Meniere’s Disease is a complex disorder affecting the inner ear, affecting both balance and hearing. This systematic review investigates the use of Electrocochleography (ECoG) as a monitoring tool for Meniere’s Disease. ECoG is commonly used as a diagnostic tool for Meniere’s Disease. Is there evidence in the literature to also support its use to monitor the disease through treatment or progression of the disease?

Questions
Can ECoG results be used to track the progression of Meniere’s Disease?
What is its current use in monitoring Meniere’s?
This question is addressed by investigating the factors and outcomes in a systematic review of the literature.

Search Criteria

Literature Review:
- Keywords extracted from systematic review question.
- Inclusion/exclusion criteria
- Appraisal of literature
- Evaluation of literature

Search Terms:
- Meniere’s Disease
- Electrocochleography (and acronyms)
- Monitoring

Inclusion / Exclusion Criteria

Higher Priority
- Investigates ECoG as monitoring tool to track progress of Meniere’s
- Data collected with well documented protocols
- Quantitative data analysis
- Comparison of results to control group

Lower Priority
- Does not address ECoG as monitoring tool
- Intra-operative use of ECoG
- Qualitative reports & opinion papers

Search Process
- Multiple databases searched: Embase, Scopus, Medline, CINAHL
- Keywords searched in stages: combined results given

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<tr>
<th>Reference</th>
<th>Objective</th>
<th>Sample Size</th>
<th>Description of Intervention</th>
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<th>Findings/Conclusions</th>
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<tr>
<td>1</td>
<td>Adamonis et al. 2000</td>
<td>Comparison of ECoG before and 1 month after intratympanic gentamicin treatment</td>
<td>n=48 normal control, MD control, treated group</td>
<td>Gentamicin: trans tympanic ECoG before &amp; 1mo after</td>
<td>100-μs clicks 2000 repetitions 8.3% rate 90dBnHL Tympp electrode</td>
<td>Significant reduction in SP/AP ratio of treatment group. Evidence supports reduction in hydrops via ECoG measurement.</td>
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<td>2</td>
<td>Büklı et al. 2012</td>
<td>Comparison of before after measurements following gentamicin therapy</td>
<td>n=62 before &amp; after</td>
<td>Intratympanic gentamicin (1-6 injections)</td>
<td>Alternating clicks 2000 repetitions 28μs rate 800μs 90dBnHL Tympp electrode</td>
<td>Intratympanic gentamicin showed a significant decrease in SP/AP ratio of MD patients. AP latency values compared between involved/non-involved ears were significant</td>
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<tr>
<td>3</td>
<td>Martin-Sanz et al. 2014</td>
<td>Changes in ECoG after intratympanic steroid injections and long term effects</td>
<td>n=82</td>
<td>Dexamethasone: 3 weekly, 4mg/ml treatments</td>
<td>Alternating clicks 1000 repetitions 8.1/s rate 90dBnHL Tympp electrode</td>
<td>Significant SP/AP ratio difference between 1 month pre- &amp; post- treatment. Ratios returned to initial values following 1 year post-.</td>
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<td>4</td>
<td>Martin-Sanz et al. 2013</td>
<td>Use of ECoG to monitor response of MD patients to intratympanic steroids</td>
<td>n=53</td>
<td>Dexamethasone: 3 weekly, 4mg/ml treatments</td>
<td>Alternating clicks 1000 repetitions 8.1/s rate 90dBnHL Tympp electrode</td>
<td>Significant SP/AP ratio improvements 1 month before and after treatment. Short term benefit of treatment through ECoG monitoring.</td>
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<td>5</td>
<td>Miller &amp; Agnew 2014</td>
<td>Review of recent intratympanic therapies for MD</td>
<td>N/A</td>
<td>Various</td>
<td>See Martin-Sanz et al. 2013</td>
<td>Limited evidence of ECoG use for monitoring MD. Only recent study completed by Martin-Sanz et al. 2013</td>
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<tr>
<td>6</td>
<td>Moon et al. 2012</td>
<td>Predictive value of ECoG as initial visit on hearing outcomes</td>
<td>n=90</td>
<td>ECoG SP/AP ratio obtained at initial visit</td>
<td>Alternating clicks 1000 repetitions 8.1/s rate 90dBnHL TIPtrode</td>
<td>High SP/AP ratios at initial visit may be used as predictors for hearing outcomes for MD patients— especially MD Stages 1 &amp; 2.</td>
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<td>7</td>
<td>Nguyen et al. 2010</td>
<td>Survey on clinical use of ECoG in diagnosis/treatment of Meniere’s Disease</td>
<td>n=143</td>
<td>N/A</td>
<td>Little consensus amongst survey respondents</td>
<td>Low clinical use of ECoG as a tool for diagnostics/monitoring. Used routinely in only 1 of 6 respondents (half reported no use of ECoG).</td>
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<tr>
<td>8</td>
<td>Orchil et al. 1998</td>
<td>Comparison of SP/AP ratio in MD patients before &amp; after medical/surgical interventions</td>
<td>n=84 (88 ears)</td>
<td>Various medical/surgical treatments (shunt, medical, dexamethasone…)</td>
<td>ECoG before &amp; after (mean 13.5mo) Ratio &gt; 0.4 abnormal</td>
<td>Enlarged SP/AP ratios after treatment. Despite the treatment effects on vertiginous symptoms, enlarged SP/AP ratios persisted.</td>
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</table>

Conclusions
Data extracted from the 8 retrieved articles suggest that the evidence is varied for the use of ECoG as a monitoring tool for Meniere’s Disease. There were multiple articles that show significant results following therapy, however longitudinal ECoG data is still lacking—only 1 study reported a 1 year follow up. One study found no significant results between SP/AP ratios before and after treatment. Additionally, the survey results, although lacking in statistical evidence, provided a snapshot of current ECoG use as a monitoring tool. ECoG is not used as a standard of practice, and it is not standardized in its protocols (there is some consensus). The use of ECoG as a monitoring tool is not fully supported in the literature; however, more research is needed to provide a well supported evidence-based conclusion.

References