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Review – Kidney Cancer

Systematic Review of Oncological Outcomes Following Surgical Management of Localised Renal Cancer

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Abstract

Context: Renal cell carcinoma (RCC) accounts for 2–3% of adult malignancies. There remain uncertainties over the oncological outcomes for the surgical management of localised RCC.
Objective: Systematically review relevant literature comparing oncological outcomes of surgical management of localised RCC (T1–2N0M0).
Evidence acquisition: Relevant databases including Medline, Embase, and the Cochrane Library were searched up to October 2010, and an updated scoping search was performed up to January 2012. Randomised controlled trials (RCTs) or quasi-RCTs, prospective observational studies with controls, retrospective matched-pair studies, and comparative studies from well-defined registries/databases were included. The main outcomes were overall survival, cancer-specific survival, recurrence, and metastases. The Cochrane risk of bias tool was used to assess RCTs, and an extended version was used to assess nonrandomised studies (NRSs). The quality of evidence was assessed using Grading of Recommendations Assessment, Development, and Evaluation (GRADE).
Evidence synthesis: A total of 4580 abstracts and 389 full-text articles were assessed. Thirty-four studies met the inclusion criteria (6 RCTs and 28 NRSs). Meta-analyses were planned but were deemed inappropriate due to data heterogeneity. There were high risks of bias and low-quality evidence across the evidence base. Open radical nephrectomy and open partial nephrectomy showed similar cancer-specific and overall survival, but when both open and laparoscopic approaches are considered together, the evidence showed improved survival for partial nephrectomy for tumours $\leq$4 cm. The overall evidence suggests either equivalent or better survival with partial nephrectomy. Laparoscopic radical nephrectomy offered equivalent survival to open radical nephrectomy, and all laparoscopic approaches achieved equivalent survival. Open and laparoscopic partial nephrectomy achieved equivalent survival. The issue of ipsilateral adrenalectomy or complete lymph node dissection with radical nephrectomy or partial nephrectomy remains unresolved.
Conclusions: The evidence base suggests localised RCCs are best managed by nephron-sparing surgery where technically feasible. However, the current evidence base has significant limitations due to studies of low methodological quality marked by high risks of bias.

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1. Introduction

Renal cell carcinoma (RCC) accounts for approximately 2–3% of all adult malignancies. More than 50% of all RCCs diagnosed are a localised stage (ie, T1–T2N0M0 or stage I–II) [1]. Open radical nephrectomy has been the standard curative intervention for localised RCC for the past five decades [2]. There were controversies over whether radical nephrectomy should be performed in conjunction with ipsilateral adrenalectomy, as originally described by Robson, or if the adrenal should be preserved [3–6] and whether ipsilateral extended retroperitoneal lymphadenectomy or limited hilar lymphadenectomy should be performed [7,8].

With the advent of minimally invasive surgery, laparoscopic radical nephrectomy has become an acceptable alternative to open surgery for localised RCCs [6,7]. Another recent controversy is the use of nephron-sparing surgery (NSS; partial nephrectomy). NSS has been the accepted mode of treatment when radical nephrectomy would render the patient anephric or at high risk for subsequent renal replacement therapy [9]. This organ-preserving approach has recently emerged as a viable alternative for small renal tumours (<4 cm or T1a) in patients with a normal contralateral kidney, with encouraging short-term and long-term oncological outcomes [10,11]. The era of increasing use of NSSs has also witnessed the development of minimally invasive nephron-sparing interventions such as cryoablation, radiofrequency ablation (RFA), and high-intensity focussed ultrasound (HIFU) for the treatment of localised renal cancer [10,11].

Although various guidelines exist in relation to the various interventions for localised RCC [6,12], it is important to recognise that such guidelines were based on reviews that were not undertaken systematically and often used methodology that was not transparent, reproducible, or robust. A systematic review of current evidence is urgently needed to establish whether the outcomes of competing treatment options are comparable. Methodological rigour is needed in assessing risks of bias and quality of evidence in a standardised and transparent way to highlight weaknesses in the evidence base and to make recommendations for future research.

The objective of this systematic review was to compare the oncological outcomes for all interventions relevant to the management of localised RCC. This paper reports the oncological outcomes, and a separate article reports the surgical and quality-of-life outcomes from this systematic review. There is also a full report published online with extra methodological information and data for oncological and surgical outcomes [13].

2. Evidence acquisition

2.1. Search strategy

The databases searched were Medline (1950 to October 2010) and Embase (1980 to October 2010), Cochrane Library, all sections (Issue 4, 2010), Web of Science, with Conference Proceedings (1970 to October 2010), and American Society of Clinical Oncology meeting abstracts (up to October 2010). The searches were not limited by language. Auto-alerts in Medline were also run during the course of the review. Reference lists of relevant articles were also checked [13]. Two reviewers screened all abstracts and full-text articles independently. Disagreement was resolved by discussion, and where no agreement was reached, a third independent party acted as an arbiter. In addition, an updated scoping search was performed up to January 2012.

2.2. Types of study design included

All relevant randomised controlled trials (RCTs) or quasi-RCTs were included. Due to the small number of RCTs, we also included nonrandomised studies (NRSs). Prospective observational studies with controls, retrospective matched-pair studies, and comparative studies from well-defined registries/databases were also included. Studies with no comparator group (eg, case series), nonmatched retrospective studies, and chart reviews were excluded.

2.3. Types of participants included

The study population was patients diagnosed with localised RCC based on computed tomography scan or magnetic resonance imaging, defined as clinical stage T1a–T2N0M0. Studies that reported pathologic T3 cases were included so long as the clinical staging was T1–2N0M0.

2.4. Types of interventions included

The following interventions were compared:

- Radical nephrectomy
- Partial nephrectomy (NSS)
- Laparoscopic surgery for radical or partial nephrectomy
- Hand-assisted laparoscopic surgery for radical or partial nephrectomy
- Robot-assisted laparoscopic surgery for radical or partial nephrectomy
- Complete regional (extended) lymphadenectomy
- Partial regional (limited) lymphadenectomy
- Adrenalectomy
- RFA
- Cryoablation
- HIFU.

A valid comparator was no intervention or any of the specified interventions (see full report for definitions of interventions [13]).

2.5. Types of outcome measures included

The principal oncological measure of effectiveness was overall survival rate at 5 and 10 yr. Other oncological measures of effectiveness were considered such as cancer-specific survival, local recurrence, metastasis, and positive