# Sensipar® instead of Surgery. Is it a sensible option?

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## Aim

To compare an estimated financial cost of the length of hospital stay post-parathyroidectomy to the cost of Sensipar® (cinacalcet) for the management of hyperparathyroidism.

## Background

In chronic kidney disease (CKD) disruption of calcium, vitamin D and phosphate homeostasis and an altered response to parathyroid hormone (PTH) can lead to renal bone disease and calcification of soft tissue and vasculature.[1] Correction of calcium, vitamin D and phosphate imbalances are treatments of renal bone disease and control PTH. When the parathyroid gland hypertrophies, becomes insensitive to changes in calcium, vitamin D and phosphate and begins autonomously secreting PTH this is referred to as tertiary hyperparathyroidism.[1]

Surgical parathyroidectomy is a treatment option for tertiary hyperparathyroidism, however this procedure comes with risks and complications including Hungry Bone Syndrome (HBS). HBS is severe and prolonged hypocalcaemia, that can extend hospitalisation resulting in significant expenses and patient inconvenience.[2]

Another treatment option is cinacalcet, a calcimimetic agent which mimics the action of calcium by activating the calcium sensing receptor and inhibiting PTH release.[1]

The definitive trial assessing the effect of cinacalcet on cardiovascular events, patient survival and risk of fracture (the EVOLVE trial) was unable to demonstrate a benefit of it's primary outcome (reduced cardiovascular deaths) despite its proven ability to favourably change calcium, phosphate and PTH levels.[4,5]

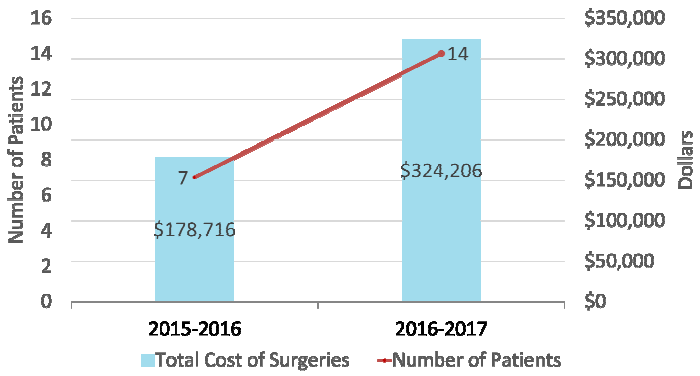
The negative trial results led the Pharmaceutical Benefits Advisory Committee (PBAC) to reassess the clinical role of cinacalcet and renegotiate the pricing arrangements with cinacalcet's manufacturer Amgen. An acceptable price compromise was unable to be achieved with the PBAC, leading to Amgen's decision to withdraw its application for cinacalcet's Pharmaceutical Benefits Scheme (PBS) subsidised medicines listing. In August 2016 cinacalcet was removed from the PBS.[3,4] Since PBS delisting, local hospital use of cinacalcet has declined and parathyroidectomy surgeries have increased.

## Methods

A retrospective audit of end-stage renal disease parathyroidectomy patients between two time periods pre and post cinacalcet PBS delisting in a Metropolitan Teaching Hospital was under taken. It compared the number of parathyroidectomy surgeries performed, the length of stay (LOS) and the incidence of complications. The estimated the total cost of hospital stay was also compared to the cost of cinacalcet therapy for 3.5 years (approximate waiting time for kidney transplant is 3.5 years).[6]

## Results

The number of parathyroidectomy surgeries has doubled between the two time periods causing an increase in associated financial costs (graph 1).




Graph 1. Comparison of the number and total cost of parathyroidectomy surgeries occurring between Aug 2015 – Jul 2016 and Aug 2016 – Jun 2017.

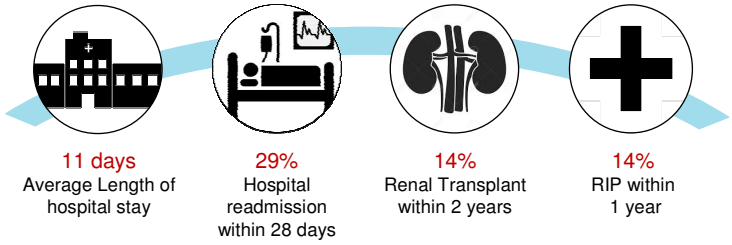



Figure 1. Results of total Parathyroidectomy surgery patients (21) across the two time periods.

The total number of patients (in the two time periods) were combined and the break down of results can be seen in figure 1. In figure 2, the average cost of cinacalcet treatment is compared to the average total cost of surgery (21 patients).

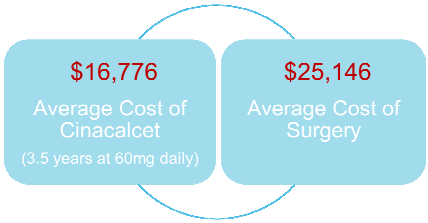



Figure 2. Average cost of Cinacalcet (3.5 years at 60mg daily) versus average cost of Parathyroidectomy surgery (from 21 patients across the 2 time periods).

## Discussion

When comparing pre and post cinacalcet PBS delisting, the number of surgeries has doubled resulting in increased healthcare costs. The average LOS was 11 days and there was a substantial number of complications including HBS and an extravasation of calcium chloride. These resulted in lengthy hospitalisations (the longest at 35 days), loss of productivity and inconvenience to the patients.

Additionally, when reviewing the cost of cinacalcet therapy, using our hospital price for 60mg daily for 3.5 years, cinacalcet treatment costs less than the average cost of surgery. The duration of cinacalcet treatment was based on the approximate waiting time for kidney transplant and mid range dose was arbitrarily chosen and hence the actual cost per patient may differ.

The total cost of surgery reported is only for the initial hospital admission and does not include associated readmissions (29%), additional pathology, calcium treatment and medical/ nursing monitoring required after discharge which may continue for many months post surgery.

Admittedly for some patients who develop tertiary hyperparathyroidism parathyroidectomy surgery may still be required however for many others this invasive and costly procedure could be avoided.

## Conclusion

Surgical management of hyperparathyroidism is a significant cost to hospital funders and bears risks to patients in the form of HBS and other surgical complications leading to lost productivity and increased morbidity through a lengthy hospital stay. Based on rough estimates it may be beneficial for hospital funders to consider including cinacalcet therapy on hospital formularies.

## References

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