(PMD 5) RESEARCH POSTER SESSION 5, ISPOR 2019, COPENHAGEN, DENMARK

ECONOMIC BENEFIT OF CENTRIFUGAL VERSUS MEMBRANE THERAPEUTIC PLASMA EXCHANGE: A SINGLE INSTITUTION EXPERIENCE IN VIETNAM

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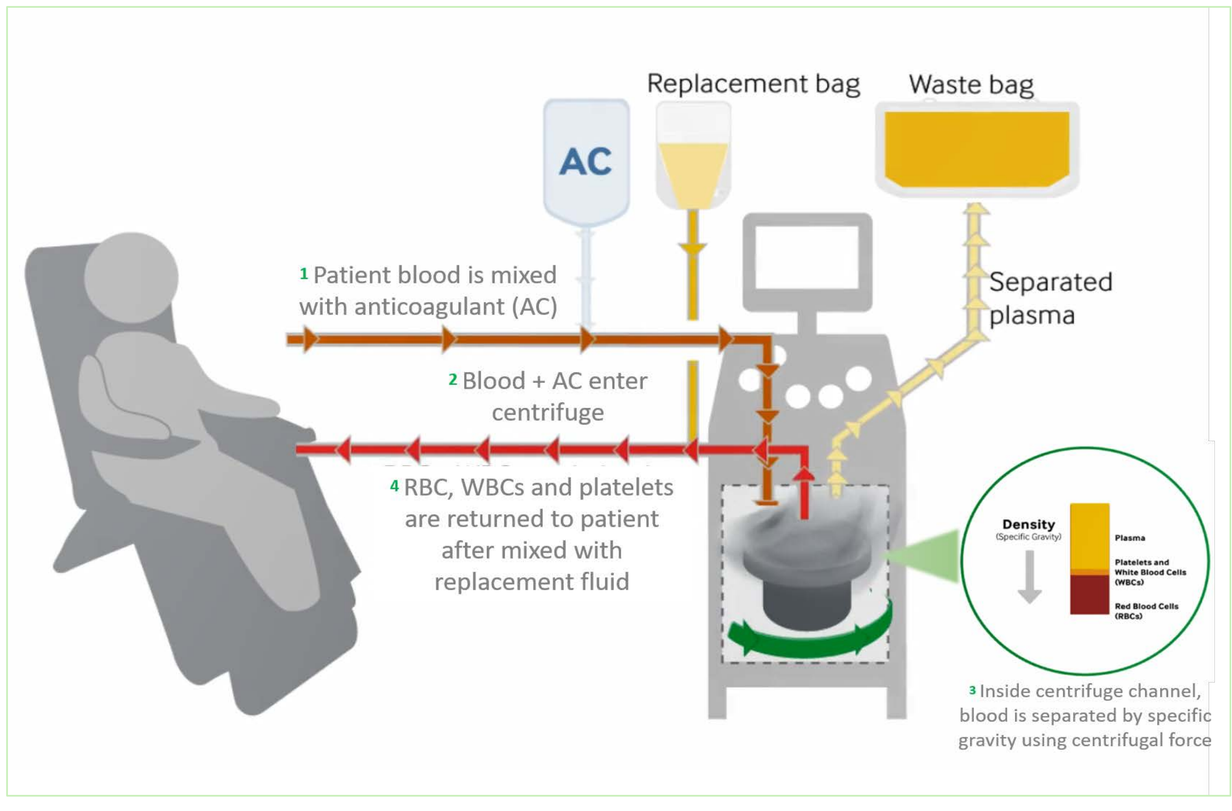
BACKGROUND

Therapeutic plasma exchange (TPE) is a procedure that removes pathogenic substance that cause disease — such as harmful antibodies, immune complexes, cytokines or endotoxins — from a patient's plasma.[1] In a typical TPE procedure, 1 to 1.5 plasma volumes are removed and replaced with another fluid (human albumin or fresh frozen plasma). In the American Society for Apheresis 2019 guidelines,[1] TPE is recommended as first-line therapy in management of various renal, hematological, and neurological diseases. TPE can be performed using two categories of devices: membrane[2] or centrifugal.[3] This study assessed the cost associated with these techniques from a public payer perspective.

Figure 1: Centrifugal therapeutic plasma exchange



STUDY METHODOLOGY

- TPE procedures and cost data were collected from the nephrology and hematology departments, Hue Central Hospital, Vietnam.
- A cost-minimization analysis was performed. The model[4] was created on a Microsoft Excel spreadsheet using a micro-costing approach with the following cost components: device acquisition, maintenance, consumables, venous access, replacement fluids, and labor.
- 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 the two techniques.

Table 1: Cost data derived from study sites

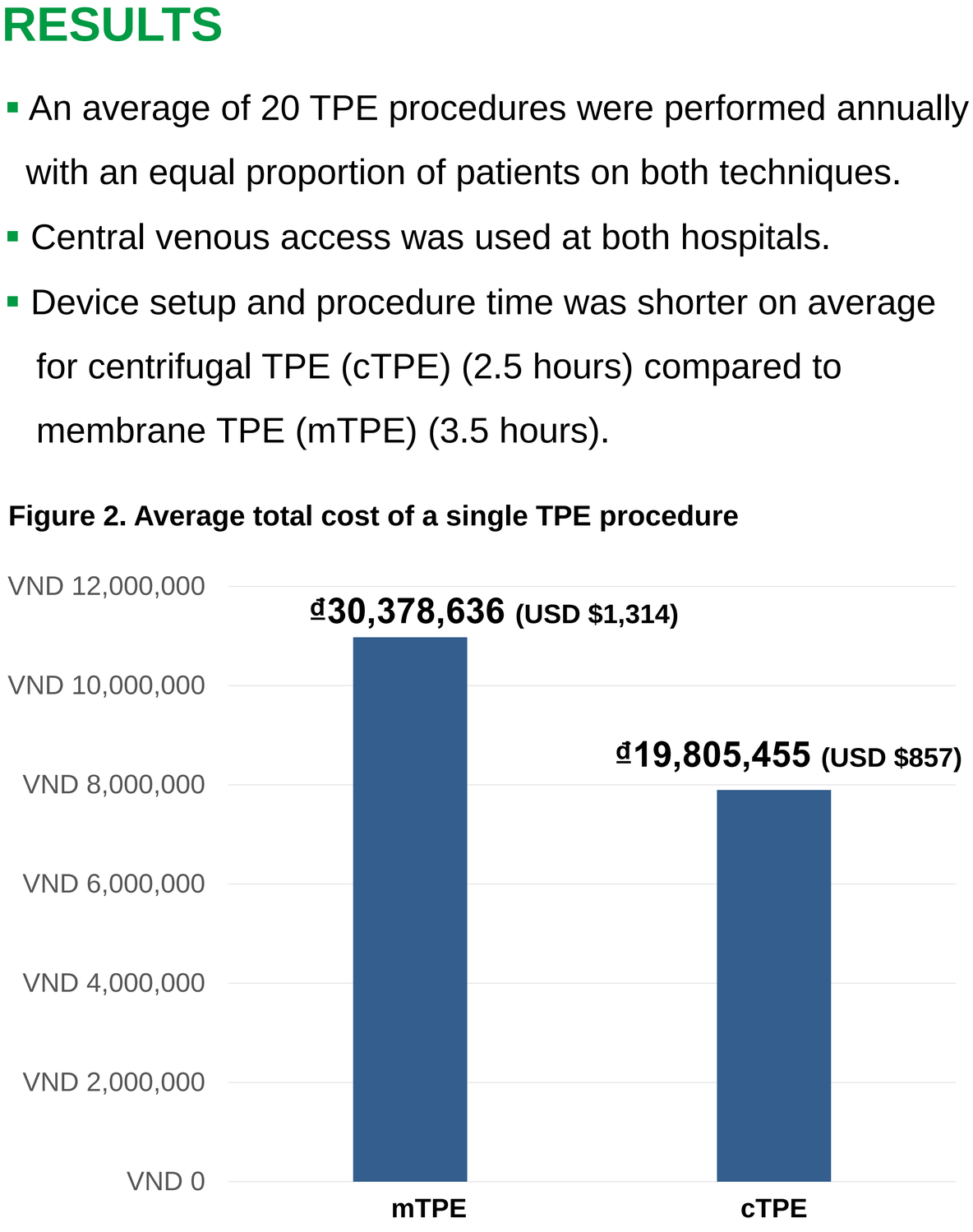
Direct Cost (VND)	Membrane	Centrifugal
Capital device	750,000,000*	1,000,000,000
Service/maintenance fee per year	*	50,000,000
Disposables, exchange sets	5,500,000	3,000,000
Accessories, i.e. tubing	10,000,000	N/A
Anticoagulant and other solutions	300,000	660,000
TPE operator annual salary	384,000,000	384,000,000
Central venous access	1,200,000	1,200,000
Clotting	5,425,000	0

**Service fee is included in the purchase of a capital device.*

RESULTS

- An average of 20 TPE procedures were performed annually with an equal proportion of patients on both techniques.
- Central venous access was used at both hospitals.
- Device setup and procedure time was shorter on average for centrifugal TPE (cTPE) (2.5 hours) compared to membrane TPE (mTPE) (3.5 hours).

Figure 2. Average total cost of a single TPE procedure



CONCLUSION

- The cost comparison between these two plasma exchange methods 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.

REFERENCES

[1]Padmanabhan A, et al. Guidelines on the use of therapeutic apheresis in clinical practice – evidence-based approach from the writing committee of the American Society for Apheresis: the eighth special issue. *J Clin Apher*. 2019;34:171-354.

[2]Siami GA, Siami FS. Membrane plasmapheresis in the United States: a review over the last 20 years. *Ther Apher*. 2001;5(4):315-320.

[3]Burgstaler EA. Current instrumentation for apheresis. In: McLeod BC, Szczepiorkowski ZM, Weinstein R, Winters JL, eds. *Apheresis: Principles and Practice*. 3rd ed. Bethesda, MD: AABB Press; 2010:95-130.

[4]Kobelt G. *Health economics: an introduction to economic evaluation*. 2nd ed. London: Office of Health Economics; 2002.

[5]Betz C, Buettner S, Geiger H, Jung O. Regional citrate anticoagulation in therapeutic plasma exchange with fresh frozen plasma – a modified protocol. *Int J Artif Organs*. 2013;36(11):803-811.

[6]Puppe B, Kingdon EJ. Membrane and centrifugal therapeutic plasma exchange: practical difficulties in anticoagulating the extracorporeal circuit. *Clin Kidney J*. 2014;7(2):201-205.

[7]Paton E, Baldwin I. Plasma exchange in the intensive care unit: a 10 year retrospective audit. *Aust Crit Care*. 2014;27(3):139-144.

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