may be a result of antithrombin losses into chylous drainage.

THROMBOSIS AND CHYLOTHORAX AS CONSEQUENCES OF INTRINSIC COAGULOPATHY

The concentrations of procoagulant and anticoagulant factors are significantly decreased in children with single-ventricle physiology, who suffer an elevated risk of both thrombosis and chylothorax.⁵

The circle of finger pointing between thrombosis, hemodynamics extrinsic to the lymphatics, intrinsic coagulopathy, and intrinsic lymphatic aberration as the cause of chylothorax remains to be resolved. Origin stories of thrombosis and chylothorax revolve in a chicken-versus-egg relationship. Impressive results in the propranolol-responsive group should prompt future investigations to understand

factors that predict the individuals most likely to respond to this promising approach.

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Commentary: Serendipity leads to a fresh idea for an old problem

Dennis A. Wells, MD, and
David S. Winlaw, MBBS, MD

The authors introduce us to a novel pharmacologic approach to the highly relevant and sometimes challenging problem of postoperative chylothorax in congenital cardiac surgery patients. Although several case reports/series discuss use of propranolol for treatment of chylothorax in pediatrics, Corda and colleagues¹ report the largest series to date detailing outcomes of propranolol treatment in pediatric cardiac surgery patients with chylothorax.

How did we get here and what is the mechanism by which propranolol reduces chylous drainage? Although the authors

Dennis A. Wells, MD, and David S. Winlaw, MBBS, MD

CENTRAL MESSAGE

Serendipity is an ally in medicine and can lead to fresh ideas for old clinical problems. Robust clinical trials of propranolol use in postoperative chylothorax are warranted.

provide a summary of scientific investigation into proposed mechanisms, they acknowledge that the mechanism by which propranolol reduces chylous drainage is unknown. It seems a series of events stemming from an episode of serendipity in France actually led to this proposition to

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use propranolol for such an indication. A dermatologist at Bordeaux University Hospital Center, Christine Léauté-Labrèze, was treating a child with a hemangioma. The patient also developed obstructive cardiomyopathy for which propranolol was initiated. Léauté-Labrèze happened to observe rapid improvement in the hemangioma within 48 hours after initiation of propranolol. Her curiosity led her to subsequently trial propranolol as a therapy for hemangiomas in 10 additional patients all of whom demonstrated significant improvement, which she reported in 2008 in *The New England Journal of Medicine*.² Propranolol is now an important therapy in the treatment of infantile hemangioma. Precise mechanisms by which propranolol is producing therapeutic effects in this setting are likely complex and active research on the matter continues; proposed general mechanisms have included induction of endothelial cell apoptosis and/or reducing vascular endothelial growth factor (VEGF) expression thereby inhibiting angiogenesis.³ Working on the latter theory that propranolol may reduce VEGF expression and that VEGF is also lymphangiogenic, Oseki and colleagues⁴ reported treating a patient with chylous effusions secondary to diffuse lymphangiomatosis. Subsequently, scattered case reports and case series were published reporting the use of propranolol for various lymphatic malformations, chylous effusions, or chylous ascites.⁵⁻¹⁰

In this report, 25 pediatric patients were treated with propranolol for postoperative chylothorax. Fifteen patients were identified as responders to therapy after meeting defined reductions in chest tube output determined by the study designers. When these 15 responders were compared with a cohort of 25 historical controls, a significant reduction was reported in chest tube duration, length of stay, and incidence of infection. The study has all the hallmarks of early concept clinical research and only an incomplete picture is gained because of expected methodologic limitations. However, this should not prevent readers from appreciating the authors' efforts to bring new

insight to a clinically relevant problem. An additional low-risk intervention in the tool belt of those managing chylothorax in postoperative congenital cardiac surgery patients, if effective, would be readily welcomed. Further prospective study with, ideally, a randomized trial may provide convincing evidence of propranolol having an effective role in reducing chylous drainage. One could imagine the postoperative Fontan cohort to be a key group for whom further study would be received with keen interest. Regardless, the current report provokes fresh thought regarding an old problem, and reflection on the events that led to such a concept remind us that, although rare, serendipity can still be an ally—even in modern medicine.

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