

I have had hands on involvement with a number of babies which I will detail below;

i. Child A

Child A was a twin who had been unstable initially but was stable for most of the day on 8<sup>th</sup> June 2015. When Child A collapsed, I was in the Children’s Unit next door. When I got to the Neonatal Unit he had been collapsed for about 3 or 4 minutes, and resuscitation was well under way. Arrested babies don’t look good they can look pale blue or grey because they haven’t got enough oxygen in their bloodstream.

When we resuscitate babies, we put a tube down into their windpipe (intubate them), or put a bag and mask over their face and inflate the lungs, so the lungs are full of oxygen. However, oxygen will only get around the body if blood is flowing to the lungs, and if the heart is not beating effectively that does not happen, which is why we do cardiac compressions.

Even with good resuscitation it’s never going to work as well as somebody spontaneously breathing and their heart beating normally, but some blood oxygenated by the lungs will be pumped around the body.

What was interesting with Child A was that he had intubation and had cardiac massage started appropriately and they had received appropriate drugs. Adrenaline is the main drug that we give to stimulate the myocardium (the heart muscle) to try and get the heart to work better. He had unusual discoloration; you’d expect babies to look fairly ghastly and pale and grey but he had an odd sort of discoloration where there were flitting patches of pink areas on the background of bluey grey skin; these patches seemed to appear and disappear. It wasn’t like the rash seen with a meningococcal sepsis which is caused by blood vessels bursting. It would flit and the reappear and disappear. It didn’t fit with anything I’d ever seen before.

I would describe the marks as blotches which were fairly ill-defined, about 1 centimetre to 2 centimetres, not discreetly round but blotchy patches of brighter pinkness on a background of bluey grey. After around 30 minutes of resuscitation Child A had no spontaneous cardiac activity and after discussion with his parents resuscitation was stopped.

ii. Child M

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[Child M] was a twin. I attended [Child M] after he had collapsed on 8<sup>th</sup> April 2016 and resuscitation was once again well underway. [Child M] displayed the same type of unusual blotching as [Child A] fortunately [Child M] survived.

Note: This strange blotching didn't fit with anything I'd ever seen before in my 27 years as a Paediatrician but it happened on [Child A] [Child B] [Child A] sister who collapsed the next night (although I was not involved in that resuscitation) and [Child M] and I began to wonder whether there was some common cause. I did some research and one of the things that I came across, was the possibility of something called an 'air embolism'. This is where air gets into the circulation. It usually happens accidentally, people have intravenous lines inserted into their veins and air can be injected into the blood stream. I knew that an air embolism was dangerous and could kill you.

I found a review paper, an old academic paper, written in the 1980's which looked at a case series of air embolism in babies, I produce a copy of this paper as evidence reference RJ/2.

If air is injected into your bloodstream you get what is called "free air" in the circulation. If you have free air in the circulation, what will happen is in the areas of circulation where those bubbles of air sit, the haemoglobin will take it up and when haemoglobin carries oxygen you look pinker; when haemoglobin is not carrying oxygen you look bluer. Those pink bits of haemoglobin then circulate around the bloodstream. The paper described what I had seen on the babies.

iii. [Child K]

This baby was born on [PD] February 2016 at 25weeks gestation and would not ordinarily be a baby that we would deal with on the unit. However Mum presented to the maternity unit in established in labour. Due to the age of the baby, as a matter of course, she would be intubated because she had collapsed but due to her age and the development of her lungs. She was given Surfactant which a normal gestation baby would produce normally. It helps the lungs to stay open and reduces the amount of help the baby needs from the ventilator. At 25 weeks gestation we would expect the baby's lung disease to get worse before it gets better and we had arranged for a transport team to come to the unit so she could be transported to Arrowe Park Hospital.

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