

A review of the comparative radiation exposure and costs associated with percutaneous nephrostomy tube vs ureteric stent insertion for emergency renal decompression

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Abstract

- The infected, obstructed kidney is a urological emergency requiring urgent decompression by percutaneous nephrostomy tube (PCNT) insertion or retrograde insertion of a ureteric stent (US).
- There are recognised risks and benefits between both approaches with patient factors, institutional facilities, clinician experience and preference influencing the decision making process.
- Financial cost and comparative exposure to ionising radiation are however not typically considered when deciding which modality of renal decompression is utilised.

US	PCN
Inserted with cystoscopic guidance	Inserted percutaneously (Interventional radiology)
Facilitate future ureteroscopy	Tolerated under LA
Usually GA	Usually requires second procedure for internalisation

Objectives

- The following study reviewed and compared the financial costs and levels of ionising radiation between retrograde insertion of a US and insertion of PCNT for the acute management of an infected, obstructed kidney.

Methods

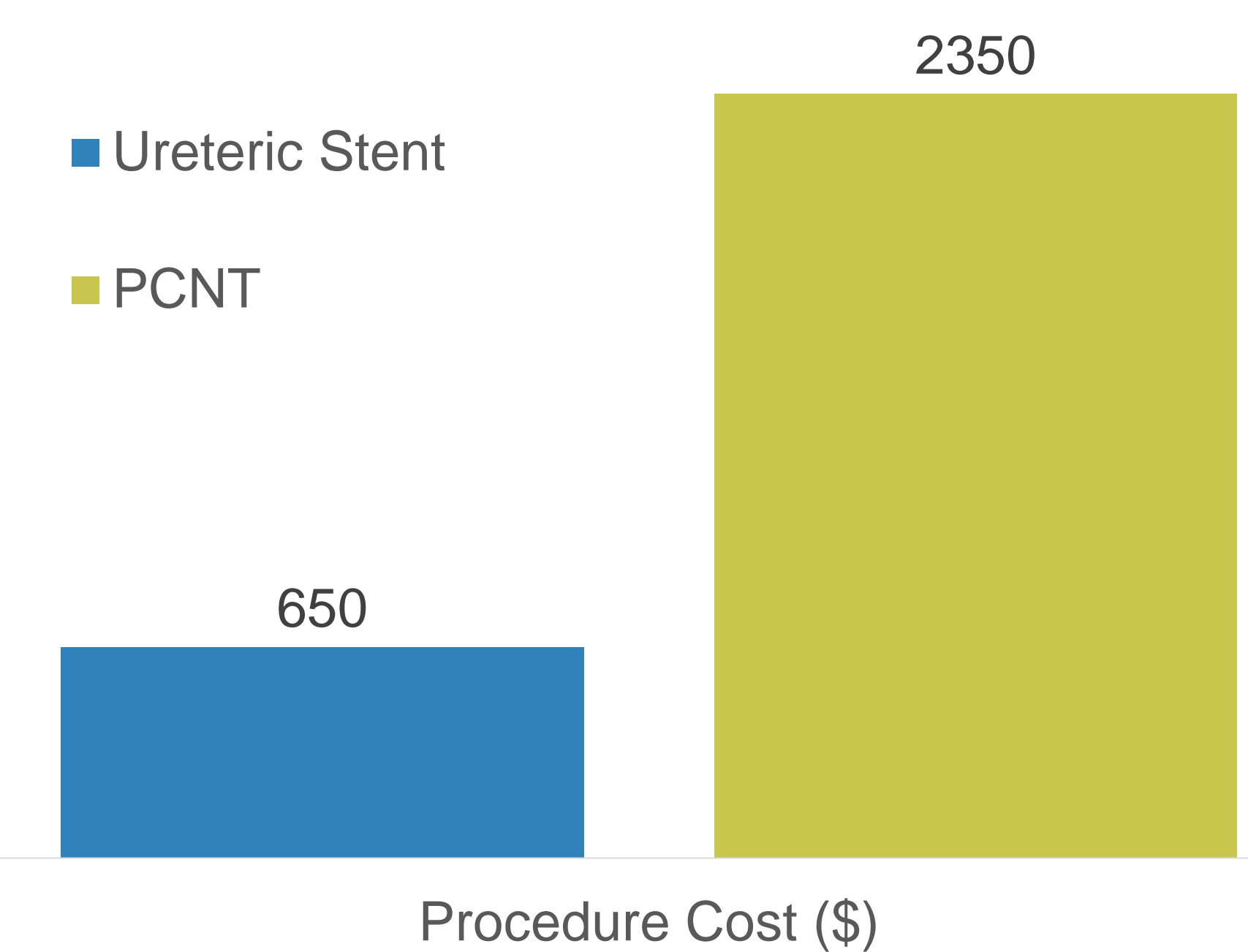
- Retrospective review.
- All patients who underwent acute decompression for an infected, obstructed kidney at a tertiary hospital in Perth, Western Australia
 - Retrograde ureteric stent
 - Percutaneous nephrostomy tube
- 01 February 2015 to 31 June 2017
- Cost analysis performed to review procedural costs.
 1. Medical devices
 2. Imaging equipment
 3. Mobilisation of theatres
 4. Personnel
- Review of recorded doses of ionising radiation
 - Overall radiation exposure
 - Clinical relevance

Results

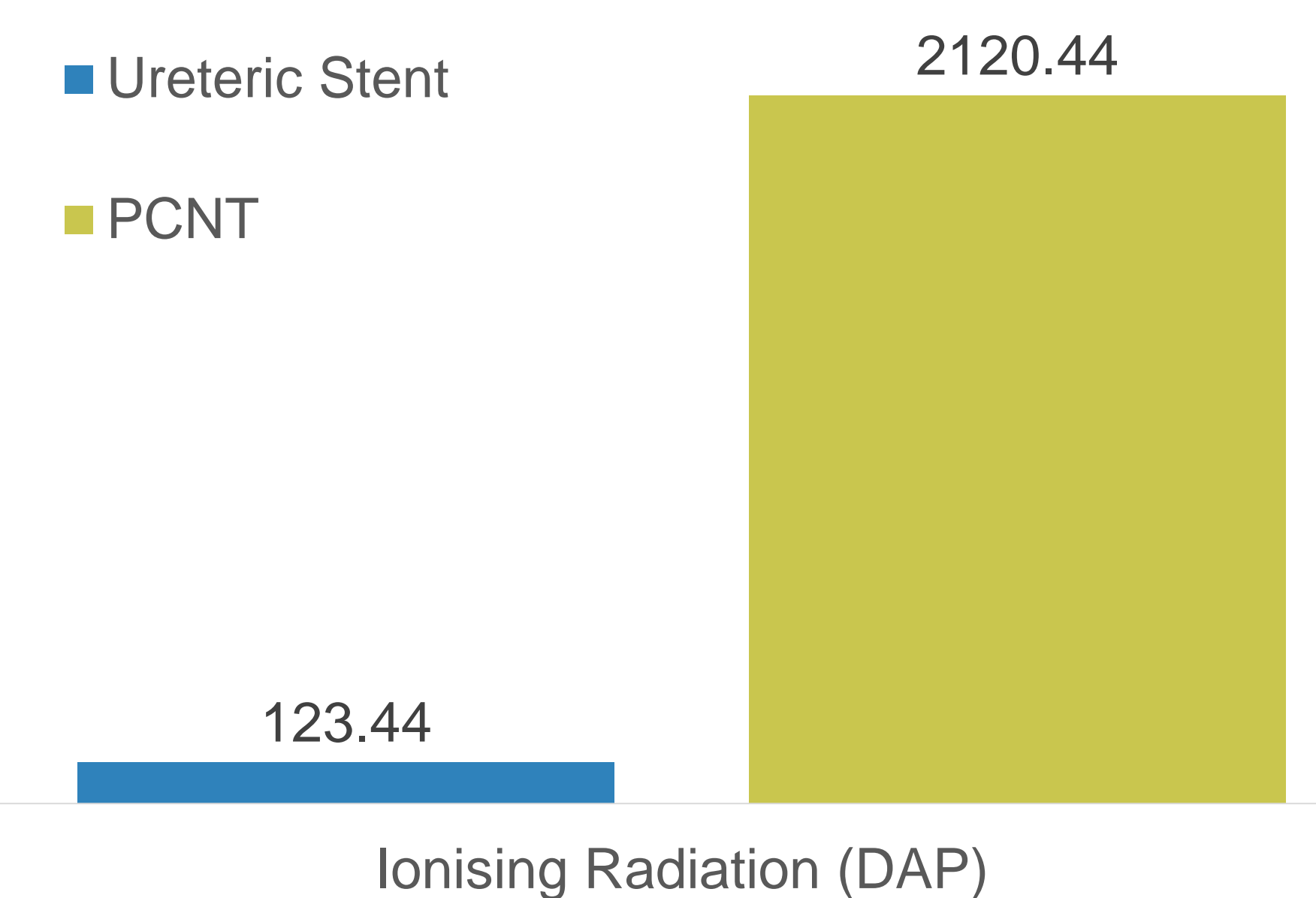
- 177 US’s vs 142 PCNT’s.
- Taking into consideration medical devices, imaging equipment and personnel, after-hours insertion of a retrograde US was approximately \$650 compared to \$2350 for insertion of a PCNT
 - Mobilisation of a specialist interventional suite
 - Staff including consultant interventional radiologist
- The average dose of ionising radiation for insertion of a PCNT compared to retrograde insertion of a US was 2120.44 Dose Area Product (DAP) vs 123.44 DAP respectively.

Results

Cost Analysis – US vs PCNT



Ionising Radiation – US vs PCNT



Conclusions

- Urgent decompression of an infected, obstructed kidney should occur without delay.
- Insertion of a PCNT is associated with an increased dose of radiation exposure and significantly increased financial cost compared with retrograde insertion of a US.
- Although a significantly higher DAP with PCNT vs US, the DAP value is still not clinically significant and unlikely to contribute to radiation-induced malignancy.
- Patient safety remains of paramount importance however cost and radiation exposure should be considered when deciding upon the modality of acute renal decompression.