The impact of ankle arthritis treatment on quality adjusted life years

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Disclosures

No conflicts to disclose.

The impact of ankle arthritis on quality adjusted life years.

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Our disclosures are in the final AOFAS Mobile App.
Background

- Patients with end-stage ankle arthritis are 2 standard deviations below population scores for all symptom and function of the SF-36 subscales
- Patients with ankle arthritis are often young (workforce age)
- Living with end-stage ankle arthritis is a compromised health state
- The economic impact of disability attributable to end stage ankle arthritis has not been quantified.
Background

- At urban teaching hospitals in Canada the total cost of Total Ankle Arthroplasty is $13,500 ± 1000 (CAD)
- Reported total cost for TAA in USA studies are ~$20,000 - $28,000
- The implant cost is average $6,420.00 (Canada)/$13,034 (USA)
- Policy makers look for economic efficiency in resource allocation decisions
Quality adjusted life year (QALY)

- 1 year life in perfect health = 1 QALY
- **Utility value** \((x)\) years lived in that state = QALY value
- Used to estimate how many extra years of life of reasonable quality are gained as a result of treatment
- $50,000/QALY is considered to be cost-effective for most new treatments/devices
Health state utility value

- Pre and post-operative health utility values for end-stage ankle arthritis were published by Slobogean et al (2010)
- These values were calculated using SF-6D
- Baseline HUV = 0.67 for TAA and 0.66 for arthrodesis (0=death/ 1=full health)
- Post op HUV at 1 year = 0.73 for both
- This is a significant improvement in health state
Purpose

To Determine the gain in QALYs attributable to surgical treatment of end-stage ankle arthritis.
Methods

- 180 subjects (45% female, 55% male) with an average age of 61 years, treated with either ankle arthrodesis or arthroplasty.

- SF-36 raw data was transformed to SF-6D to calculate the health utility value at time of surgical consent and at 1 year postoperatively.

- The difference in health utility value was assumed to be the gain in health attributable end stage ankle arthritis surgery.

- Using three theoretical valuations per QALY; $20000, $50000, and $100000, based on previously published cost per QALY for other orthopedic conditions, we calculated the cost per QALY for treating ankle arthritis at one year post surgery.
Results

- Preop mean health utility value (0.603) – Postop mean health utility value(0.690) = Change of **0.087**

This improvement in health is greater than the minimally important difference.
## Results

<table>
<thead>
<tr>
<th>Time from Surgery</th>
<th>Gain in Health QALY</th>
<th>Valuation of QALY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$20,000</td>
</tr>
<tr>
<td>1 Year</td>
<td>0.087</td>
<td>$1,740</td>
</tr>
<tr>
<td>2 Year</td>
<td>0.174</td>
<td>$3,480</td>
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<tr>
<td>3 Year</td>
<td>0.261</td>
<td>$5,220</td>
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<tr>
<td>4 Year</td>
<td>0.348</td>
<td>$6,960</td>
</tr>
<tr>
<td>5 Year</td>
<td>0.435</td>
<td>$8,700</td>
</tr>
</tbody>
</table>

- Note: there are many assumptions that go into the calculations above. For example, assumes patients’ health is linear after surgery, starting on day one after surgery.

**Limitation:** Health improvement is discounted over time – (typically at 3.5% per year)

It would take longer than the timeframes above to reach cost effectiveness,
Discussion

- From this study cohort, surgically treating end-stage ankle arthritis has a meaningful health benefit for a range of cost per QALYs.

- Assuming a **static health state**, 0.087 QALY is gained each year after surgery.

- Further calculations to include health state discounting need to be done.

- Spending on surgical treatment of end-stage ankle arthritis is cost-effective.

- These findings are meaningful for policy makers faced with resource allocation demands.
References


Slobogean, GP. et al. Preference-based quality of life of end-stage ankle arthritis treated with arthroplasty or arthrodesis. Foot Ankle Int 2010

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