Platelets contribute to postnatal occlusion of the ductus arteriosus.

Abstract: The ductus arteriosus (DA) is a fetal shunt vessel between the pulmonary artery and the aorta that closes promptly after birth. Failure of postnatal DA closure is a major cause of morbidity and mortality particularly in preterm neonates. The events leading to DA closure are incompletely understood. Here we show that platelets have an essential role in DA closure. Using intravital microscopy of neonatal mice, we observed that platelets are recruited to the luminal aspect of the DA during closure. DA closure is impaired in neonates with malfunctioning platelet adhesion or aggregation or with defective platelet biogenesis. Defective DA closure resulted in a left-to-right shunt with increased pulmonary perfusion, pulmonary vascular remodeling and right ventricular hypertrophy. Our findings indicate that platelets are crucial for DA closure by promoting thrombotic sealing of the constricted DA and by supporting luminal remodeling. A retrospective clinical study revealed that thrombocytopenia is an independent predictor for failure of DA closure in preterm human newborns, indicating that platelets are likely to contribute to DA closure in humans.

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