

HEART SURGERY FOR CHILDREN

- WHEN IS IT NECESSARY?



“It is vital for parents to come to the clinic early or even during the pregnancy to perform prenatal screenings to establish an early diagnosis.”

Dr Hew Chee Chin

MBBS, FRCS, AM
Consultant Cardiothoracic Surgeon

Dr Hew Chee Chin is a Consultant Cardiothoracic Surgeon at IJN with 20 years of experience, and she gives us insights into paediatric heart surgery.



“HEART SURGERY”- THESE ARE BIG WORDS ESPECIALLY WHEN IT INVOLVES BABIES AND CHILDREN. IN WHAT SITUATIONS ARE HEART SURGERY FOR KIDS USUALLY REQUIRED?

Being a structural heart disease, Congenital Heart Disease (CHD), always requires some form of surgery because it is rarely treated solely through medication. In general, we always try to intervene as early as possible as this yields better results and a higher survival rate in children. Today, we rarely do palliative surgery, which is used to relieve symptoms and instead, we mostly perform corrective surgery to repair the heart's primary defect.

The timing of the surgery really depends on the severity and the type of disease. Children may need to have surgery immediately at birth or at a few months old, sometimes it can wait until they are toddlers. So, it is very difficult to pinpoint a specific age. Furthermore, after the first surgery, children require constant observation because while CHD is treatable, it is rarely completely curable. Only a small percentage of CHD, such as patent ductus arteriosus (PDA), are fully cured. For these reasons, regular follow-ups are needed 10 or 20 years down the line while some even have to undergo repeat surgeries.



HOW IS HEART SURGERY FOR CHILDREN DIFFERENT FROM ADULTS AND WHAT SHOULD PARENTS EXPECT?

Babies and children are delicate beings and have a different physiology compared to adults. They are smaller and thus have a smaller body surface area which means they tend to lose heat faster than adults. For them, heat loss and small fluid loss can pose a bigger risk than for adults. Also, as their hearts are smaller and organs are not fully matured, their response to surgery and inflammation are very different from those of adults, which necessitates more delicate tissue handling during the surgery. Due to these aspects, paediatric surgery always requires more concerted team efforts and CHD surgeons need to have a wider skill set and knowledge base to deal with all these variables. Thus, most CHD surgeons at IJN have gone through very long and rigorous training to be fully equipped with a wider armamentarium of all the treatment options.

Following the surgery, babies need to be intensely monitored in an intensive care unit (ICU). In total, they need about seven to 10 days before being able to return home. During this period, parents are often shocked to see a lot of invasive lines and tubes being inserted into their baby's body. This is because babies need medications and fluid transfusions and then have to be immediately put on a ventilator after the surgery. To prepare parents for this sight during this intense period, IJN doctors give parents briefings on what they can expect after the surgery and also provide psychological support through counsellors at our facility.



WHAT ARE THE RISKS INVOLVED IN CHILDREN'S HEART SURGERY AND HOW DO YOU CIRCUMVENT THEM?

First and foremost, we always try to intervene as early as possible to ensure better outcome and fewer morbidities. Hence, early diagnosis is essential as it is important that parents are aware of CHD. For example, if parents have a history of heart disease or if there are any family member with heart disease, it is vital for parents to come to the clinic during pregnancy to perform prenatal screenings to establish an early diagnosis.

Cardiac surgeries are performed with the help of cardiopulmonary bypass; this procedure carries a very small but a definite risk as the flow during bypass is different from the normal circulation. In the past, surgeons sometimes employed deep hypothermic circulatory arrest where they completely stopped the blood flow in the whole body, including the brain, in order to better visualise the surgical site in complex heart lesions.

Today, we employ different methods through continuous brain perfusion and can better monitor brain blood flow using near-infrared spectroscopy (NIRS). This gives us a very sensitive and accurate reading of the blood flow in the child's brain during surgery. So basically, we have a baseline for blood concentration of oxygen and if there is a drop below this level, CHD surgeons are immediately alerted during the surgery. However, the use of NIRS during paediatric surgery is not new and has been used for a very long time. Today, brain injuries occurring during surgery are a very rare incidence.



Near-infrared spectroscopy (NIRS) involves the use of an imaging cap pictured above equipped with LEDs that deliver near-infrared light to help with brain flow monitoring during surgery.