Patient Blood Management – the Future in Hong Kong

Dr CK Lee
Chief Executive & Medical Director
Why ME? Why NOW?

• Failure of increasing blood supply further to meet demand (explained by ageing population alone?)

• Ongoing needs to enhance patients’ outcome with minimization of the risk and adverse reactions from blood transfusion (it is already evidenced from Patient Blood Management that practiced in developed countries for more than a decade.)
As a profession and blood supplier (also a blood user in the past)

1. Concerns on patients’ cares and outcome.
2. Ensure blood supply is available as safe and of quality in a timely manner.
3. Ensure donor is safe to donate and does not have un-necessary side effects from donation.
Let re-focus at blood transfusion

Blood Transfusion

Adequacy

Outcome

Quality

Safety

Every blood donation saves 3 lives
Adequacy and availability

• Doctors, Patients, Relatives, Public – most consider “Always available”

• Not knowing that it applies to common blood products only; but they can be affected by external factors. e.g. interruption of blood collection by typhoon causes shortage of platelet supply

• For uncommon products or rare blood types – take time to get them e.g. need to call up special donors, only in frozen inventory or from overseas
Universal Blood

Enhancement of red blood cell transfusion compatibility using CRISPR–mediated erythroblast gene editing

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Every blood donation saves 3 lives
Safety

• Again, expect 100% safe!
• But adverse reactions are common e.g. FNHTR, allergic reaction
• Rarely infections can still happen as not all agents are known or can be screened
• Even with pathogen reduction technology, not all blood components are the same. Gain in safety may mean some losses in quality or quantity
• Note: mis-identification of patients not uncommon and can carry serious risk
### Observed Risk of Blood Transfusion in Hong Kong

<table>
<thead>
<tr>
<th>Incidence of all Adverse Transfusion Reaction</th>
<th>1:1,718</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incidence of Major Adverse Transfusion Reaction</td>
<td>1:36,704</td>
</tr>
<tr>
<td>Incidence of all Transfusion Incident</td>
<td>1:1,187</td>
</tr>
<tr>
<td>Incidence of Transfusion Incident with Severity Index ≥4</td>
<td>1:80,750</td>
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### Current residual risk of TTI in Hong Kong*

<table>
<thead>
<tr>
<th>Disease</th>
<th>Risk</th>
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<tbody>
<tr>
<td>HIV</td>
<td>1 in 3,368,000 (based on Window Period of 5.9 days)</td>
</tr>
<tr>
<td>Hepatitis C</td>
<td>1 in &gt;10,000,000 (based on Window Period of 2.6 days)</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>1 in 126,000 (based on Window Period of 15.1 days)</td>
</tr>
<tr>
<td>Bacteria in red cell transfusion</td>
<td>1 in 500,000</td>
</tr>
<tr>
<td>Bacteria in platelet transfusion</td>
<td>1 in 10,000</td>
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World First Case of Transfusion Transmitted Japanese Encephalitis reported on 21/07/2017

**HEALTH**

**HK man contracts Japanese encephalitis via transfusion**

World's first such case puts focus on city's donation policy, but expert sees no cause for public alarm

Nikki Sun and Emily Tsang

Hong Kong health authorities are tackling the world’s first case of a patient contracting the potentially fatal mosquito-borne disease, Japanese encephalitis (JE), through a blood transfusion.

The 52-year-old man was fighting for his life at Queen Mary Hospital yesterday.

Doctors had determined that two others received the same infected blood as the patient, who underwent a lung transplant at Queen Mary in May, followed by a blood transfusion at Grantham Hospital two weeks ago.

Doctors said the other two patients had not shown any symptoms, though one of them died of a brain haemorrhage after undergoing surgery earlier this month.

While the globally unprecedented case put the focus on the city’s current blood donation policy, which does not require testing for JE, health officials ruled out changing the system.

University of Hong Kong microbiologist Professor Yuen Kwok-yung said there was no need to start screening blood donations for JE as the chance of infection was very low.

“This is a rare and unfortunate case,” he said, adding that the lung transplant operation could have made the patient more vulnerable to the JE virus.

“From a medical point of view, I don’t see the need to develop a mass screening test, unless there is a surge in the cases of JE virus infection in Hong Kong.”

There have been only three cases of the disease this year, and only one in 100 infected people show symptoms such as headache, high fever and neck stiffness, usually four to 14 days after contracting the virus. It may lead to a swelling of the brain and death.

Yuen added that it was practically impossible to check the Red Cross blood bank for the JE virus, and there was no need for a public alarm.

“I hope this case won’t discourage the general public from donating blood in future,” he said.

There are records of similar mosquito-borne viruses spreading through blood transfusions or organ transplants.

Dr Lee Cheuk-lung of the Red Cross suggested that in addition to filling in questionnaires regarding their health, donors should report any symptom of illness after giving blood.

Investigations revealed that the donor, a 46-year-old man living in Tin Shui Wai and working in Kowloon, had given blood through the Red Cross mobile donation service on May 29. He had passed all required health tests and showed no symptoms of JE.

The donor visited London in May but could not recall if he had been bitten by mosquitoes. Centre for Health Protection controller Dr Wong Ka-ling said there was a very high chance he had been infected locally.

The patient suffering from brain haemorrhage received the infected blood on June 20, and died after surgery on July 4 due to bleeding. He was not tested for JE, but did not show symptoms of the virus either.

Another patient being treated for Jaushaemia at Queen Mary underwent a transfusion with the infected blood on June 2, but was discharged on July 14 without showing any JE symptoms.
Cost

- Blood supply and blood transfusion are not without cost (manufacturing, administration and handling of adverse reaction)
- Most blood centers do charge for cost recovery
Quality & Outcome

• No one can 100% guarantee at the highest quality and maximal effectiveness
• Can be affected at different stages
• Clinical variables most frequent contributing factors impacting quality and outcome
What is Patient Blood Management (PBM)?

• PBM improves patient outcomes by *improving the patient’s medical and surgical management in ways that boost and conserve the patient’s own blood.*

• As a consequence of better management, patients usually require fewer blood transfusions thus avoiding transfusion-associated complications.
The rationale for patient blood management addresses evidence-based transfusion medicine practice and stewardship of donated blood, to:

1. view a patient’s own blood as a valuable and unique natural resource that should be conserved and managed appropriately;
2. acknowledge that altruistically donated blood is a valuable, unique and costly resource that is held in trust, and that it will only be used as therapy when there is evidence for potential benefit and potential harm will be minimised;
3. consider transfusion alternatives;
4. ensure quality products are available in a timely and safe manner;
5. ensure potential hazards are considered and balanced against the benefits; and
6. explain the benefits and risks to the patient/relatives.

What are the Issues in Hong Kong Now?
Blood Supply NOW encounters significant difficulties!

- Poor responses of the public to recruitment and publicity
- High deferral risk due to low pre-donation haemoglobin (iron deficiency) and others in particular travel history risk
- Impact of weather in particular typhoons and cold weather
- Rumours that blood exported outside HK and used in non HK residents
Every blood donation saves 3 lives

Donation Population Growth vs Blood Demand Growth

- Red Cell Issued
  - RC Issued to HA Hospitals
  - RC Issued to Private Hospitals
  - Age 15~64

Population x1,000

- ↑5%
- ↑18%
- ↑36%
Hong Kong is using **more blood** than other developed countries

Red Cell Use per 1,000 Population

- US: 25.3
- Canada: 20.7
- New Zealand: 20.3
- Western Australia: 28.0
- England and North Wales: 28.5
- Ireland: 28.5
- Switzerland: 28.8
- Netherland: 28.8
- Japan: 25.3
- Singapore: 28.0
- Hong Kong: 33.0

Every blood donation saves 3 lives
Every blood donation saves 3 lives

Theoretical Donors Pool*

30 out of 1000 donated blood

*16 - 65
Real Problems in Sustaining Blood Supply
as shown in 2017 statistics

• Significant **drop** in
  – donor attendances: **4.7%** (from 328,318 in 2016 to 312,972),
  – blood collection: **5.3%** (from 258,222 in 2016 to 244,653),
  – new donors: **8.25%** (from 36,651 in 2016 to 33,626),

• Still high percentage of donors being deferred: **22%**
  (68,319 prospective donors were deferred for various donor and blood safety reasons – mostly low haemoglobin and travel history risk).
8 Feb 2018

BTS Annual Press Conference -
Low blood inventory
Less young donor
High deferral due to low Hb and iron
Iron Deficiency - A very serious public health problem in Hong Kong

Every blood donation saves 3 lives
Every blood donation saves 3 lives

Blood usage in HA
(90% territory wide consumption)

63.7% in patients aged 60 or above; 28.8% in 80 or above
Who used our blood?

based on clinical diagnoses

- **36%** Haematological problems and cancers
- **14%**
- **50%**

Many of them could be managed with lesser or even no blood transfusion.

- Blood Loss (including gynaecology 4%, GI 20%, elective operation 13%, emergency operation 8%, trauma 5%)
- Renal Insufficiency (including haemodialysis 7%, peritoneal dialysis+CRI without dialysis 7%)
In term of transfusion practices, Hong Kong is also behind

1. Liberal transfusion practice, with more than 60% having multiple units transfusion.

2. > 50% blood was used in treating various causes of anaemia, of which iron replacement (and ESA) could replace transfusion as the standard of care in many of these cases.

3. Haemostatic drugs use in bleeding control was far less frequently used locally.

4. Optimization of pre-operative anaemia by iron replacement was also infrequent.
Every blood donation saves 3 lives
Rapidly Ageing Population
Marked Rise in Age 65+
Significant Drop in Age 15-24

Every blood donation saves 3 lives
Our Ongoing Challenges -
Ageing is getting worse
Sustainability of our Blood Supply will be even worse if no change in blood transfusion happens
Every blood donation saves 3 lives

BTS is responsible for blood collection, processing and testing

Supply

Voluntary donation with eligibility
Shelf life
Avoid Expiration ,,,

Demand

Not easy predicted
Outcome driven,,

Sustainability must be ensured and properly addressed

BTS is responsible for blood collection, processing and testing
BTS supplies blood to hospital blood banks which distributes blood for patients requiring transfusion
Patient Blood Management to enhance patients’ outcome and slow down demand growth
Benefits of PBM are available
4 Adult Tertiary-care Hospitals in Western Australia
All 6-YEAR admissions from 2008 - 2014 (=604,046 in total)
7.8% with transfusion (=47,382 patients)

Hence, PBM definitely works

• To improve patients’ outcome
• To reduce frequency and number of blood transfusion, the risk from blood transfusion
• (May slow down increasing rate or even revert the growth; more time to plan and work out better strategies to cope with health issues from ageing population)
Trends in red cells usage in countries implemented PBM

Red Cell Use per 1,000 Population

- US
- Canada
- New Zealand
- Australia except Western Australia
- Western Australia
- England and North Wales
- Ireland
- Switzerland
- Netherlands
- Japan
- Singapore
- Hong Kong

Every blood donation saves 3 lives
FIGURE 1: SIGNIFICANT DECLINES IN BLOOD UTILIZATION

OVERALL USE OF RED BLOOD CELLS

<table>
<thead>
<tr>
<th>% of Total Cases with Blood Cell Use</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>40%</td>
<td>35%</td>
<td>30%</td>
<td>25%</td>
<td>20%</td>
<td>15%</td>
</tr>
<tr>
<td>Discharge Year</td>
<td>2011</td>
<td>2012</td>
<td>2013</td>
<td>2014</td>
<td>2015</td>
<td>2016*</td>
</tr>
</tbody>
</table>

40% DECLINE
Top 10 MS-DRGs by Volume of Red Blood Cell Use (Excl. trauma and pediatric)

20% DECLINE
134 MS-DRGs Representing 80% of Red Blood Cell Use

*January – June 2016

FIGURE 2: SHIFTS IN BLOOD UTILIZATION AMONG PROCEDURES

<table>
<thead>
<tr>
<th>PROCEDURE</th>
<th>PATIENTS RECEIVING BLOOD 2011-2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Joint Replacement without multiple chronic conditions</td>
<td>↓ 72.4%</td>
</tr>
<tr>
<td>Hip and Femur Procedures except Major Joint with chronic conditions</td>
<td>↓ 28.4%</td>
</tr>
<tr>
<td>Major Small and Large Bowel Procedures with multiple chronic conditions</td>
<td>↓ 23.8%</td>
</tr>
<tr>
<td>Red Blood Cell Disorders without multiple chronic conditions</td>
<td>↓ 15.3%</td>
</tr>
<tr>
<td>Red Blood Cell Disorders with multiple chronic conditions</td>
<td>↓ 7.0%</td>
</tr>
</tbody>
</table>
Now, to get aware of PBM and makes our changes
PBM in Hong Kong
— today and tomorrow

1. Awareness and Education (in particular two area – latest PBM development and iron deficiency anaemia management)

2. Problems Identification among their specialties

3. Programme Development to implement PBM according to their patients characteristics and needs

4. Transfusion Practices change NOW

5. Experience sharing
Awareness and Education

• **Aims to drive for better patients outcome**
• Blood supply is not unlimited
• Blood Transfusion carries risk
• Transfusion Alternatives are available
• **Our Professions should be made themselves aware of PBM NOW, just like they know medical advances**

*(Professional bodies, HA/Hospitals Management, Universities, Public & Government)*
PBM initiatives

• Potential area of issues and interests have been identified by selected groups of professions in Hong Kong (today is small)
• Worth to have their results to share among professions and relevant stakeholders
• Also learn from overseas experience
Every blood donation saves 3 lives.
From today onwards
Patient Blood Management is not something difficult to learn and implement. Rather it is more a process to get aware and execute our professionalism based on evidence in delivering better patients care.
Conclusion

• Blood supply in Hong Kong is currently in significant difficulties that works must be done immediately at both supply and demand simultaneously.

• Patient Blood Management should be implemented locally for ensuring better patients’ outcome with possibility of slowing down blood demand increase.
Thank you