Bilateral cochlear implantation – do patients with the same devices perform better than those with devices from different manufacturers?

Jafri Kuthubutheen, MBBS(Hons), FRACS1,2; Lendra Friesen, PhD1,2; David Shipp MA FAAA1,2; Joseph Chen, MD FRCSC1,2; Julian Nedzelski, MD FRCSC1,2; Vincent Lin, MD FRCSC1,2

1University of Toronto, 2Sunnybrook Health Sciences Center, Toronto, ON

ABSTRACT

Objectives: To investigate our population of sequentially implanted bilateral adult cochlear implant patients with the same device and with different devices on each side to determine if there are objective and subjective differences in hearing outcomes.

Study Design: Ongoing prospective study of our bilateral cochlear implant patients.

Methods: Our population of bilateral cochlear implant patients underwent measurements of speech understanding and quality of life based on a standardized questionnaire. Measurements were performed before and after the second cochlear implant.

Results: There were 54 patients with bilateral cochlear implants in our study. All patients had routine audiological, medical and imaging workup prior to surgery. Post operatively, speech perception outcomes as well as quality of life measures were collected.

Conclusions: Bilateral cochlear implantation can be extremely beneficial even when the same device is not implanted on both sides. This finding will provide patients with a wider choice of cochlear implants when it comes to their second cochlear implant surgery.

INTRODUCTION

Bilateral cochlear implantation is becoming the standard of care in pediatric populations and are generally performed simultaneously.

In the adult population, bilateral cochlear implantations are becoming more frequent due to the increasingly recognized importance of binaural hearing.

In adults, bilateral cochlear implantation is often done sequentially, with a variable time period between the first and second implant. This waiting period is often due to cost constraints and institutional funding arrangements.

During this period, which may be several years, cochlear implant models are often updated and the tendering process may change which cochlear implant company is available for use by the institution.

Very little research has been done on whether implanting the same brand device on both sides results in better performance than a device from a different manufacturer.

METHODS AND MATERIALS

The Sunnybrook Cochlear Implant Database which follows 1190 patients with 1267 implants was used.

All implantations were performed at a tertiary academic otology unit. All patients had routine audiological, medical and imaging workup prior to surgery.

Post operatively, speech perception outcomes as well as quality of life measures were collected.

The speech perception outcomes measured were HINT sentences and CNC word scores in quiet. Quality of life measures employed were the SF-36 questionnaire and Hearing Handicap Inventory (HHI).

Unpaired 2-tailed T-test and Fisher exact tests were performed to compare outcomes.

RESULTS

During the period of July 1989 to August 2012, there were 54 patients with bilateral cochlear implants.

There were sixteen mixed brand users and 38 same brand users.

In the same brand group the following implant brands were used bilaterally:
- Advanced Bionics = 28 patients
- Med-EL = 5 patients
- Cochlear Corp. = 5 patients

In the mixed brand group, different brands were used as shown in Table 1.

Pro operatively comparisons between the two groups showed:
1. No significant difference in demographics
2. Significantly longer duration between implants in the mixed brand group.

3. No significant differences in preoperative thresholds (500Hz, 1 kHz, 2kHz) prior to the 1st and 2nd implant.

4. No differences in HINT scores in quiet.

5. No differences in SF-36 and Hearing Handicap Inventory Scores.

DISCUSSION

Some weaknesses of the study include the small sample size and some lack of consistent speech discrimination testing across all patients.

This study does not take into consideration problems with mixed branding such as cosmetics, difficulties for patients requiring to learn two different systems and less efficient programming.

Although one aspect of the SF-36 questionnaire score was higher in the same brand user group, the other measures including the Hearing Handicap Index was not significant.

CONCLUSIONS

Bilateral cochlear implantation can still be beneficial even with mixed brands.

This finding will provide patients and institutions with a wider choice when it comes to their second cochlear implant surgery.

REFERENCES

