Evaluating the cost-effectiveness of pulse oximetry during surgery in low-income countries

Background

- A pulse oximeter monitors oxygen saturation and pulsation during surgery, and can provide early warning of hypoxia, hypovolaemia and impending cardiac arrest.
- Routine use is recommended for all patients undergoing anaesthesia.
- However, pulse oximetry is unavailable in many operating theatres in low-income countries (LICs) – partly because of the high purchase cost.
- The Lifebox® oximetry project provides a low-cost, hand-held pulse oximeter.
- However, as this is still a considerable investment for resource-constrained settings, a cost-effectiveness analysis is needed for patients undergoing surgery in LICs.
Findings

- The Lifebox® hand-held oximeter performs as well as standard tabletop oximeters.
- Total peri-operative mortality was 2,445 deaths per million procedures in LICs, and 467 deaths per million were potentially preventable by oximetry.
- Estimated that 10% of anaesthetic-related deaths could be averted by oximetry.
- 15.5 DALYs (disability adjusted life years) are averted per anaesthetic-related deaths avoided.
- Costs per DALY averted were US$115 for the hand-held oximeter, and US$374 for the tabletop pulse oximeter, and fell below the very cost-effectiveness threshold of one times the GDP per capita for low-income countries.
- Purchasing hand-held oximeters for the 77,000 operating theatres around the world without oximeters would cost US$19.3 million and would reduce the global burden of disease by an estimated 63,800 DALYs annually.
- Sensitivity analysis suggests the hand-held pulse oximeter would be very cost-effective even if it prevented only 1.7% of anaesthetic-related deaths, or 0.3% of total peri-operative deaths. This could increase if non-fatal brain damage was also taken into account.

References


Recommendations for practice

Providing hand-held pulse oximeters to hospital settings in low-income countries is a cost-effective intervention and pulse oximetry should be made more widely available.

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