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Letter to Editor

BRIDGING GAPS: ADDRESSING TREATMENT CHALLENGES WITH ORAL PGE2 IN DUCTUS-DEPENDENT CONGENITAL HEART DEFECTS

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Dear Editor

The ductus arteriosus (DA) is an essential connection between the fetal aorta and pulmonary artery, playing a crucial part in fetal circulation. During fetal development, it diverts approximately 90% of the right ventricular output from the high-resistance pulmonary circulation to the umbilical-placental circulation for gas exchange with maternal blood. After birth, the ductus arteriosus usually shuts within 72 hours to help with lung circulation. Failure to close leads to a persistent left-to-right shunt known as patent ductus arteriosus (PDA). PDA affects up to 80% of premature infants and constitutes 5–10% of all congenital cardiac abnormalities in term infants. Hemodynamically significant PDA is associated with various morbidities, including neurodevelopmental impairment and respiratory distress syndrome (Slaughter et al., 2019). Conversely, in ductus-dependent heart lesions, which account for 20–25% of all congenital heart defects, it is crucial to maintain patency of the neonatal DA to uphold life-saving pulmonary or systemic circulation before corrective surgery (Subramaniam and Solomon, 2013).

Treatment for closing patent ductus arteriosus (PDA) mostly involves nonsteroidal anti-inflammatory medicines (NSAIDs) such as indomethacin and ibuprofen, which block cyclooxygenase enzymes necessary for prostaglandin production. Although effective, NSAIDs carry dangers such as renal impairment and intestinal problems. Acetaminophen is considered a safer option, although its effectiveness in premature infants is unclear because it may not fully inhibit prostaglandin synthesis. However, few medications exist for preserving ductus arteriosus (DA) patency, with prostaglandin E1 (PGE1) being the sole pharmacological option despite its associated side effects, such as peripheral vasodilation, apnea, fever, and physiological disturbances (Sear, 2019). Furthermore, the shortage of PGE1 in certain countries like Pakistan highlights the urgent need for alternate solutions. In such situations, adopting other available choices like PGE2, which is accessible in Pakistan as an oral drug, becomes crucial for the efficient management of ductus-dependent congenital heart anomalies.

Prostaglandin E2 (PGE2) has been successfully utilized orally in newborns with ductus-dependent cyanotic congenital heart disease. In research by Silove et al., PGE2 was supplied orally in doses ranging from 12 to 65 micrograms/kg at 1 to 4 hours intervals. This treatment regimen resulted in consistent increases in oxygen saturation (SaO2) and plasma PGE2 concentrations within 15-30 minutes after administration, equivalent to those achieved with intravenous infusions. Treatment lasted for durations ranging from 5 days to 4 months, during which the ductus remained open for extended periods, allowing for delayed surgical intervention to support the growth of the infants and their pulmonary arteries. While adverse effects during oral medication were similar to those found with intravenous administration, they were generally less severe in this series, underlining the effectiveness and simplicity of oral PGE2 administration for long-term treatment (Nabavi et al., 2019).

Furthermore, a 1987 study by B.D. Thanopoulos et al. supported the effectiveness of oral PGE2 in the treatment of neonates with cyanotic congenital heart disease, which primarily depends on the ductus. The data from this investigation revealed that oral PGE2 treatment, while less productive than intravenous infusions, nonetheless proved useful for long-term therapy, affording more convenience and lower morbidity (Fernández-Francos et al., 2021). It is crucial to highlight that side effects such as apnea and hypotension may occur in newborns following PGE2 therapy and require close monitoring during treatment. In conclusion, oral PGE2 offers a viable alternative for addressing congenital heart defects in resource-limited countries like Pakistan. Its effectiveness and convenience make it a viable choice, especially if access to injectable drugs is limited. This underlines the necessity to investigate alternative treatments for appropriate care in such circumstances.

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