Assessing the Cost of Parathyroidectomy as a Treatment for Uncontrolled Secondary Hyperparathyroidism in Stage 5 Chronic Kidney Disease

Fotheringham J1, Duenas A2, Rawdin A2, Wilkie M1, Harrison B3, Akehurst R2
1 Sheffield Kidney Institute, Northern General Hospital, UK; 2 ScHARR, University of Sheffield, UK; 3 Department of General Surgery, Sheffield Teaching Hospital, UK

Introduction and Aims

Conventional therapy for chronic kidney disease mineral bone disorder includes control of serum phosphate with phosphate binders and the supplementation of activated vitamin D. In many cases this proves inadequate, and in the UK parathyroidectomy (PTX) is recommended for patients who are otherwise surgical fit as it is perceived as less costly than calcimemetics. However, no details of the true cost of PTX have been published.

AIMS: To describe the healthcare resource use and costs associated with patients receiving PTX as a treatment for uncontrolled secondary hyperparathyroidism in a single UK National Health Service (NHS) centre (Sheffield Kidney Institute).

Methods

One hundred patients with stage 5 chronic kidney disease who underwent PTX at the Sheffield Kidney Institute between January 2002 and December 2007 were identified. Four key elements of resource usage and overall costs up to 12 months post surgery were evaluated:

- Pre-operative assessment (investigations and clinician time),
- Surgical costs (theatre, pathology and length of stay),
- Peri-operative costs (medications, investigations, clinicians’ time and outpatient appointments), and
- Complications including readmission up to 12 months post-operatively.

Sources of information included patient notes and exports from clinical information systems. The cost of medical time required for medication alteration as a result of biochemical results was also assessed using a combination of blood results and a record of dose changes. Unit cost multipliers were applied and results summed to obtain total direct costs.

Demographic features

age: mean (SD) 49(14) years
Prevalence of diabetes : 11%
Prevalence of resp disease : 3%
(copd or asthma)
Prevalence of TE disease: 4%
(previous DVT or PE)
Prevalence of hypertension : 47%

Health care utilisation

PHASE RESOURCE Mean (SD)
Operative stay: 6.83 (4.29) days.
Post-operative : Antibiotic treatment 27%
IV calcium infusions 42%
Radiological imaging 37%
Readmission: 17% patients
11 episodes of hypocalcaemia
9 episodes of hypercalcaemia
1 wound infection

Total Costs

The average direct health care costs for the different types of stay and complications are as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Pre-operative</th>
<th>Operative</th>
<th>Readmission</th>
<th>Reviews</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>£299</td>
<td>£5,772</td>
<td>£237</td>
<td>£520</td>
<td>£6,828</td>
</tr>
<tr>
<td>Median</td>
<td>£299</td>
<td>£5,597</td>
<td>£0</td>
<td>£341</td>
<td>£6,256</td>
</tr>
<tr>
<td>Standard Dev</td>
<td>£184</td>
<td>£1,640</td>
<td>£763</td>
<td>£410</td>
<td>£2,059</td>
</tr>
<tr>
<td>Standard error</td>
<td>£18</td>
<td>£164</td>
<td>£76</td>
<td>£41</td>
<td>£206</td>
</tr>
</tbody>
</table>

Least Expensive Patient (Total Cost: £4,632.00)

<table>
<thead>
<tr>
<th>Description</th>
<th>Operative Stay</th>
<th>Pre-assessment</th>
<th>First Surgical Procedure</th>
<th>Reviews</th>
<th>Post-operative Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Operation Day</td>
<td>£380.00</td>
<td>£13.96</td>
<td>£644.85</td>
<td>£5,597.72</td>
</tr>
</tbody>
</table>

Median Patient (Total Cost: £6,237.28)

<table>
<thead>
<tr>
<th>Description</th>
<th>Operative Stay</th>
<th>Pre-assessment</th>
<th>First Surgical Procedure</th>
<th>Reviews</th>
<th>Post-operative Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Operation Day</td>
<td>£380.00</td>
<td>£13.96</td>
<td>£644.85</td>
<td>£5,597.72</td>
</tr>
</tbody>
</table>

Most Expensive Patient (Total Cost: £16,308.58)

<table>
<thead>
<tr>
<th>Description</th>
<th>Operative Stay</th>
<th>Pre-assessment</th>
<th>First Surgical Procedure</th>
<th>Reviews</th>
<th>Post-operative Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Operation Day</td>
<td>£380.00</td>
<td>£13.96</td>
<td>£644.85</td>
<td>£5,597.72</td>
</tr>
</tbody>
</table>


Conclusion

The NHS tariff cost for PTX for patients with uncontrolled secondary hyperparathyroidism in stage 5 chronic kidney disease is £2,786. This pilot study demonstrates that the true cost is considerably more at £6,828. This is a small descriptive retrospective study and therefore subject to various unknown potential confounders. This study could be used to identify the feasibility elements for an extended protocol in a larger multi-centre study.

Acknowledgements

This study has been funded by Amgen Europe GmbH. The views expressed in the report are those of the authors and not necessarily those of Amgen.