economical intervention for disorders associated with iron load and erythrocytosis producing significant haematological and clinical improvement with minimal complications.

Keywords: Therapeutic phlebotomy, polycythaemia vera, hemochromatosis, iron overload, retrospective study.

INTRODUCTION

Therapeutic phlebotomy refers to the removal of blood for medical purposes and is one of the oldest therapeutic procedures still practiced in modern medicine. It reduces iron stores and decreases red cell mass, thereby improving blood viscosity and reducing the risk of thrombotic complications[1].

The principal indications for therapeutic phlebotomy include hereditary hemochromatosis, polycythaemia vera (PV), and porphyria cutanea tarda (PCT). Additional indications include secondary polycythaemia, sickle cell disease with iron overload, and selected patients with non-alcoholic fatty liver disease associated with hyperferritinemia[2-5].

In polycythaemia vera, maintaining haematocrit below 45% significantly reduces cardiovascular mortality and thrombotic events. Therapeutic phlebotomy also remains the cornerstone of treatment for hereditary haemochromatosis, effectively reducing ferritin levels and preventing organ damage[7].

Despite its widespread use, there are limited Indian data regarding the clinical profile and outcomes of therapeutic phlebotomy. Therefore, this study was undertaken to evaluate indications, procedural characteristics, and outcomes among patients undergoing therapeutic phlebotomy in a tertiary care teaching hospital.

Objectives

Primary objective is to evaluate the clinical profile and indications of therapeutic phlebotomy.

Secondary Objectives:

1. To assess haematological and biochemical outcomes.
2. To evaluate adverse events associated with the procedure.
3. To determine overall clinical response following therapy.

MATERIALS AND METHODS

Study Design: Retrospective observational study.

Study Setting: Department of Pathology, Tertiary care hospital, Hubballi.

Study Period: January 2022 - December 2025.

Sample Size: 50 patients.

Inclusion Criteria:

- Patients aged ≥18 years.
- Patients who underwent therapeutic phlebotomy during the study period.
- Complete medical records available.

Exclusion Criteria:

- Incomplete documentation.
- Patients lost to follow-up.

Data Collected:

- Demographic profile
- Clinical indication
- Haemoglobin and haematocrit values
- Serum ferritin levels
- Number of phlebotomy sessions
- Adverse events
- Clinical outcomes

Statistical Analysis:

Data were analysed using SPSS version 26. Continuous variables were expressed as mean ± SD and categorical variables as percentages. Paired t-test was used to compare pre- and post-treatment parameters. A p-value <0.05 was considered statistically significant.

RESULTS

Table-1: Demographic characteristics(n=50)

Variables	Frequency	Percentage
Male	34	68%
Female	16	32%

Age 18-30	8	16%
Age 31-45	17	34%
Age 46-60	18	36%
Age >60	7	14%

Mean age = 47.8 ± 13.6 years.

Table 2: Indications for therapeutic phlebotomy

Indications	Number	Percentage
Polycythaemia era	20	40%
Secondary polycythaemia	15	30%
Hemochromatosis	8	16%
Porphyria cutanea tarda	4	8%
Others	3	6%
Total	50	100%

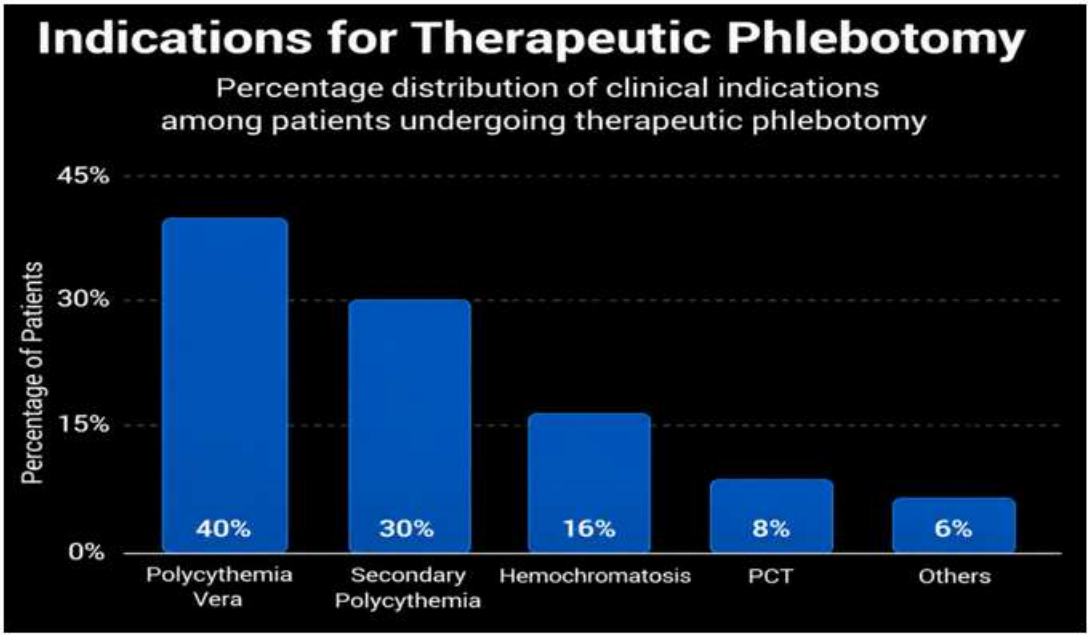

Figure 1: Distribution of indications

Table 3: Baseline clinical features

Symptoms	Frequency (%)
Headache	52
Fatigue	48
Dizziness	42
Pruritis	24
Hyperpigmentation	16
hepatomegaly	12

Table 4: Haematological Outcomes

Parameter	Before TP	After TP	p - Value
Haemoglobin(g/dl)	18.1±1.9	15.2±1.3	<0.001
Haematocrit (%)	56.2±4.8	46.3±3.2	<0.001
Ferritin(ng/dl)	1180±540	320±180	<0.001

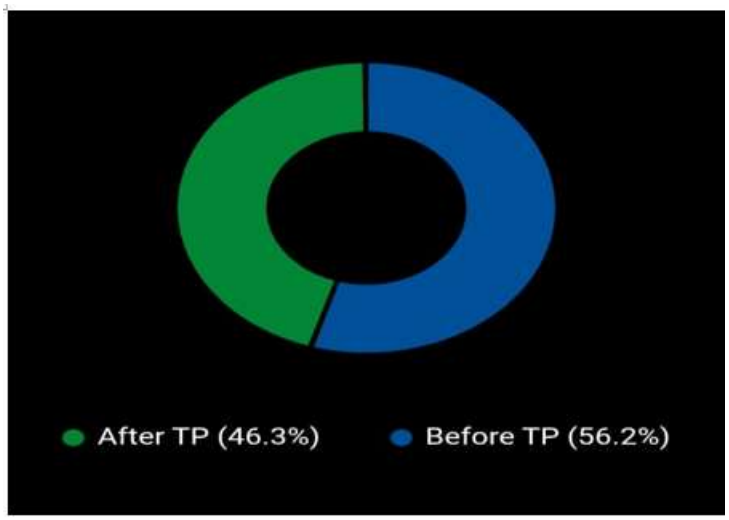

Figure 2: Reduction in Haematocrit
Comparison of mean haematocrit values before and after Therapeutic phlebotomy.

Table 5 : Number of Phlebotomy sessions

Sessions	Patients
1-3	12
4-6	18
7-10	14
>10	6

Mean sessions: 5.8 ± 2.6

Table 6: Adverse events

Adverse events	Frequency	Percentage
Vasovagal reaction	3	6%
Hematoma	2	4%
Mild hypotension	1	2%
None	44	88%

Table 7: Clinical Outcomes

Outcome	Number	Percentage
Complete improvement	32	64%
Partial improvement	12	24%
No significant change	6	12%

Overall symptomatic improvement: 88%

DISCUSSION

Therapeutic phlebotomy remains an important treatment modality in disorders characterized by iron overload and erythrocytosis. In the present study, polycythaemia vera constituted the largest indication (40%), followed by secondary polycythaemia (30%). Similar observations have been reported by Assi and Baz, who identified PV as one of the major indications for therapeutic phlebotomy[2].

The predominance of males (68%) is consistent with previous studies on hemochromatosis and polycythaemia.[7,8]. The mean age of 47.8 years observed in our study is comparable to findings reported by Kim and Oh[1].

A significant reduction in haematocrit from 56.2% to 46.3% was achieved after therapy. The CYTO-PV study demonstrated that maintaining haematocrit below 45% significantly reduces cardiovascular mortality and thrombosis risk in PV patients[6].

Similarly, patients with iron overload showed marked reductions in ferritin levels. Previous studies have established therapeutic phlebotomy as the treatment of choice for hereditary hemochromatosis because it effectively depletes excess iron stores and prevents organ damage[7,9].

Adverse events were infrequent and mild, predominantly vasovagal reactions and local hematomas. These findings are consistent with published literature indicating that therapeutic phlebotomy is generally safe when performed under appropriate supervision [10,11].

The overall clinical improvement rate of 88% highlights the effectiveness of therapeutic phlebotomy in relieving symptoms related to hyperviscosity and iron overload.

Limitations

1) Retrospective design.
2) Single-centre study.
3) Small sample size.
4) Lack of long-term follow-up data.

CONCLUSION

Therapeutic phlebotomy is a safe, inexpensive, and effective treatment for polycythaemia vera, secondary polycythaemia, hereditary hemochromatosis, and related disorders. Significant improvements in haematological parameters and symptom burden were observed with minimal adverse effects. Establishing standardized institutional protocols may further enhance patient outcomes.

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