Know your Departments-Neonatology

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Transforming tiny lives - Translating cutting edge research for low resource settings

In the early 1950s, long before neonatology was recognized as a separate field, Dr. J.K.G. Webb identified the need to have a Neonatology service in Christian Medical College (CMC) with trained Paediatricians manning newborn services. Dr.Malati Jadhav, with the encouragement of Dr.Webb, improved the status of the nursery from an observation area to a Level II nursery. This was the first Level II special care nursery in south India. Dr. Chellam Kirubakaran and Dr. Prabhakar D. Moses played important roles in improving and upgrading the special care facilities.

Neonatology evolved as **an independent unit on July 12th 1996** with Dr. Atanu Kumar Jana as the first head of the unit. Since then, Level III facilities have been added and improved upon. The neonatology department at Vellore now is one of the biggest perinatal centres in the region. It is at the forefront of patient care, training and in research.

Neonatal intensive care involves the use of expensive and hi-tech equipment and the cost of treatment can be prohibitively high for parents. The majority of the babies looked after by the neonatology department are from the surrounding small towns and villages of Vellore, Tiruvannamalai and Chittoor districts and come from a mid-low socio-economic background. Trying to cut the cost of treatment to make it more affordable for these poor patients is done on a daily basis in the department and has led to several innovations. One such innovation is the MIRACRADLE.

Birth asphyxia is a leading cause of neonatal mortality and many of the babies who survive go on to develop long term neurodevelopmental disability. It is estimated that 150-200,000 babies die due to asphyxia in India. The only proven therapy to decrease mortality and disability in this conditions therapeutic hypothermia (TH), which has, over the last decade become the standard of care in high income countries. The cost of the devices used to provide TH is between 18-25 lakhs and is beyond the reach of most hospitals in Low and Middle income countries.

The Neonatology department at CMC, Vellore was the first to start TH in India and started cooling babies with asphyxia from September 2007. Initially, ice gel packs (used in vaccine carriers) were used and the results of the experience were published in 2009. Whick showed that, the using cool gel packs was feasible, cheap and safe, it was labour intensive and not very precise.

Dr. Niranjan Thomas worked towards developing a **low cost device which would work better than cool gel packs.** An idea of using phase changing material (PCM) was conceptualized. A google search reveled that PCM was being manufactured for industries by a company in Gurgaon. An email order resulted in the delivery of 3 kg of PCM! From 2009 to 2011, after much trial and error, the PCM's which would help maintain the temperature in the appropriate temperature was worked out.

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With the department of Bio-Engineering helping to make a prototype of the bed, a working model "The CMC PCM bed" was built at a cost of Rs.3000 (1/600th of the cost of a standard device). The data on the first 9 babies cooled with this mattress was presented at the Annual National Conference of the National Neonatology Forum (NNF) in December 2012 where it won the Best Poster innovation award. The temperature stability achieved was even better than the semi-automated machines that were used in trials in Europe and USA. A patent was filed and the concept and design handed over to PLUSS polymers, the company that provided the PCM. From 2013 to 2014, with the help of PLUSS polymers, the design was improved to incorporate a cascading system of PCM's to improve the performance and a commercial cooling bed-The MIRACRADLE (www.miracradle.com) was produced and launched for sale throughout India. The process of developing the PCM mattress has been widely recognized. The Department of Neonatology received the SKOCH award in 2017. In addition, many industry awards like Healthcare Excellence Award at Indo-Global Healthcare Summit and Expo 2014,CII Industrial Innovation award 2014,Innovators competition for DST-Lockheed MartinIndian Innovation Growth Program 2015,Indian Innovates –ASSOCHAM etc. have acknowledged the efforts.

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In addition to this, it has been included into the WHO compendium of innovative health technologies for low resource settings. Currently more than 200 hospitals throughout India, South Africa, Kenya and Turkey are using the Miracradle. In Kenya, the MIRACRADLE is being trialed after winning funding from the Grand Challenges Canada.

This success story of how a simple innovation has helped thousands of tiny lives all over the world is only one of the examples of the many innovations that are made on a daily basis in the Department and throughout the hospital. This should encourage everyone to take their ideas forward, however simple they might be.