

ECMO specialists at Karolinska saving lives throughout Scandinavia

When the swine flu epidemic broke out in the autumn of 2009, ECMO became a concept familiar to a wider audience. That autumn, a total of 13 patients with severe lung problems from both Sweden and other countries were flown to Stockholm to be nursed at Karolinska University Hospital.

The ECMO treatment stabilised their lung function and all of them, apart from one, went on to recover. The specialists at the ECMO ward possess unique knowledge, and now they have finally been given more scope to operate, giving them the opportunity to save even more lives than before.

Lung machine care for long-term use

ECMO stands for ExtraCorporeal Membrane Oxygenation; in other words, the blood is oxygenated using an artificial lung outside the body. ECMO is often needed when respirator care is no longer sufficient. The respirator helps to fill the lungs, but it can only do so as long as the lungs retain sufficient elasticity. Sick lungs are not elastic, and if they fill with fluid the respirator can no longer cope. This is when ECMO treatment is needed, taking anything from a day or so to several months.

Unlike a heart-lung machine used during operations, the ECMO machine is designed for long-term use.

Patients of all ages

In 1987, the first Swedish patient to be given ECMO treatment was admitted to St. Göran's Children's Clinic in Stockholm. Paediatric surgeon **Björn Frenckner**, now Head of Surgery at the Karolinska University Hospital ECMO ward, was the initiator of this new form of treatment.

"We only treated infants initially. We moved to the Astrid Lindgren Children's Hospital, which is part of Karolinska, in

1998 and were given two beds on their intensive care ward. Now we have been given a ward of our own at the same hospital with a total of six beds. Four of these are reserved for the actual treatment and two are provided for aftercare," explains Björn.

At present, ECMO is able to save around 75 per cent of infants with congenital lung problems or injuries due to complications at birth. Although the ECMO ward is still situated at the Astrid Lindgren Children's Hospital, around half its patients at present are adults. The most common reasons for adult patients to need ECMO care include trauma, septicaemia and severe

Challenge

The ECMO ward moved into bigger premises in 2011. The building itself being old, the low ceiling height was a problem as the pendants and lighting had to be installed in the operating theatre.

Solution

A specially designed Merlux X5 Vision lighting and camera unit which is easy to use even with a low ceiling height.

The ECMO ward is at the Astrid Lindgren Children's Hospital, which in turn is part of Karolinska University Hospital in Stockholm.

ECMO – ExtraCorporeal Membrane Oxygenation – oxygenates the blood outside the body through a membrane by means of an artificial lung. The heart and lungs may fail due to severe pneumonia or septicaemia, for example, or meconium aspiration or diaphragmatic hernia in neonates.

The purpose of ECMO is to allow the lungs and/or heart time to rest and heal. The treatment time varies between a few days and months.

The ECMO ward at Karolinska University Hospital treats patients of all ages, from premature babies to adults who have acute reversible respiratory failure with or without circulation failure or multiple organ failure, where all conceivable intensive care would not suffice to save the patient's life. Patients come from both Scandinavia and other countries in Europe; this unit is the only one of its kind in Europe.



Almost half the patients are infants, while the others are older children and adults.



Björn Frenckner, consultant at the ECMO ward, is happy with the lamp system, which works even with the low ceiling.

pneumonia, often as a consequence of viral and bacterial disease.

Cooperation important within the hospital

The special knowledge needed by the staff is one reason why the ECMO ward has been separated from intensive care in terms of organisation. There are generally two nurses per patient and one ECMO doctor (specially trained anaesthetist) for every three patients.

There is very close cooperation between intensive care and surgery, and there is always an ECMO surgeon on hand.

Focus on knowledgeable staff

Staff complete in-house training lasting six to eight weeks and including both theory and practice.

“In addition, we have ‘dry runs’ every other month to practise various types of incident that may arise during treatment,” explains **Krister Eriksson**, an ECMO nurse since 1988 who participated in the very first in-house training session at Karolinska.

“You have to change cannulas quickly, prevent air entering the hose, and so forth. One of the biggest risks of this treatment is actually the occurrence of machine faults, and so everyone has to know what to do when something goes wrong.”

“Cerebral haemorrhage and cerebral infarct are other risk factors which can affect the patient. This is why recovering as quickly as possible is necessary in order to avoid complications of this kind,” adds Björn.

How treatment takes place in practice

Most patients initially receive treatment in intensive care and are placed on a respirator. The local care team monitors the situation, and if the patient’s condition worsens they react quickly and call for assistance from the ECMO unit.

Patients are often in other countries – mainly within Northern Europe – and an air ambulance is dispatched from Bromma



The young patients at Astrid Lindgren’s Children’s Hospital can also go to school during their stay at the hospital.

airport carrying a care team of at least three people. This transport service offered by Karolinska is unique, the only one of its kind in Europe. If there is no space at Karolinska, other Northern European ECMO units in Aarhus, Copenhagen, London, Newcastle and Leicester are contacted.

The patient is connected to the ECMO machine by means of a cannula inserted in the blood vessel in the neck or groin. Sometimes it is necessary to operate if the treatment is not successful immediately. Then the ECMO machine pumps blood through the membrane which imitates the function of the lungs; that is to say, it removes the carbon dioxide from the blood and oxygenates it before then pumping the blood back into the patient. This gives the lungs the opportunity to rest and gives them time to heal.

The patient is initially under anaesthetic, but attempts are made to keep him/her awake after just a few days. When the thorax starts moving again, the lungs have begun to recover their elasticity and recovery can begin.

Custom lamp system helps with teaching

The operating theatre is used for the procedure when the patient is put on the ECMO machine. The camera is an important part of this equipment as procedures can then be recorded and used for training purposes.

Merivaara was found to supply a good lamp system with a camera and monitor. But the low ceiling height caused problems as the standard version of the lamp would have been in the surgeon’s way.

“However, Merivaara demonstrated their flexibility and created a custom lamp for us. Their project knowledge meant we were able to install our lamp system in time, and now we have an entire system at our disposal which works beautifully,” says Dr Frenckner with satisfaction.

All Merivaara products bear the CE mark and are ISO certified (ISO 13485 for medical device).

Solutions for optimal physical patient flow

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Established in 1901, Merivaara has more than 100 years experience in designing and manufacturing hospital furniture. Today, Merivaara's products are highly appreciated by users in more than 100 countries thanks to their ease-of-use, reliability and functional design.

All products are CE labelled and Merivaara's quality system complies with EU directives for medical device, and certified according to ISO 9001:2008 and ISO 13485:2003 quality standards. The company's environmental management system is ISO 14001:2004 certified.

