Clinical Governance report Lung - September 2017

In a 7 month period, January to July 2017, there were 37 Incidents categorized under the key-word "Lung", a number completely in line with previous time-periods

23 Incidents relate directly to aspects of lung transplantation, which is an increase – it was 15 from 6 months in the previous report

No less than 11 revolved around Retrieval.
Gratifyingly none of them involved DCD heart retrieval.

5 Incidents concerned mobilization of the NORS teams. 1 suggested the NORS team was mobilized too early, and the others were complaints about them arriving too late. 1 was due to high activity, and 1 due to the team insisting on having a plane for a journey quoted at three hours. No plane was readily available, and after some discussion, the team came by road, arriving 40 minutes after the planned time. Most of these issues could be resolved by better communication on all sides. It is hoped that the greater role of the duty office will smooth call-out of NORS teams

There was one allegation of damaged organ, with both short veins and a length of clot in the PA. The retrieval surgeon admitted that the veins were "tight" but claimed a thorough retrograde flush had shown only clear effluent. Another lung came in an unsealed box with no paperwork.

A set of DCD lungs went unused because of copious secretions in the donor. The single-handed surgeon found copious secretions, but abandoned bronchoscopy because of a perceived need to carry out lung flush before clot appeared in the lungs. There remain misconceptions about the need to flush the lung; simple inflation maintains viability for at least an hour.

Contaminated Ice
A number of instances of contaminated ice in transport boxes were reported, and coalesced into a single Incident. Following initial discussion, Prof Kate Gould, from Newcastle reported her investigations. Her lab had identified positive cultures from the ice surrounding thoracic organs, and she then instituted routine culture. She then described the course of events in Newcastle, and came up with some recommendations

In Newcastle 214 samples were tested of which 76 were positive. They were mostly gram negative environmental bacteria but the numbers are significant. The ice from machines is not expected to be sterile but if the machine is maintained and used correctly the numbers of bacteria should be insignificant. When contaminated ice from the Freeman Hospital was investigated, she discovered that the ice machines were not being maintained and at the bottom there was a nasty brown sludge.
Ice machines were replaced and the cardio theatre team was given a protocol to keep it clean, but at that stage many other users collected ice from the machine.

After 2 years she again noted positive samples and the machine is currently being replaced again. This time there will be one in the clean area of theatre, reserved for transplants and another kept in the dirty corridor for the adult and paediatric ITU's.

It has been argued that it does not matter that the ice is contaminated because it is not in contact with the organs. Never the less, the bags are opened in theatre and the heater cooler incident has alerted us to the possibility of low level aerosol formation causing serious infection.
Prof Gould has contacted Microbiologists in the other centres when she has had positives from them. This network has been very aware of the problem and she has supplied centres with the local SOPs because their ice machines were in a similar state to the Freeman's in 2014.

Finally, the ice from machines frequently grow Mycobacterium chelonae. This is not surprising because it is in the Northumbria water supply. Other supplies may have other Mycobacteria and this was the original source of M.chimeriae. The sequelae of the M Chimeriae infections are well known to the whole cardiothoracic community

It is recommended that transplant retrieval teams use ice only from machines maintained to a high standard and follow the device manufacturer's instructions for care/maintenance, and test approximately monthly. All centres should have their local ice machine maintenance/cleaning protocol. Although there have been no direct links between positive ice cultures and post-operative infections in transplant recipients, Prof Gould's view is that it is only a matter of time before such infections occur. The issue of atypical mycobacterial contamination is a particular concern, and the M Chimeriae experience should serve as a warning. The only way to prevent any risk from ice from ice machines is to use sterile ice which is more expensive

Transplant Centres/Duty Office

There were 4 Incidents around prolonged offering when the allocation system changed. In one instance, a lung was throught to have been turned down by all UK centres and a Swiss team were en route before it was apparent that one centre had actually accepted (and subsequently used) the lungs. It is apparent that changes in the offering system to aimed to speed up the donation process have placed an additional burden on transplant centres

There were some concerning decision-making issues. A centre turned down the lungs for logistic reasons 45 minutes before cross-clamp. Other centres turned down the lungs on function or on logistics – long cross clamp.

A lung was turned down at retrieval because the donor was 5cm taller than expected; all other centres eventually declined on function

A good single lung was lost because of failure to look at the donor X-ray, even though it was available. The investigation summary is included to illustrate the error:

Documented timings 18.02.2017:

01:00 - lungs were accepted
01:59 - transplant centre requested photograph of chest x-ray - sent by SNOD
07:05 - CT NORS team arrived
10:45 - WLST (local delays encountered)
11:13 - transplant centre declined lungs on chest x-ray findings.

The transplant centre have explained that they didn't look at the copy of the chest x-ray as it was their feeling that the 'improving consolidation left lower lobe zone' as described on EOS as reviewed at the time of organ offer would have to be assessed by the retrieval team. The transplant centre had at the time of receiving the offer asked if it was possible for the donor hospital to perform a bronchoscopy, which it wasn't. Their intended recipient was contacted and brought into the hospital.

The donor hospital delays triggered further discussions locally at the transplant centre due to logistical pressures and concerns about the likelihood of the lungs being usable. It was only at this point that the transplant centre examined the copy of the chest x-ray and discovered that the findings were clinically different from those described on EOS. The consensus decision was that the right lung (extensive shadowing with loss of volume, a small pleural effusion and patchy shadowing in both upper and lower lobes) was never going to be useable. The transplant centre did spend some time trying to identify a suitable recipient for the left lung but did not have one on their waiting list.

The transplant centre have concluded that they did make an error in not looking at the chest x-ray when it was originally sent to them at around 02:00. The assumption was made as described earlier that if the changes were as described on EOS, then only an assessment could be made by the retrieval team.

EOS and the donor hospital medical records reviewed and there is an entry by a doctor, I assume one of the ITU doctors but there is no name or designation. They documented that the chest x-ray was reviewed on 17.02.2017 at 20:30 and showed "improving consolidation left lower zone." There were no comments as to the right-sided changes that the transplant centre describe. As chest x-ray interpretation is outside the SNOD scope of practice, they recorded on EOS what had been assessed and documented by the local medical team when they had been asked to review the chest x-ray.

Best practice now probably includes routine examination of the donor X-ray at an early stage. Interpretation by the donor hospital team, which may just be an inexperienced ITU clinician, should not always be relied upon