Cost-Effectiveness Analysis of an Active Transcutaneous Bone Conduction Implant for Patients with Conductive or Mixed Hearing Loss or Single-Sided Deafness in Turkiye

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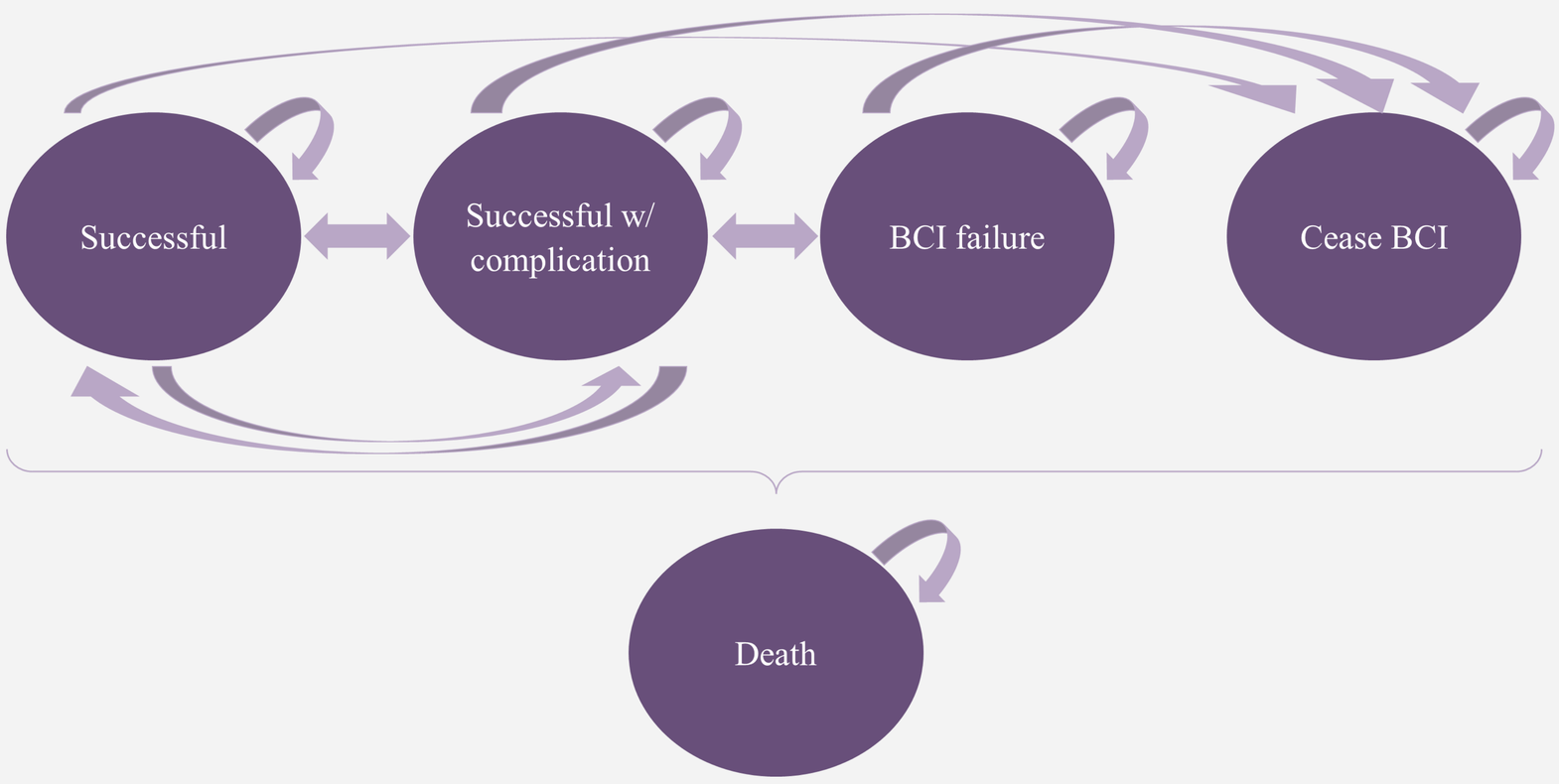
Introduction

- In conductive, mixed hearing losses and single-sided-deafness bone-anchored hearing aids are a well-established treatment[1].
- Bone conduction implants (BCIs) transmit sound directly to the inner ear via bone conduction[2].
- The aim of this study is to compare the cost effectiveness of an active transcutaneous BCI to a passive transcutaneous BCI as well as percutaneous BCIs for people with conductive or mixed hearing loss or single-sided deafness in Turkiye.

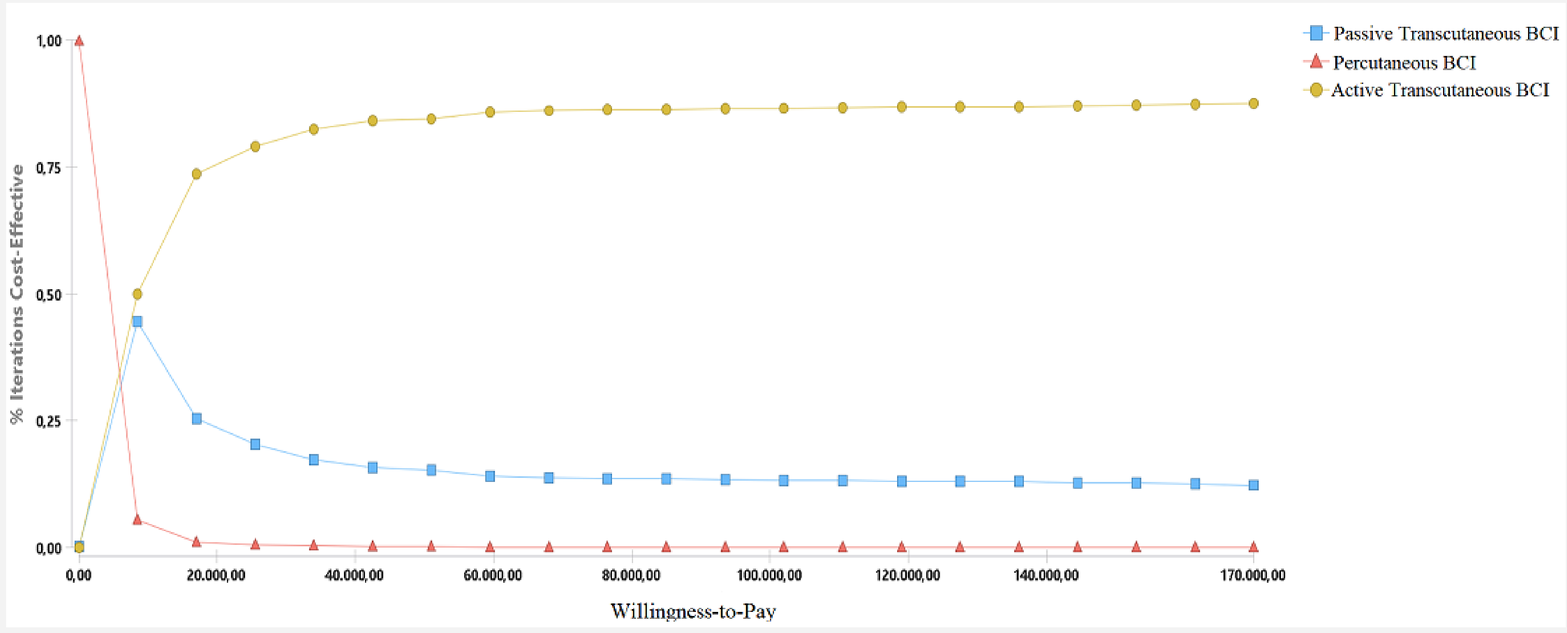
Model Structure



ICUR Results

Strategy	Average Total Costs (±SD), TL	Incremental Cost, TL	Average Total Effects ±SD), QALYs	Incremental Effect, QALYs	ICUR, TL/ QALY
Percutaneous BCI	42,912 (±15,387)	-	3.62 (±2.29)	-	-
Passive Transcutaneous BCI	52,075 (±14,653)	9,163	5.79 (±2.60)	2.17	4,224
Active Transcutaneous BCI	63,900 (±9,928)	11,825	7.14 (±.161)	1.35	8,745

Cost-Effectiveness Acceptability Curve



Methods

- A Markov model was used to determine the incremental cost-utility ratio (ICUR) and to compare the cost effectiveness of an active transcutaneous BCI to a passive transcutaneous BCI as well as percutaneous BCIs.
- All analyses were performed from a third-party payer perspective using the TreeAge Pro Healthcare program.
- Clinical data for the study were obtained from expert opinions and a literature review, and data on costs were obtained from the Turkish Social Security Institution Health Practice Communiqué.
- A probabilistic sensitivity analysis (PSA) was used to measure the robustness of the study findings and to evaluate parameter uncertainty.

Results

- The annual total costs were 42,912 TL for the percutaneous BCI, 52,075 TL for the passive transcutaneous BCI, and 63,900 TL for the active transcutaneous BCI.
- The average total quality adjusted life years (QALY) were 3.62 for the percutaneous BCI, 5.79 for the passive transcutaneous BCI, and 7.14 for the active transcutaneous BCI.
- These results indicate that the active transcutaneous BCI offers an ICUR of 8,745 TL per QALY.
- The PSA analysis showed that the probability of being cost effectiveness was 87.6% for the active transcutaneous BCI; 12.3% for the passive transcutaneous BCI, and 0.1% for percutaneous BCIs.
- At a willingness-to-pay of 170,000 TL per QALY, 87.6% of the simulations in which patients were implanted with the active transcutaneous BCI were considered cost-effective.

Conclusions

- The results indicate that the active transcutaneous BCI is highly cost effective compared to a passive transcutaneous BCI and percutaneous BCIs over a ten-year period for adults and children either suffering conductive or mixed hearing loss or single-sided deafness in Turkiye.
- Results are mainly driven by changes in health utilities and the lengths of the analysis (time horizon used) as shown in the PSA.
- Due to small sample sizes on health utilities, further research is suggested with larger sample sizes and longer follow-up times.

References

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2. Sprinzl, G. M., & Wolf-Magele, A. (2016). The Bonebridge Bone Conduction Hearing Implant: indication criteria, surgery and a systematic review of the literature. Clinical Otolaryngology, 41(2), 131-143.

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