Drug Therapy for Chronic Thromboembolic Pulmonary Hypertension: A Review

**Context**

Chronic thromboembolic pulmonary hypertension (CTEPH) is a progressive disease caused by pulmonary thromboembolism (when blood clots block one or more arteries in the lung). CTEPH is thought to occur in 1% to 4% of patients who have experienced an acute pulmonary thromboembolism. Left untreated, CTEPH can lead to right ventricular failure and death. Pulmonary endarterectomy, a surgical procedure to remove blood clots from the lungs, is the first choice of treatment for CTEPH. But in cases such as when the clots are inaccessible or comorbidities are present, surgery may not be an option, leaving drug therapy as the only alternative.

**Technology**

Riociguat is the only drug with Health Canada approval for inoperable CTEPH, or persistent or recurrent CTEPH after surgical treatment, but drugs for pulmonary arterial hypertension are frequently prescribed off-label to treat CTEPH. In Canada, these include soluble guanylate cyclase stimulators, endothelin receptor antagonists (such as bosentan), phosphodiesterase-5 inhibitors, and prostacyclin analogues.

**Issue**

A review of the comparative efficacy and safety of monotherapy or combination therapy for CTEPH will help inform treatment decisions for patients with this condition.

**Methods**

A limited literature search was conducted of key resources, and titles and abstracts of the retrieved publications were reviewed. Full-text publications were evaluated for final article selection according to predetermined selection criteria (population, intervention, comparator, outcomes, and study designs).

**Key Messages**

For the treatment of CTEPH:
- Riociguat appears to improve functional ability and pulmonary vascular resistance.
- Bosentan appears to improve functional ability and hemodynamics (e.g., pulmonary artery pressure).
- For patients awaiting pulmonary endarterectomy, preoperative treatment with bosentan appears to improve functional ability, hemodynamics, and right ventricular remodelling potential but not morbidity and mortality outcomes.
- Sildenafil appears to improve pulmonary vascular resistance but not functional ability.
- There is not enough evidence to draw conclusions about the comparative efficacy and safety of the drug therapies, whether as monotherapy or in combination.

**Results**

The literature search identified 226 citations, with 2 additional articles identified from other sources. Of these, 5 met the criteria for inclusion in this review: 1 systematic review and meta-analysis, and 4 randomized controlled trials.

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