

Background

The purpose of MTP is to provide large quantities of blood products rapidly to exsanguinating patients. Retrospective studies have shown improvement in survival after implementation of MTP.¹ Wastage of blood components during MTP is inevitable and can be quite significant. There has been concerns from our local blood bank with regards to blood products wastage as well as the appropriateness of our MTP activation.

Aims

- Primary aim is to quantify the usage and the wastage of blood components during MTP activation
- Secondary aims include assessing:
 - The appropriateness of each MTP activation
 - MTP fulfilling the definition of a massive transfusion
 - The utility of O-negative bloods

Methods

All the MTPs carried out in Southland Hospital from Jan 2016 to Dec 2019 were retrieved

NHI of all the patients who had MTP activated were identified and their electronic and paper notes were accessed for relevant information such as

- Usage and wastage of blood components red blood cells (RBC), fresh frozen plasma (FFP), cryoprecipitate (Cryo) and Platelets, estimated blood volume transfused, reasons for MTP activation and utility of O-negative bloods

Each MTP activation was compared against the protocol set out by the Blood Bank for smaller DHBs to determine the appropriateness of each activation

MTP Protocol²

- Suspicion of overt or occult bleed
 - ↓ Yes
- Presence of coagulopathy or Shock
 - ↓ Yes
- Utilise 3 units of O-negative blood first before deciding if MTP is needed

Definition of a Massive Transfusion³

- More than 10 units RBC in 24 hours OR
- More than 4 units RBC in 1 hour OR
- More than 50% of Total Blood Volume replaced by blood products in 3 hours (Nadler's equation was used to estimate each patient's total blood volume)

Nadler's equation for Total blood volume, L (adults and children ≥25 kg):

Male = [0.3669 × (height, m)³ + 0.03219 × (weight, kg) + 0.6041]
 Female = [0.3561 × (height, m)³ + 0.03308 × (weight, kg) + 0.1833]

Results

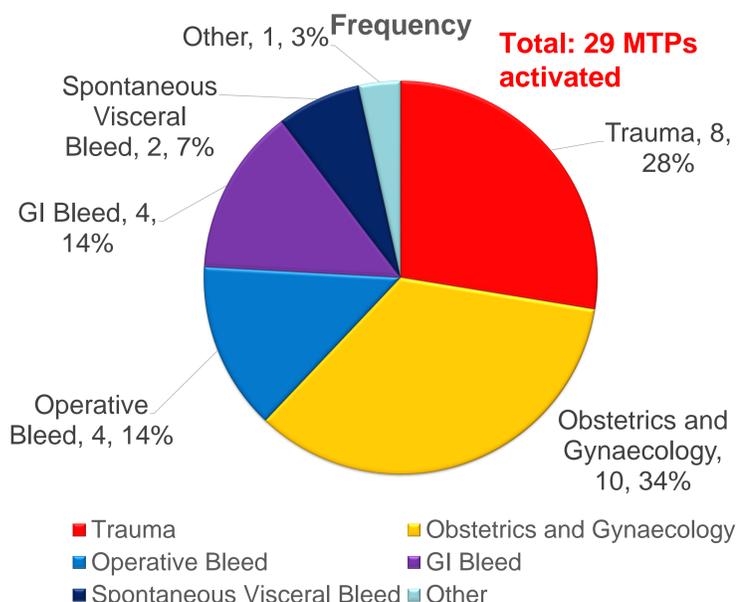


Figure 1: Reasons for MTP Activation

Results

Blood products	Average no. units used per transfusion	Cost per unit (NZD) ⁴	Average cost per transfusion (NZD)
RBC	5.9	307.75	1836.0
FFP	3.1	225.75	708.4
Cryo	1.8	422.83	743.6
Platelets	0.3	872.19	240.6
Total			3308.6

Table 1: Usage of Blood Components during MTP

Blood products	Average no. units wasted per transfusion	Cost per unit (NZD) ⁴	Average cost wasted per transfusion (NZD)
RBC	4.78	307.75	1473.9
FFP	2.3	225.75	522.8
Cryo	1.5	422.83	623.1
Platelets	0	872.19	0
Total			2618.9

Table 2: Wastage of Blood Components during MTP (2017 was not included due to poor documentation on wastage)

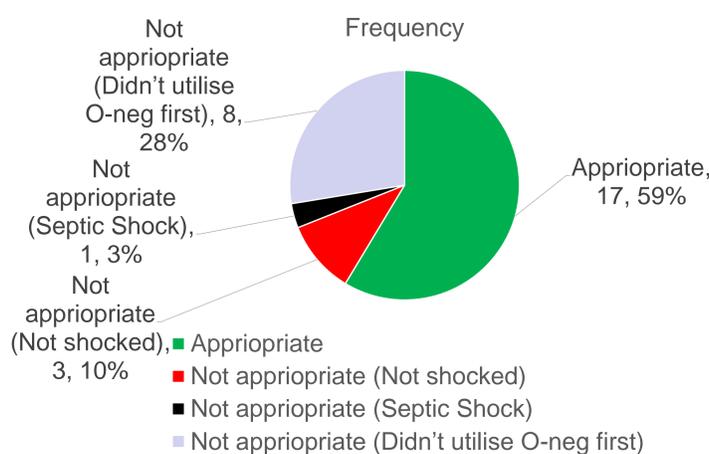


Figure 2: Appropriateness of MTP Activation

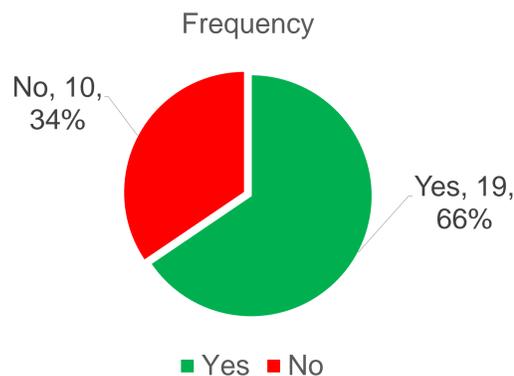


Figure 3: MTP activation Which Met Definition of a Massive Transfusion

Discussion

- 40% of our MTP activation were inappropriate and most of them were due to the premise that O-negative bloods were not utilised first. This may be due to the misconception that MTP would get the RBCs to the patient faster. It is also possible that the clinician did not think using O-negative bloods first would change the outcome of ultimately needing MTP.
- Managing a patient with acute haemorrhage is often a stressful situation and activating the MTP ensures arrival of blood components thus allowing the clinician to focus on other important aspects of resuscitation.
- A third of our MTP activation did not fit the definition for a massive transfusion.
- On average, 1473.9NZD of RBC was wasted per MTP followed by Cryo (623.1NZD) and FFP (522.8NZD). No platelets were wasted.
- The reason for such significant wastage of blood components is likely multifactorial relating to premature activation of MTP and also the lack of establishment of a guardian whose role is to cease the MTP when it is no longer requires.

Conclusion

- Significant wastage of blood components has been detected with the MTP activation in Southland Hospital and decision to activate a MTP should be considered more thoroughly aided by the use of O-negative bloods. This may help reduce the cost of blood components wasted.

References

1. Johansson PI et al. Effect of Haemostatic Control Resuscitation on mortality in massively bleeding patients: a before and after study. Vox Sang. 2009; 96:111-8
2. A Massive Transfusion Protocol for Smaller DHBs. NZBlood 2017
3. Pham HP et al. Update on Massive Transfusion. Br J Anaesth. 2013; 111:71-82
4. www.nzblood.co.nz NZBlood (Prices valid as at 1st July 2018)