



“It’s in the blood”

A neglected cause of transfusion-fever

Sentinel Event One

A patient with myelodysplasia and neutropaenia received a platelet transfusion as a day patient. The patient developed a high fever and became very unwell. An urgent Gram stain showed Gram-positive organisms. Culture showed a heavy growth of Group B Streptococcus. This was confirmed on molecular testing as identical to isolate from the patient’s blood culture. The Blood Service was notified and available blood products from the pooled donations were recalled. These were all negative on culture. The patient made a good recovery on antibiotics.

Sentinel Event Two

A haematology patient required a platelet transfusion. The transfusion was started. The patient complained of feeling unwell with chest tightness and severe abdominal cramping about half an hour after the start of the transfusion. He developed fever and rigors. The platelet bag and the patient’s blood cultures both grew staphylococcus aureus. The patient received a two-week course of IV antibiotics and made a good recovery.

BACTERIAL CONTAMINATION

In both these cases, bacteria had contaminated the bags of platelets. Bacterial contamination is often missed as a cause of fever during transfusion. The patient may be already septic and on antibiotics, may have a haematological malignancy, or the features may suggest another type of transfusion reaction.

Bacterial contamination can occur in all types of blood components, including red cells and platelets (presence of detectable bacteria reported as 0.002 – 1% and 0.04 – 10% respectively).

It is more likely in platelet transfusions. Why? Red blood cells are stored at 4°C, and this temperature is an effective inhibitor of the growth of many bacterial species.

However platelets must be stored at about 22°C with agitation, a favourable temperature for bacterial growth. Platelets lose viability and haemostatic efficacy if stored at lower temperatures. The most likely origin of the bacterial contaminant is from the skin of the person who donated the blood. This can occur despite rigorous skin-cleansing techniques.

Since platelets are frequently transfused as pools, both the hospital blood bank and the Australian Red Cross Blood Service must be notified urgently about the contamination. This will prevent release and transfusion of associated components from the same donation.



What signs and symptoms may be seen?

The patient may have the following signs and symptoms: rigors (88%), fever (79%), tachycardia (75%), nausea & vomiting (44%), dyspnoea (35%), hypotension (47%), lumbar pain (26%), and hypertension (24%) (*Kuehnert et al 2001*).

How quickly can the infection be transferred?

As little as 10mL of the contaminated product may lead to bacteraemia. Signs and symptoms may develop within minutes or take up to four hours. The patient can be any age and either gender.

What are the most likely bugs?

Because the transfusion contamination usually derives from the donor's skin, think common skin flora first. Gram-positive organisms include staph epidermidis, staph aureus and strep agalactiae.

Don't forget the Gram negatives!

These are less common but tend to cause the fatalities. The best estimate is one person will die for every million platelet transfusions. The most likely organisms are *E. coli*, *Serratia marcescens*, *Enterobacter aerogenes*, *Enterobacter cloacae* and *Yersinia enterocolitica*.

Prompt recognition and early treatment can save a life and reduce the impact of the infection.

What is the significance of 'clots in the bag'?

The presence of visible clumps in a bag of platelets is NOT necessarily a sign of contamination. Platelets like clumping (their reason for being!) and this is the reason the bags require continuous agitation during storage. However look for large clots, unusual discolouration or turbidity, or any colour difference between the bag and the attached 'pig-tails'. These are important clues of probable contamination.

If you suspect contamination or are just unsure, send the bag back to your laboratory for immediate checking.



Remember to notify the Red Cross Blood Service of a suspected bacterial contamination. They need early notice so they can test and remove other blood products from pooled blood donations.

Want to know more? We used these articles:

Blajchman M, Goldman M.
Bacterial contamination of platelet concentrates: Incidence, significance & Prevention.
Seminars in Hematology 38(4), Suppl 11:20-26

Kuehnert M, Roth V, et al.
Transfusion-transmitted bacterial infection in the United States, 1998-2000
Transfusion Dec 2001 41:1493-1498

Blajchman M.
Reducing the risk of bacterial contamination of cellular blood components.

In Brown F, Vyas G (eds): *Advances in Transfusion Safety*. Dev Biol. Basel, Karger 1999, 102: 183-193.

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