

RESEARCH

Cathy Saunders

Making medicine better

Studies aim to find new ways to treat patients at emergency departments

Medical problems such as chest pain and life-threatening allergy that result in people being rushed to hospital are the focus of a new hub of research in WA that aims to reduce the growing burden on emergency departments.

The Centre for Clinical Research in Emergency Medicine, which opened 18 months ago in the WA Institute for Medical Research, is seeking evidence-based answers on how best to understand and treat a broad range of serious illnesses and injuries.

Working with other metropolitan and regional emergency departments in WA and with interstate and overseas researchers, it is overseeing research into the management of conditions such as sepsis, major trauma, heart failure, snake envenoming, redback spider bite and acute medical conditions in elderly people.

And in a first for Australia, three months ago the centre established a dedicated research nurse post in the resuscitation unit at Royal Perth Hospital's emergency department, which sends blood samples to a special research laboratory for immediate processing.

Professor Simon Brown, head of the centre, said the value of the research nurse post and laboratory

meant research staff were in the thick of the action so that when patients were admitted to the resuscitation unit, the staff could get samples for research and enrol patients in studies.

"Some of the techniques that are useful from a research point of view need to be applied very quickly while the blood is fresh," Professor Brown said. "We often need to do them straight away without transporting the cells elsewhere, when we are looking for some of the unstable things that may be in the blood or for cell markers.

"And the hospital laboratory is often tied up with the urgent patient care needs."

When critically ill patients arrived, they would have the option of participating in research which could improve their own health as well as treatment for others in the future, he said.

The centre was the brainchild of Professor Brown and was set up with the support of WAIMR, Royal Perth Hospital and the University of WA's discipline of emergency medicine.

The centre staff includes senior emergency physicians from several WA teaching hospitals and WAIMR, research nurses and laboratory scientists.

Professor Brown said the way acute health care was delivered had changed radically over the past 20



Seeking evidence: Professor Simon Brown of the Centre for Clinical Research In Emergency Medicine. Picture: Sandie Bertrand



Nasty: Redback spider.

years, some for the better and some not.

"We haven't really done much in the way of academic or scientific research, we have often been very focused on how we deal with patient care," he said. "So much of the hospital is now focused on the front door. From the moment people hit the front door, we have multi-disciplinary teams trying to work out how to get the patient out

of hospital and back to the community."

It was to help redress the lack of scientific evidence for some of the clinical care and evaluate what was done in the emergency department that he had set up the centre.

The collaboration with WAIMR allowed research to be taken from the bench to the bedside, he said.

The centre has notched up some early successes including a unique study which recruited people from eight different emergency departments in WA who had suffered anaphylaxis, or life-threatening allergic reactions that are commonly triggered by food, insect bites or medications such as penicillin.

"We got some great samples for looking at what biochemical mediators are involved in anaphylaxis," Professor Brown said. "Sometimes you have got a very short period of time to initiate

treatment for anaphylaxis which is often over within an hour and has clearly got better or killed someone."

Their research identified that a protein, known as interleukin-10, is produced in big amounts during moderate and severe anaphylactic reactions.

This finding has prompted a further study, funded by a \$90,000 grant from the Raine Medical Research Foundation, to try to identify genetic markers linked to IL-10 that may have a correlation with the severity of the allergic reaction or the chance of having another severe reaction in the future.

Anaphylaxis affects up to 15 per cent of people at some time in their lives, with about 1 in 70 children affected by peanut allergies worldwide. In Australia, hospital admissions for anaphylaxis have increased by nearly nine per cent a year from 1993 to 2005.

MAJOR PROJECTS AT THE CENTRE FOR CLINICAL RESEARCH IN EMERGENCY MEDICINE

CHEST PAIN

Chest pain is a common symptom in patients presenting to emergency departments and accounts for almost 10 per cent of visits in WA. Most patients require admission to rule out a serious cause such as a heart attack but then more than 90 per cent of those with chest pain are found to be suitable for discharge. This is not only inconvenient for patients but also contributes to increased congestion in emergency departments.

A major study co-ordinated by the centre and conducted at Armadale, Fremantle, Joondalup, Rockingham and Royal Perth Hospitals is examining a new combination of blood tests with the aim of identifying patients who can safely be discharged without the need for hospital admission.

Simon Brown, from the Centre for Clinical Research in Emergency Medicine, said the study was testing a panel of five biomarkers to rule out heart attack in chest pain patients in the first two hours after admission. This could replace the usual test for a single biomarker which required a wait of 12 hours for the results.

"There is some evidence to suggest that by using this panel of biomarkers,

a number of people who are negative might be able to get out of hospital earlier," he said. "There is still a number of high-risk people we would need to keep for 12 hours but there is a big group of low-risk patients.

"Something like this could vastly improve the efficiency of the emergency department. It would be great for patients as they could go home 10 hours earlier and would be good for the department because it would free up a lot of cubicles," he said. However a clinical test as well as a blood test was always needed to ensure serious cases were not missed. And discharged patients were often advised to have follow-up testing in the community such as a stress test.

The study, which is nearing completion, is being conducted by Stephen Macdonald, research fellow at the centre, and Yusuf Nagree, emergency medicine specialist at Fremantle Hospital.

SEVERE SEPSIS

The centre is collaborating with intensive care researchers in a randomised study of therapeutic approaches to severe sepsis. Professor Brown, who is helping recruit patients

to the study, said the researchers were comparing a structured approach to early goal-directed therapy using drugs, fluids and blood to treat patients as opposed to the current approach of using clinical judgment.

"We are interested in the whole issue of what determines whether people live or die from sepsis," he said. The centre will work with other researchers in WA and interstate.

"We are trying to get biological samples early on during severe sepsis to work out whether it might just be the amount of bacteria in the bloodstream that determines whether you live or die. If that proves to be the case, the most important part of management might be early antibiotic therapy. You can do a whole range of resuscitative interventions but if the important thing is giving the antibiotics early, that changes the approach. In the first 20 minutes, the goal might be to give a broad spectrum antibiotic."

The other possibility was that a bad outcome might not be related to the bacterial load but to the human immune response in which an overreaction by the body might cause death.

ACUTE ILLNESSES IN ELDERLY PEOPLE

Glenn Arendts, senior lecturer at the centre, has a research focus on older people in the emergency department. He is aiming to improve:

1. The diagnosis and understanding of heart failure, the leading cause of hospitalisation in older people.

2. The acute medical care of vulnerable older people living in nursing homes, including research into methods to prevent as much as possible unnecessary transfer to the emergency department which results in considerable upheaval for the patient.

3. The recognition of delirium, a condition that is often unrecognised in older people admitted to the emergency department, with devastating consequences for the patient.

4. The understanding and treatment of severe infections in older people. This is important as people aged over 65 are twice as likely to die of such infections as younger adults.

CRITICAL ILLNESS AND SHOCK STUDY (CISS)

CISS is an observational study which

aims to identify those groups of seriously ill and injured patients at high mortality risk and will link into many other studies, including those described above.

The researchers will focus in particular on heart failure, anaphylaxis, severe sepsis, major trauma and massive bleeding.

Dr Arendts, Professor Brown and Daniel Fatovich, also of the centre, are managing the study.

"When patients come in critically ill, they are undifferentiated," Professor Brown said.

"So the Critical Illness and Shock Study is about getting this group of patients and looking at what is happening.

"I am not aware of anyone in recent times having a snapshot of what, over a period of time, this group of critically ill patients ends up comprising when you look at the final diagnosis."

With a clear picture of what is currently being treated in emergency departments, the number of patients presenting with specific conditions and the patient outcomes, researchers will be in a better position to plan new investigations to reduce mortality in high risk patients.