Cost-Effectiveness in Otolaryngology

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What is This?
ears have received oxymetazoline drops at the time of middle ear ventilation tube insertion without any adverse outcome.

In our study, we used our validated chinchilla animal model to test the ototoxicity of Drixoral, an over-the-counter preparation of oxymetazoline. Our results demonstrate that a one-time application of oxymetazoline at the time of ventilation tube insertion does not lead to demonstrable ototoxicity either functionally or morphologically, as measured by distortion product otoacoustic emission and surface electron microscopy. This corroborates the findings of Dr Isaacson, using a different model. Although extrapolations from animal studies to humans should be done carefully, the chinchilla animal model is an exquisitely sensitive model for toxicity as its round window membrane (RWM) is 4 to 7 times thinner than the RWM in humans, thereby allowing a much easier penetration of the toxic agents into the cochlea. It can be deduced that oxymetazoline, being safe through the thinner RWM of the chinchilla, may be also safe in the much thicker human RWM. In our study, oxymetazoline was applied only once after placement of the ventilation tube to mimic the clinical procedure whereby patients would receive drops of oxymetazoline as a hemostatic agent or to unblock the tympanostomy tube intraoperatively.

More knowledge will become available in the near future as to the safety of long-term/prolonged usage of oxymetazoline, as well as its direct effects on cochlear blood flow and on the electrophysiological activities of cochlear cells. Until then, the intraoperative use of oxymetazoline to unblock ventilation tubes or stop bleeding appears to be a safe and effective tool at the disposal of the otolaryngologist.

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Singer et al have published a case series of 307 patients undergoing total or completion thyroidectomy whom they have treated with postoperative calcium carbonate supplementation without biochemical assays of either calcium or parathyroid hormone levels. They find that only 7.5% of their patients required additional supplementation, and only 2 (0.65%) required admission using this protocol. Because they assert that the cost of a 3-week regimen of calcium supplementation...
is $15, compared with up to $293 for biochemical parathyroid hormone assays, they conclude that “prophylactic calcium supplementation without routine laboratory assessment proved to be . . . safe and cost-effective.”

Unfortunately, their data do not support this claim.

“Cost-effective” does not mean “cheapest” (see, for example, Russell et al). For an intervention to be cost-effective, it must either be less costly and more effective than its competitor intervention or more costly and more effective than its competitor. By these metrics, immediate calcium supplementation does not necessarily qualify as a cost-effective intervention.

The authors do not give enough information for a rigorous cost-effectiveness analysis to be performed on their data. However, making a few assumptions (that biochemical testing decreases the risk of hypocalcemia, both inpatient and outpatient; that the authors’ probabilities are applicable to the general population; that the authors’ costs are correct; and that the cost of a hospital admission is not zero, which it is implicitly assumed to be in the authors’ article), supplementation without biochemical assays is cost-effective only across a small range of probabilities and costs. Ionized calcium testing is more cost-effective than supplementation across a very reasonable set of probabilities and costs (Figure 1), many of which are similar to those found in the published literature.

While it is true that the nominal cost of calcium supplementation is lower than the nominal cost of biochemical assays, it is erroneous to claim that it is therefore a more cost-effective intervention.

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Cost-Effective by Any Definition: Response to “Cost-Effectiveness in Otolaryngology,” from Mark G. Shrime
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We thank Dr Shrime for his interest in our article “Calcium Management after Thyroidectomy: A Simple and Cost-Effective Method” and for providing an opportunity to clarify the objective of our approach.

We sought to simplify the management of patients undergoing thyroid surgery using an approach that is cost-effective. We use the common definition of cost-effective, namely, “economical in terms of tangible benefits produced by money spent” (Webster’s Dictionary) or “the minimal expenditure of dollars, time, and other elements necessary to achieve the health care result deemed necessary and appropriate” (Mosby’s). We specifically disagree that to be “cost-effective,” an intervention “must be less costly and more effective, or more costly and more effective,” as proposed by Dr Shrime.

Neither do we agree that “biochemical testing decreases the risk of hypocalcemia.” Testing represents a way to diagnose the condition. A patient who needs to be admitted after surgery needs to be admitted regardless of how this need is determined. The cost of this admission is independent of the approach used to reach that conclusion, and indeed a very small minority of patients (0.65% in our experience) will require admission.

Regrettably, Dr Shrime appears to have misunderstood what is cost-effective (and safe and simple) is the supplementation of all patients with the intention of sending them home rather than the acquisition of an expensive battery of tests. Interestingly, a recent independent analysis reached the same conclusions regarding cost-effectiveness as we did (and favored routine supplementation over acquisition of the parathyroid hormone assay).

Our data are clear. This is an effective and safe strategy (and by the way, it is less costly). We encourage Dr Shrime to consider pursuing routine supplementation in his patients because we are confident he will promptly adopt this approach.

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