NICE National Institute for Health and Care Excellence

EE281

Costing Analysis For The Management Of Localised Renal Cell Carcinoma From The UK NHS Perspective

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Background

Renal cell carcinoma (RCC) is a common cancer with approximately 10,000 people diagnosed per year in England, and more than 50% of patients with RCC are diagnosed at localised stage. There are both surgical and non-surgical options for management of localised RCC, and their use varies across the NHS. Due to its high prevalence, variations in practice can translate to substantial differences in resource impact. This study aims to compare the costs of treatment and of downstream events such as recurrence between surgical and non-surgical interventions, and active surveillance for localised RCC, from the UK NHS perspective.

Methods

A costing analysis using a clinician-validated treatment pathway estimated the upfront costs for each treatment option, and the cost of follow-up and managing downstream events. Nephrectomy was estimated as an average cost using the proportions of laparoscopic, robot-assisted, and open surgery. Ablation cost was calculated as an average of radiofrequency ablation, cryoablation and microwave ablation. Multiple cost scenarios for stereotactic ablative radiotherapy (SABR) were explored. Costs for active surveillance and 5-year follow-up were based on clinical guidance and expert opinion. Recurrence management costs were included. Unit costs were from published literature reviews and national sources, adjusted to 2023/24 prices[1].

Figure 1: Treatment options for different patient populations

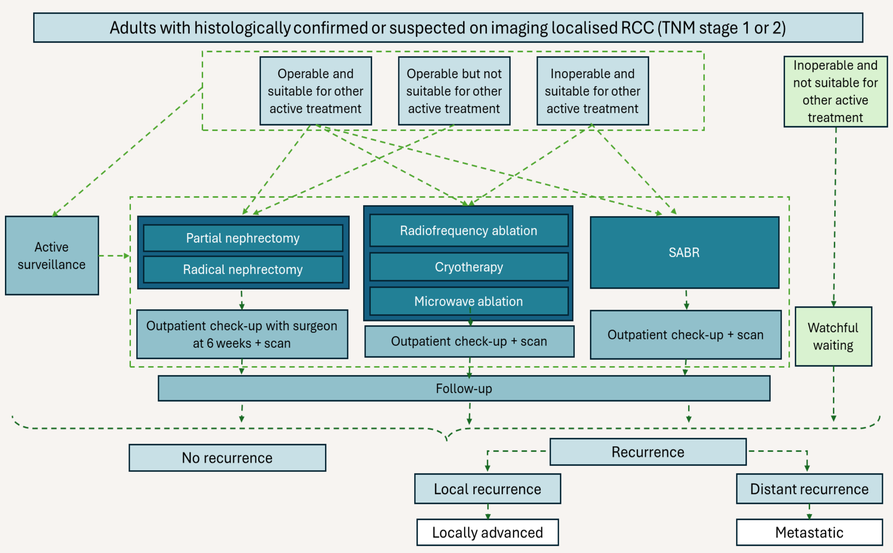

Table 1: PICO of costing analysis

Population	Adults (18 years or over) with (histologically confirmed or suspected on imaging) localised renal cell carcinoma (RCC)

Intervention	• Thermal ablation
	  ○ Radiofrequency ablation
	  ○ Cryoablation
	  ○ Microwave ablation
	• Stereotactic ablative radiotherapy (SABR)
	• Active surveillance

Comparator	• Surgery
	  ○ Partial nephrectomy
	  ○ Radical nephrectomy

Outcomes	Costs

Findings

Table 2: Summary of management costs

Surgery procedure	Type of procedure[2,3]	Total cost of the procedure
Partial nephrectomy	Open: 9% Laparoscopic: 4% Robotic: 87%	Open: £10,142 Laparoscopic: £9,970 Robotic: £10,172 Surgical consultant: £157 Overall: £10,319
Radical nephrectomy	Open: 20% Laparoscopic: 48% Robotic: 31%	Open: £10,142 Laparoscopic: £9,970 Robotic: £10,172 Surgical consultant: £157 Overall: £10,226
Thermal ablation	Radiofrequency: 20% Cryoablation: 60% Microwave ablation: 20%	Radiofrequency: £2,118 Cryoablation: £3,632 Microwave ablation: £2,118 Overall: £3,026
SABR	Lowest estimate: 1 fraction of radiation, post-surgical appointment with cancer MDT Highest estimate: 3 fractions of radiation, post-surgical appointment with surgical consultant	£2,133 £2,684
Active surveillance	CT CAP only Alternating CT CAP and ultrasound Alternating MRI and ultrasound	1st year: £123, Subsequent annual: £123; 1st year: £123, Subsequent annual: £88; 1st year: £202, Subsequent annual: £128

Table 3: Summary of downstream costs

Downstream resource	Costing approach	Total cost
Follow up after initial treatment	CT scan with contrast of three areas. Low risk: 3 total scans, intermediate risk: 6 total scans, high risk: 8 total scans.	Total 5-year cost: Low risk: £378 Intermediate risk: £757 High risk: £1,009
Recurrence	Local recurrence: 51% managed by open nephrectomy, 24.5% by laparoscopic nephrectomy and robotic nephrectomy, respectively. Distant recurrence: 85% systemic therapy, 37% cytoreductive nephrectomy, 12% radiotherapy, 17% metastasectomy.	Cost per local recurrence (5-year cost): £14,649 Cost per distant recurrence (1-year cost): £77,342 Note that these costs apply onto to those who experience recurrence.

Discussion

Surgery has a higher initial treatment cost than other treatments. The management of recurrences, particularly metastatic RCC, are much more costly than the initial treatment. The use of robotic-assisted surgery is increasing in the clinical practice in England[3]. The absence of a robotic procedure in NHS reference costs may result in underestimation of its true cost. Clinical experts would expect a larger difference in total episode cost between robot-assisted nephrectomy and other surgical approaches given the number of staff required and cost of consumables.

Conclusion

Nephrectomy has better recurrence outcomes than thermal ablation, a comprehensive cost-effectiveness analysis would be needed to assess its economic value across different patient groups.

References

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3. National Kidney Cancer Audit (NKCA). National Kidney Cancer Audit State of the Nation Report 2024. Available from https://www.natcan.org.uk/reports/nkca-state-of-the-nation-report-2024/.

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