

Procatерol for Infantile Sick Sinus Syndrome

Sick sinus syndrome (SSS) is a type of bradyarrhythmia due to abnormal pacemaking of a degenerated sinoatrial (SA) node; the pathophysiology and optimal treatment of neonatal SSS remains unclear [1].

A male neonate was born at the gestational age of 30 weeks by emergency cesarean section due to maternal hypertensive disorders of pregnancy. The patient's body weight and length were 1361 g (−0.80 SD) and 40.0 cm (−0.03 SD), respectively. His Apgar scores were 3, 5, and 8 at 1, 5, and 10 minutes after birth, respectively. After resuscitation, including intubation, he was admitted to the neonatal intensive care unit (NICU). Echocardiography revealed no structural abnormality. After administration of indomethacin for eight times from the 1st to 23rd days, the ductus arteriosus became narrower and asymptomatic. On day 13, the first extubation was performed. Soon after extubation, a recurrent attack of bradycardia with a heart rate of 50 to 80/min was observed, which required re-intubation and mechanical ventilation. Holter electrocardiography (ECG) performed on day 17 showed that an escaped rhythm occurred for 0.7% of the total 24 recorded hours, leading to the diagnosis of SSS. Enteral administration of procaterol via gastric tube with a dose of 0.65 µg/kg for three times/day was initiated on day 21. The frequency of bradycardia reduced, and the minimum heart rate increased above 90 beats/min, whereas his heart rate at rest was elevated to 180–190 beats/min soon after initiating procaterol. Therefore, procaterol was adjusted to 0.65 µg/kg/dose for two times/day on the 22nd day. From the 34th day, procaterol was increased to 1 µg/kg/dose for two times/day for prevention of bradycardia after

re-extubation. Holter ECG performed on day 34 showed disappearance of the escape rhythm, and the patient was successfully extubated on day 38. He is now 6 months of age, and the procaterol therapy has been continued after the discharge. SSS is well controlled and pacemaker implantation was not required.

Although the fundamental treatment for SSS is pacemaker implantation, several problems, such as a small body size and limitation of medical resources makes it difficult to apply it immediately in the neonatal period, especially for preterm infants [1-3]. The present case suggests the efficacy of enteral procaterol in infantile SSS management.

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Mother-Neonatal Intensive Care Unit – A New Model of Family Participatory Care?

We read with great interest the article on Mother-Neonatal Intensive Care Unit (M-NICU) published in a recent article in *Indian Pediatrics* [1]. This model of care

seeks to operationalize two key concepts that are widely accepted as part of optimal care for newborns—integration of maternal and newborn care, and family engagement.

The Ministry of Health and Family Welfare (MOHFW), Government of India, through its National Health Mission (NHM), has demonstrated exemplary leadership in responding and adapting to the evolving needs of India's program for small and sick newborns. Recent inclusion of Family Participatory Care (FPC) as a national health program innovation in newborn care and

launch of a Training Guide and FPC Operational Guidelines [2] are steps in this direction.

Chellani, *et al.* [1] have introduced M-NICU as a novel model that tests the feasibility of zero-separation of the mother and newborn, thus taking the FPC model a step further in increasing family engagement. M-NICU is a collaborative effort between the neonatology and obstetrics departments. It positions the mother's bed in the NICU, providing an opportunity for the mother and her newborn to be together continuously throughout the hospital stay. While this model is a laudable effort in increasing family engagement in the care of small and sick newborns, it raises many questions regarding implementation.

Evidence from India and other countries [3,4] indicate that the family-centred care model does not increase nosocomial infection; does this hold true in the M-NICU model of family-centred care? How is hygiene maintained in a model that widens the circle of family members and health providers who come in contact with the newborn? Are the health staff of the Obstetrics and Neonatology departments trained together in infection prevention and developmentally supportive care? What are the cost implications of a model that requires enhanced infrastructure support and additional space requirements?

The development of a structured, implementable framework for family-centred care in the Indian setting has provided an opportunity for iterative learning for 12 years. From these lessons, we anticipate two major challenges: the attitude of the health care provider (rather than that of the family) and the structural modification that will be required in the NICU space.

Feasibility and acceptability of the family-centred model as a winning strategy for increasing rates of Kangaroo Mother Care and for facilitating developmentally supportive care, has been documented in the Indian setting. Data from 38 District Special Newborn Care Units (SNCUs) have demonstrated that family-centred care is a feasible model within the Indian public sector health system. A qualitative study has shown not

only a high degree of acceptability among both parents and service providers but also that essential newborn care skills acquired by parents during hospital stay with their sick neonate continues when they return home. The study also documented an improved patient-staff relations, a highly needed area in the India health care system.

While family-centred, developmentally supportive care is the standard model in many high-income countries, India has blazed the trail [5] as the first among low- and middle-income countries to have introduced a national policy to integrate family-centred care in all sick newborn care units. We anticipate many challenges that will need to be overcome in the national rollout of the FPC model, and in the adaptation and integration of the M-NICU model to further deepen FPC in SNCUs at scale.

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