Improving the Massive Hemorrhage Protocol at Sunnybrook Health Sciences Centre

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MLT

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when it matters MOST

Learning Objectives

1. Identify several challenges we encounter during activations of our Massive Hemorrhage Protocol (Code Omega)

2. Demonstrate improvements made to meet these challenges

3. Discuss areas for Continued Quality Improvement

Our Code Omega History

- Sunnybrook has had established guidelines and procedures for the provision of products in emergency situations long before the onset of Massive Hemorrhage Protocols.
  - Products were prepared on demand, at the discretion of the physician
  - MLTs would recommend plasma/platelets after 8-10 RBC or based on the patients coagulation results

- Code Omega was first implemented at the Women's College Hospital for women suffering post partum hemorrhage.

- 2010 term was applied to Sunnybrook's first hospital-wide MHP
  - Code Omega
  - Code Omega (obstetrics)

The Original Protocol

Code Omega / Code Omega Obstetrics

- 1:1:1 blood product ratio
  - Pack 1a) 4 RBC
  - Pack 1b) 4 FFP & 1 pool plt (+ 1 pool of cryo if obstetrical bleed)
  - Pack 2 (and onwards) 4 RBC, 4 FFP, 1 PLT
  - Cryoprecipitate prepared on demand.
- Initiated with a call to locating, and was then paged overhead
- Included a dedicated porter to run coolers and samples

Identifying Areas for Improvement

Code Omega Debriefs

- Established early on to help identify glitches in the system
- Documentation and feedback provided by those present during the code
- Debrief sessions serve as a means to bring stakeholders together to discuss what went well (or not) after each activation
- Information gathered is used to identify patterns and areas for improvement

Areas for Improvement

- Activation
- Communication during the Code
- Frequency of laboratory testing
- Wastage of Blood Products
- Transfusion Ratio

Activation

- The official activation process of the code omega did not originally include a call to the Blood Bank. Often many additional phone calls were needed to identify the patient before preparing blood products
- Further delays in providing blood products were seen due to the transit time of the porter to the Code Omega location and then to the Blood Bank
- The porter often arrived at the Blood Bank with no documentation of the patient's information (no pick up slip), meaning any blood that was crossmatched or labelled with the patients information could not be issued

Communication

- During a Code, patients frequently move between departments of the hospital leading to difficulty contacting the medical team when blood products were available, to request samples, or to report critical values.
- Porters expressed difficulties identifying who they should receive direction from and who to give the blood products to, especially when these team members changed.
- Termination of the protocol was not always relayed promptly to the laboratory (extra preparation of blood products, delay in testing/product preparation for other patients)

Frequency of Lab Testing

- It was shown that laboratory testing was not typically occurring frequently enough to move from ratio-based to lab-guided patient management.

- The clinical team expressed that a visual prompt may be required to trigger more frequent testing

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Areas for Improvement – Blood Wastage

Wastage occurs when RBCs are taken out of the cooler before they are needed:

- RBC units became warm when left out of the cooler too long, not placed between the cold gel packs, or the lid was left open.
- RBC units come in contact with ice packs, which can lead to hemolysis.

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Product Discards

Red Blood Cell Units Destroyed									
	2008	2009	2010	2011	2012	2013	2014	2015	2016
Packaging error on return to the TS	17	14	7	18	19	18	18	12	11
All Cause Error	133	92	84	68	66	58	56	59	46
	13%	**15%**	**8%**	**26%**	**29%**	**31%**	**32%**	**20%**	**24%**

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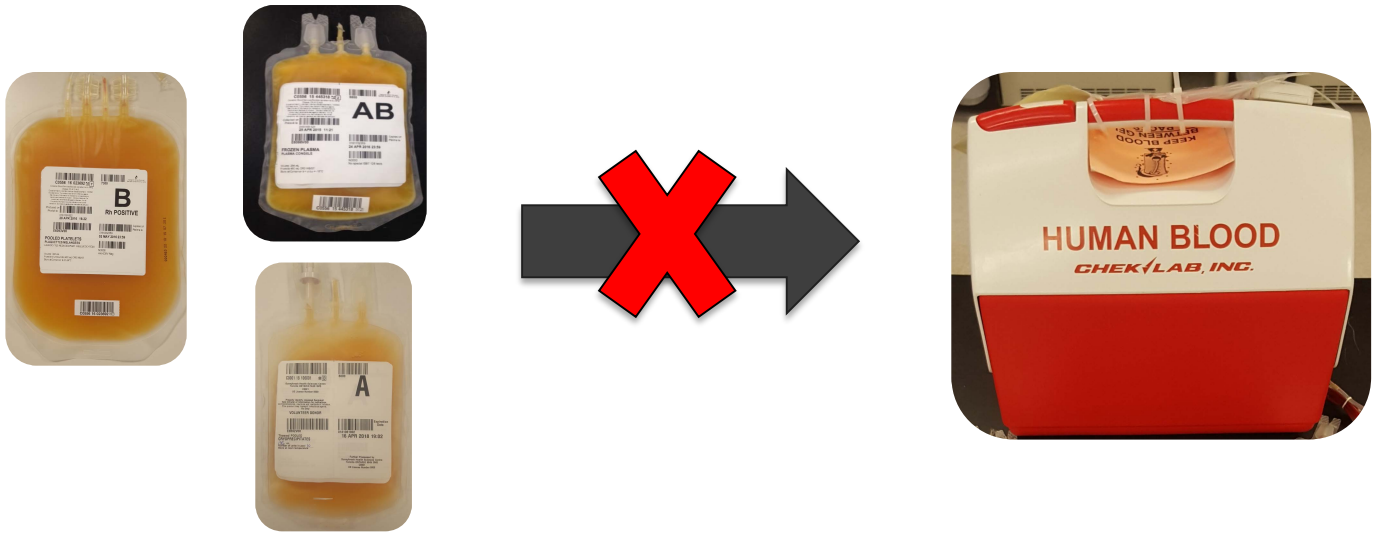
Plasma, Platelets, Cryoprecipitate

- Wastage occurs when these products are inappropriately placed into the blood cooler.
- Plasma and cryoprecipitate wastage also occurs when the products are thawed and not used before their expiry date/time



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Product Discards

Frozen Plasma (Thawed) Units Destroyed									
	2008	2009	2010	2011	2012	2013	2014	2015	2016
Packaging error on return to the TS	0	2	0	8	2	19	7	10	9
All Cause Error	32	18	21	22	54	39	33	33	22
	0%	**11%**	**0%**	**36%**	**4%**	**49%**	**21%**	**30%**	**41%**

Platelets (Pooled or Apheresis) Destroyed									
	2008	2009	2010	2011	2012	2013	2014	2015	2016
Packaging error on return to the TS	1	0	0	3	2	1	3	1	7
All Cause Error	3	3	6	6	7	9	8	10	18
	0%	**0%**	**0%**	**50%**	**29%**	**11%**	**38%**	**10%**	**39%**

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Improvements

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Improving Activation

- When a Code Omega is initiated, locating patches the caller to Blood Bank
  - The caller provides: *Patient name, HFN and location*

    Including key clinical facts – such as patient on anticoagulants or anti-platelet drugs, head or spine injury
  - ➢ Technologist repeats the information back to the caller
  - Patient's name and HFN is transmitted to **Porter's** pager by Locating so they can pick up the first cooler of blood
- Blood Bank will notify the Coagulation Technologist and provide the Patient's name, HFN and location
- Blood Bank will begin preparing 1st cooler

Improving Activation

- Porter will go directly to Blood Bank to pick up 1st cooler
  - for this first delivery **only**, no pickup slip is required since the HFN is on the **Porter's** pager

HFN

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Improving Communication

- Dedicated Code Omega phone is carried by the Lead RN and remains with the patient.
- Transfusion Medicine communications and laboratory results are called to this phone.
- Sister phone that remains in the blood bank to ensure the team can reach the laboratory with ease
- A termination phone call to Transfusion Medicine was added to the protocol. The Blood Bank then calls hematology.

Identifying Key Team Members

- To ensure that the key team members are identifiable, stickers are issued with the Cooler of Blood.
- Worn by the Lead MD, Lead RN and dedicated Porter
- The Lead RN serves as the communications lead for the medical team.
- A Communications lead is also identified in the Blood Bank

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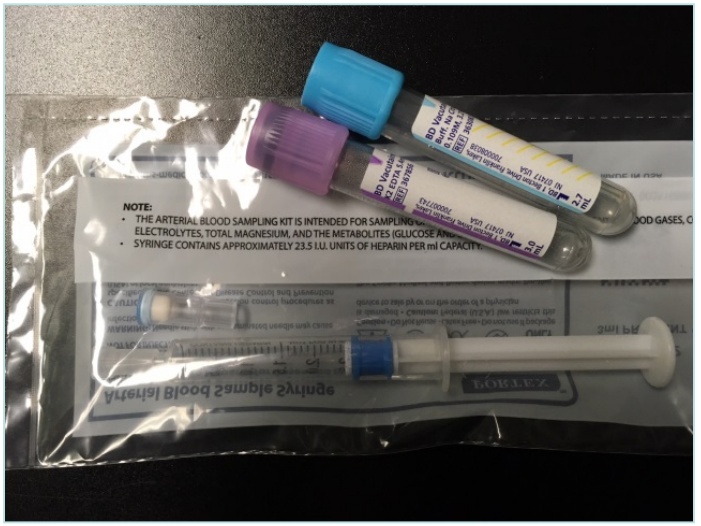
Frequency of Blood Work

- A set of complete blood work will be drawn at the start of the code and at least hourly thereafter
- Transfusion Medicine sends a set of blood tubes and Code Omega order set with each cooler (ABG syringe, Lavender and Blue)

- A Group & Screen (G&S) sample will be drawn with the baseline bloodwork and sent to Transfusion Medicine if required
  - If a group check sample is required, Blood Bank will send it with the Porter after the G&S is received
- The lab will communicate all results (critical and normal) to the Lead Nurse



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1st Code Omega Cooler

Sample tubes and Requisition

Pre Printed Order Form

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Bag with Stickers

MD Lead | RN Lead | Porter

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Code Omega Phone

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Improving Blood Product Wastage

For blood to be accepted back into inventory:

- Unit must be unopened
- All movement of the unit in and out of the blood bank must be documented
- Must be maintained at the **APPROPRIATE TEMERATURE (RBCs 1-10˚ C)**
- Must be returned within the proper time frame (defined by the validation of the transport system)

RBCs that are not issued in a cooler must be returned to the blood bank within 60 minutes of issue, and at <14℃.

Improving Blood Product Wastage (RBCs)

- Implementation of an improved cooler packing configuration with interventions to ensure products are put back correctly if removed.
- Education for all staff involved in transport and transfusion of products during MHP (e-learning)

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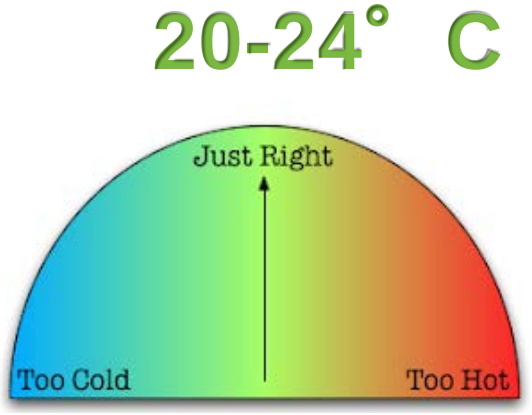
Improving Blood Product Wastage (Platelets)

- Implementation of platelet transport bags to maintain platelets at the proper temperature for up to 4 hours.
- Labels and Tags on the transport containers to reinforce storage requirements



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Transfusion Ratio

Data from recent studies such as the PROPPR study showed that 1:1:1 ratio was not superior to 2:1:1[1]

New Protocol

Pack	Contents
1	4 RBC
2	4 RBC, 4 FP, 1 PLT
3	4 RBC, 2 FP
4	4 RBC, 2 FP, 1 PLT
5+	4 RBC, 2 FP

Pack 5 and beyond
Platelets “a la carte”

1. Holcomb JB, Tilley BC, Baraniuk S, et al. Transfusion of plasma, platelets, and red blood cells in a 1:1:1 vs a 1:1:2 ratio and mortality in patients with severe trauma: the PROPPR randomized clinical trial. JAMA 2015;313:471-82.

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Continued Challanges

- Plasma Wastage
  - Frozen plasma is thawed at 30-37°C. Current standards say that thawed plasma must be stored **and transported** at 1-6°C
  - Further plasma wastage occurs when plasma is thawed ahead during the code and it is not used within the 5 day expiry date.
- Delays in receiving the group and screen or group check specimen
  - Prompt testing of the group and screen, and blood group check specimen is critical to move to crossmatched and group specific blood products. Delays lead to excess usage of group O (pos/neg) RBCs and AB plasma

Continued Challanges

- Patients transferred from other institutions
  - Occasionally patients at other institutions are transfused a mix of O Pos and O Neg RBCs with no pre-transfusion specimen.
  - With no pre-transfusion testing we can not interpret a blood group which leads to delays in preparing crossmatched blood and group specific products

- Products transferred from other institutions
  - We often receive products from other institutions with trauma patients. On occasion these products do not meet acceptance criteria and they can not be kept.

ORBCON Redistribution Forms and Guidelines

http://transfusionontario.org/en/documents/?cat=redistribution

Continuing Improvement

- Debrief after each activation (within 72 hours)
  - Quick response in the event of a problem
- Quality metrics are reviewed for each patient
- Simulation
- Education (code of the month)
- Planning – Code Orange discussions, simulations and drills
- Province wide standardization for MHP in progress

Review

1. Identifed some challenges we encounter during activations of our Massive Hemorrhage Protocol (Code Omega)

2. Demonstrated several improvements made to meet these challenges

3. Discussed areas for Continued Quality Improvement

Thank You

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