FOCUS ON THE WORK OF HEALTH CARE SCIENTISTS

Trauma!

Some of City's Health Care Scientists

ONE BITTERLY cold day last November the familiar sound of gunfire shattered the freezing calm of a terraced street in Lozells, Birmingham.

Ten, maybe twenty years ago neighbours would have stepped outside to see what was happening. Today they hide indoors less they too get caught up in the gang warfare that has become as familiar as the high pitch siren of the ambulance taking the latest victim to City Hospital.

With over 140 gunshot and stabbing incidents last year surgeons, anaesthetists and theatre staff in City's rapid response team know what is expected of them. As they prepare to save the life of another gun shot victim a small army of support staff are also being mobilised to help in this patient's journey.

They are staff from Health Care Scientists. It may not sound as glamorous as 'front line' surgery but without HCS the medical staff couldn't do their job. Neurophysiolgist Anne Burge says, "We are part of a large team who provide crucial help with the diagnosis and management of patients, working for their benefit, but in a variety of different ways. Sometimes we are directly involved with patients performing tests and analysing samples in laboratories, or we may be part of a larger team in theatres or Critical Care Units".

The victim has been has been shot in the chest and abdomen and sustained a head injury as he fell. Paramedics at the scene have performed a tracheostomy (opening to the windpipe) and he is on a ventilator. At A&E a team of health care professionals await him. On arrival, he is examined by medical staff, stabilised and rushed into X-ray.

A specialist Cardiac Physiologist performs an echocardiogram (cardiac ultrasound) to look for specific heart damage, to see if there are any ruptured muscles or heart valves, and to see if pericardial or pleural effusions have formed.

Monitored

It's obvious the patient will need surgery and quite possibly a blood transfusion fairly soon. But none of this can happen until Biomedical Scientists in Pathology have grouped and cross-matched his blood for compatibility with a donor's.

A Phlebotomist will take a blood sample and a medical laboratory assistant will then prepare it for Biomedical Scientists to analyse. In this way the functioning of the patient's heart, lungs, kidneys and liver are monitored. A Clinical Scientist may be called to give advice on the test results

After these investigations he is taken straight to theatre for emergency surgery and is then transferred to the Critical Care Unit where he receives on going one to one care by nursing staff and has constant access to medical intervention. He is still unconscious and requiring ventilation

A pharmacist has joined the team caring for the victim in CCU. As most patients with gunshot wounds are admitted outside normal hours, the Trust has a pharmacist on call 24 hours a day to ensure that unusual medication can be obtained very quickly.

In one recent case a medicine that helps the blood clot had to be obtained in the middle of the night. Head of Pharmacy Dr. Brian Hebron remembers, "All the usual medicines stocked in the hospital had been tried but to no avail. The patient needed to go to theatre and any continued bleeding would have endangered the operation.

"The medication cost about £7,000. Our pharmacist obtained approval from the Trust's Drugs and Therapeutics Committee, and the medication was obtained within the hour."

While the CCU specialists are examining and caring for him the Critical Care Technologist is calibrating the blood gas analyzer to so that the patient's blood can be checked to ensure the ventilator is giving him enough oxygen and maintaining harmful carbon dioxide at clinically safe levels.

And while this is running and as the patient is starting to recover from the surgery, there's always the possibility he may develop an infection. Biomedical Scientists will identify the causative organism and test for antibiotic sensitivity. A Microbiologist is on stand by to offer advice on the treatment, and monitor antibiotic levels in the blood.

A Haemotoligist is on hand to carry out further tests on the blood to determine the degree of blood loss and the possible formation of life threatening clots.

If blood clots are suspected a team from Nuclear Medicine will be called to perform a Ventilation Perfusion Lung Scan. This involves injecting particles of a protein tagged with a radioactive isotope which become trapped in the lungs and show how blood is being distributed.

The patient would be asked to breathe a radioactive gas that shows the ventilation of the lungs. A special Gamma camera takes pictures from the rays produced by the isotopes in the lungs. The blood distribution pictures should match the ventilation images. If they don't it indicates a blood clot.

It is now 48 hours since the patient was admitted. He is still on Critical Care and showing no signs of regaining consciousness. After performing a CT Scan, medical staff are beginning to question whether there is any brain activity or other physiological signs to tell them whether his brain is functioning.

They call a Neurophysiologist to carry out an EEG. It is tricky because the patient's relatives are at his bedside. His Mother asks, " Why are you sticking those things all over his head?"

Neurophysiologist Diane Roden tells them that he is having an EEG. The electrodes will pick up and record the electrical activity of his brain, in a similar way to the ECG screens that are showing the responses from electrodes monitoring his heart and breathing. "Doctors need to know whether he shooting has affected his brain waves." The EEG shows activity. His brain is still functioning.

Eight days after he was admitted he regains consciousness. Now recovering on a ward he tells nursing staff that he seems to be having hearing problems, a dizziness, and ringing in his ears.

Porters take him to see an audiologist for a hearing test. His notes reveal abrasions on his head consistent with a heavy fall after being shot. This could account for his tinnitus and dizziness but to confirm it he needs to undergo a special test to check his vestibular (balance) system.

Hearing aid

The test actually induces dizziness. The audiologist asks him to look at a series of lights so she can record his eye movements. Her investigation confirms a hearing loss and a loss of balance.

He is booked in for counselling over the sudden loss of hearing and the tinnitus and he will eventually be fitted with a digital hearing aid and offered rehabilitation to help regain his sense of balance.

Throughout his time in our hospital his life has depended as much on the skill of clinical staff as it has on reliable medical machinery. Lawrence Barker, Head of Clinical Engineering says, "Throughout his treatment this patient has depended on sophisticated medical devices. An x-ray machine to find out where the bullet was lodged, and determine what surgical technique to use to remove it. Another machine to process the x-ray film.

"His blood was analysed on complex machinery, the anaesthetic machine in surgery has been regularly tested to make sure it delivers the correct gas mixtures. The moving parts and vital seals of the ventilator that kept him alive could only be relied upon because they have been maintained and serviced at regular intervals.

"Doctors, nurses and other healthcare professionals make vital decisions based on the data provided by diagnostic equipment and it's the job of clinical engineers to ensure it is working as it should. Everything from an operating table to a diathermy machine for sealing blood vessels has to be in perfect working order."

This patient will probably be fit enough to go home eight or nine weeks after he was admitted. Had he not survived mortuary staff and others in Pathology would have been asked to help determine the cause of death.

From the day he arrived he will have had close contact with a score or more of consultants, doctors, nurses and other allied health professionals. He won't have realized that staff from 12 Health Care Scientist groups were also involved in saving his life.

This is a story tracing the journey of a gunshot victim from the moment he arrives at City's emergency entrance. It's not an actual case history, it's an example of what could happen.

The healthcare and treatment has been compiled from examples of the hundreds of stabbing and gunshot wounds treated by City staff every year. Some roles described can be performed by other health care staff.

'Patient depended on skills of staff and reliable machinery'

The Chief Scientific Officer Prof Sue Hill was guest speaker at a recent Health Care Scientist strategy event. She said she was extremely impressed with the event and the proactive approach to HCS the Trust was taking. Details of the strategy meeting and the issues that arose from it can be obtained from Anne Burge. City ext 4433.