

ECONOMIC EVALUATION OF CENTRIFUGAL AND MEMBRANE THERAPEUTIC PLASMA EXCHANGE IN TAIWAN

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BACKGROUND

Therapeutic plasma exchange (TPE) is a procedure in which the patient’s blood is passed through a medical device that separates plasma from the other blood components and removes it (Figure 1). It is a common treatment modality in management of various renal, hematological, and neurological diseases.¹ Through TPE, pathologic substances that cause disease — such as inflammatory mediators, autoantibodies, complement components, and cytokines — are eliminated to substantially improve patient quality of life. TPE can be performed using two categories of devices: membrane² (mTPE) or centrifugal³ (cTPE). This study assessed the cost associated with these methods from a payer perspective.

STUDY METHODOLOGY

- Hospital TPE procedure volume and cost data were collected from Taipei Veteran General Hospital (TVGH) and Kaohsiung Medical University Hospital (KMUH).
- A cost minimization analysis model⁴ was created on a Microsoft Excel spreadsheet using a micro-costing approach with the following cost components: device acquisition, maintenance, staff salaries, consumables, venous access, and anticoagulants and other solutions.
- Data on clotting frequency^{5,6,7} were found in published literature. Clotting was defined as filter replacement needed to continue the procedure.
- The model assumed similar clinical outcomes for both techniques.
- Sensitivity analysis was conducted comparing 100 TPE procedures of each type.

RESULTS

- The majority of TPE procedures were performed using mTPE due to the absence of a centrifugal consumables reimbursement code.
- KMUH reported an average of 175 mTPE procedures annually, while TVGH performed 4 cTPE procedures.
- mTPE patients had central venous access, whereas cTPE patients had peripheral venous access.
- On average, device setup and procedure time was shorter for cTPE (2.5 hours) than for mTPE (3 hours).

Table 1: Local hospital cost data

Direct cost (NTD)	Membrane	Centrifugal
Capital device*	1,000,000	2,240,000
Service/maintenance fee per year	100,000	60,000
Disposables, exchange sets	2,500	7,000
Accessories, i.e. tubing	2,300	N/A
Blood warmer	2,000	N/A
Anticoagulant† and other solutions	845	370
TPE operator annual salary	742,500	1,344,000
Venous access	5,000	1,406
Clotting	875	0

*mTPE: heparin; cTPE: ACD-A.

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Figure 1: Centrifugal therapeutic plasma exchange

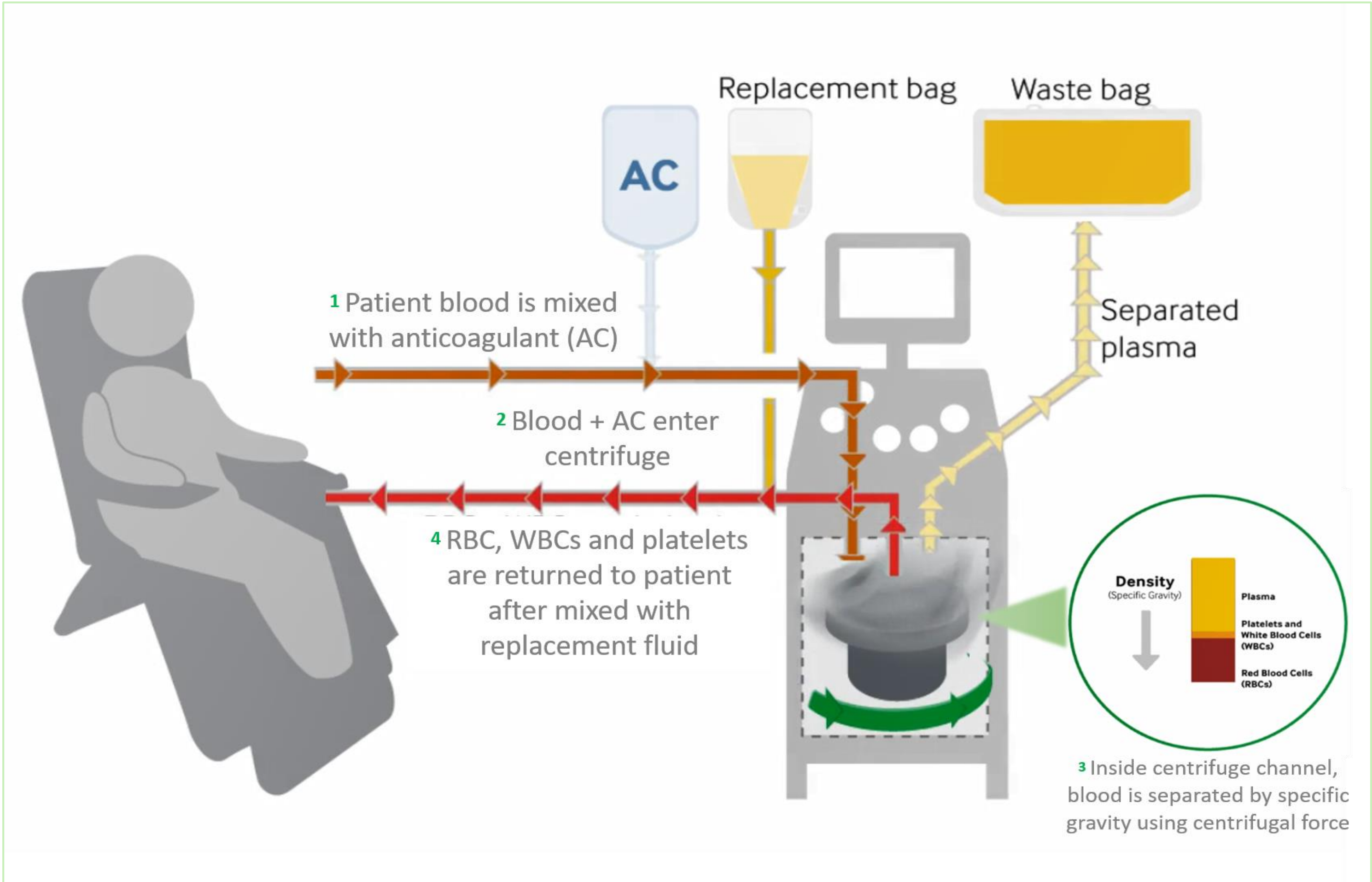


Figure 2: Sensitivity analysis: Average cost of a single TPE procedure

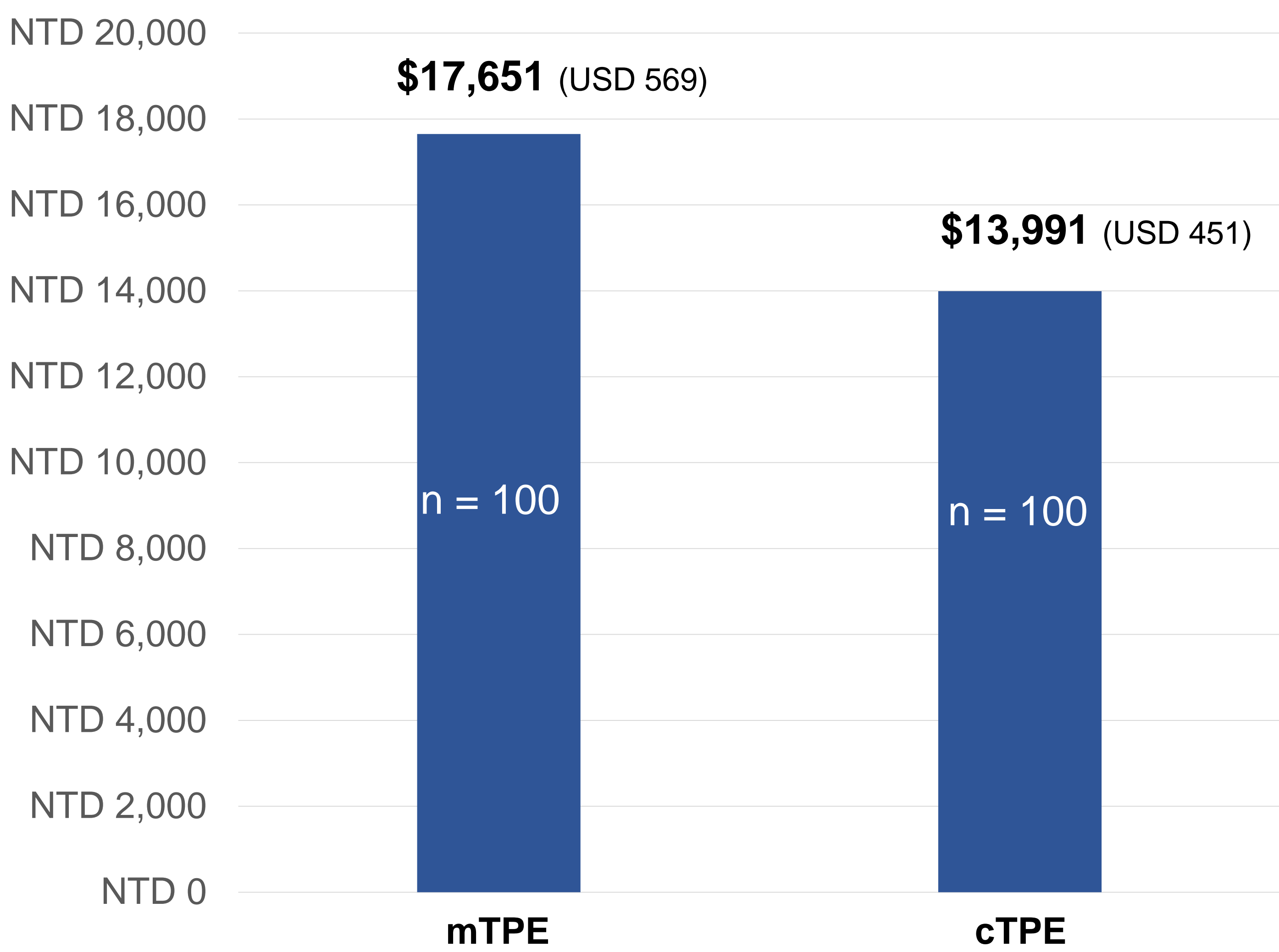


Figure 3: Sensitivity analysis: Projection of 5-year savings for adoption of the centrifugal technique based on 100 membrane TPE procedures



Annual Savings
NTD 365,989 (USD 11,796)

Savings over 5-year period
NTD 1,829,947 (USD 58,994)

CONCLUSION

- The cost comparison between these two plasma exchange techniques showed that centrifugal TPE is less costly than membrane TPE.
- Hospitals with similar characteristics should experience operational and financial efficiencies when performing cTPE over mTPE.
- It is recommended that hospitals with different characteristics perform their own calculations.