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A Review and Development of an Evidence-Based Blood Transfusion Monitoring Frequency in a tertiary teaching Hospital

Hwang Chung Cheng, Chua Tse Lert, Fazila Aloweni, Ang Shin Yuh.
NURSING DIVISION

Singapore General Hospital
SingHealth

Background

The process of blood transfusion involves regular monitoring of patients in order to identify and provide treatment for adverse transfusion reactions (ATR).
Our clinical audits have shown that there were inconsistency in the frequency of monitoring done by nurses during blood transfusion. Hence the purpose of this clinical query was to review our current nursing practice on the frequency of monitoring of vital signs among adult patients during blood transfusion, and to develop an evidence-based blood transfusion monitoring frequency.

<u>Definition of ATR:</u>
- range from bothersome to life-threatening complications. Signs and symptoms may include, urticarial rash, fever, dyspnoea, tachycardia, hypotension, severe anaphylaxis reactions or acute haemolytic reactions
- may not be immediately apparent, but are differentiated from *delayed transfusion reactions,* which may occur days to weeks after the transfusion (Silvergleid, 2015).

Methodology

A systematic search was done using the following databases: PubMed, and Cochrane Library, using the following keywords: *blood transfusion*, *blood administration*, *monitoring*, and *observation* to locate published primary studies and best practice guidelines. Hand search was also done through the Joanna Briggs Institute repository.

Reported incidents of blood transfusion-related reactions were also retrieved from the hospital risk management system (RMS). Incidents which occurred from June 2014 to June 2015 were analyzed.

Results were compared with international guidelines on recommended monitoring practice during blood transfusion.

Conclusion

Our finding was consistent with the published data that up to 30% of serious adverse transfusion reactions occur within 30 minutes after starting blood transfusion and hence close monitoring during after initiation is necessary to detect blood transfusion-related reactions.

Based on the evidence, our hospital has adopted the recommended international guidelines on frequency of monitoring patient while on blood transfusion. In addition we also recommended an hourly visual observation on patient until the completion of blood.

Reference:
Silvergleid AJ. Approach to the patient with a suspected acute transfusion reaction. In: UpToDate, Post TW (Ed), UpToDate, Waltham, MA. (Accessed on July 1, 2015.)

Results

There were no evidence from primary studies that provides recommendation on the frequency of monitoring during blood transfusion. Nine international and one local blood transfusion guidelines were retrieved. All guidelines recommended monitoring vital signs at *0*-minutes, *15*-minutes and *upon completion* of the blood transfusion (Table 2). The rationale for close and frequent monitoring is to detect serious and life threatening reactions (anaphylaxis, transfusion-related acute lung injury [TRALI], haemolysis and sepsis) early. When patient is not in an open area that allows continuous visual observation, consideration should be given to attend to patient for the first 30 minutes of the transfusion.

From our RMS, a total of 148 adverse transfusion reactions were reported over the one year period. 7% of all reported cases were critical transfusion events. 3% of critical events occurred within 15 to 30 minutes after starting transfusion, and 4% of the remaining critical events occurred within 31 to 180 minutes from the start of transfusion (Table 1). Critical events comprised of chills, fever, rigor, hypotension, urticaria, dyspnea, tachycardia.

Time to ATR reported	No. (%)			
	"No obvious clinical problem"	"Critical"	Unclassified	Total
0 – 14th min	17 (11%)	0 (0%)	0 (0%)	17 (11%)
15th – 30th min	20 (14%)	4 (3%)	0 (0%)	24 (16%)
31st – 60th min	40 (27%)	2 (1%)	0 (0%)	42 (28%)
61st – 120th min	29 (20%)	3 (2%)	3 (2%)	35 (24%)
121st – 180th min	14 (9%)	1 (1%)	0 (0%)	15 (10%)
181st – 240th min	4 (3%)	0 (0%)	0 (0%)	4 (3%)
>240th min	10 (7%)	0 (0%)	1 (1%)	11 (7%)
Subtotal	*134 (91%)*	*10 (7%)*	*4 (3%)*	***148 (100%)***

Table 2: RMS data on ATR onset

Art No.	Guideline / Country of Origin	Year updated	Time point											Remarks
			START O min	10 min	15 min	30 min	60-240min	END 240min	1st hr Post	2nd hr Post	3rd hr Post	4th hr Post	24th hr Post	
1	ANZSBT (Aus and NZ)	2011	✓		✓		o (optional)	✓						Opt: continous visual monitoring for first 15min
2	NYSED (USA)	2013	✓		✓									Periodic observation for first 10-15 min
3	NL-PBCP (Canada)	2012	✓		✓			✓						Monitor closely for first 15min
4	MH-PBPO (Canada)	2010	✓		✓			✓	✓					Remain with patient for first 15min
5	RCN (UK)	2013	✓		✓		o	✓						Setting allows for direct observation
6	BCSH (UK)	2009	✓		✓		o	✓	Mandatory periodic monitoring					
7	JPAC (UK)	2013	✓		✓		o	✓	Mandatory periodic monitoring					
8	JBI (International)	2013	✓		✓		o	✓				✓		
9	WHO (International)	2002	✓		✓			✓				✓		
10	MOH-HAS (Singapore)	2011	***No recommendation on routine montoring***											

Table 1: Blood transfusion guidelines on the recommended monitoring frequency

Legend

✓	Mandatory monitoring timepoint
o	Periodic monitoring timepoint