Leitlinienreport zur
Aktualisierung der S3-Leitlinie
Diagnostik, Therapie und
Nachsorge des
Nierenzellkarzinoms

Version 3.0 – November 2021
AWMF-Registernummer: 043/017OL
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1. Informationen zum Leitlinienreport

Dieser Leitlinienreport dokumentiert das Aktualisierungsverfahren der Leitlinie von 2020-Juni 2021 (Version 3). Diese Aktualisierung bezog sich auf die Kapitel 3.2.5 „Exposition gegen Trichlorethen“ und 6 „Organerhaltende Operation, OP-Techniken, Lymphadenektomie und Adenektomie“

Der Leitlinienreport zur Erstellung der Vorversionen kann unter https://www.leitlinienprogramm-onkologie.de/leitlinien/nierenzellkarzinom/ eingesehen werden.

1.1. Autoren des Leitlinienreports

Heidrun Rexer, Prof. Dr. med. Christian Doehn, Prof. Dr. med. Susanne Krege

1.2. Herausgeber

Leitlinienprogramm Onkologie der Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften e.V. (AWMF), Deutschen Krebsgesellschaft e.V. (DKG) und Deutschen Krebshilfe (DKH).

1.3. Federführende Fachgesellschaften der Leitlinie

Deutsche Gesellschaft für Urologie (DGU)

Deutsche Gesellschaft für Hämatologie und Onkologie (DGHO)

1.4. Finanzierung der Leitlinie

Die Erstellung und Aktualisierung der Leitlinie wurde von der Deutschen Krebshilfe im Rahmen des Leitlinienprogramms Onkologie gefördert.

1.5. Kontakt

Office Leitlinienprogramm Onkologie
c/o Deutsche Krebsgesellschaft e.V.
Kuno-Fischer-Straße 8
14057 Berlin

leitlinienprogramm@krebsgesellschaft.de
www.leitlinienprogramm-onkologie.de
1.6. Zitierweise des Leitlinienreports

1.7. Weitere Dokumente zur Leitlinie
Bei diesem Dokument handelt es sich um den Leitlinienreport zur Aktualisierung (Version 3) der S3-Leitlinie. Die Leitlinie steht als Langversion, Kurzversion sowie als Laienversion (Patientenleitlinie) zur Verfügung. Alle Dokumente sind über die folgenden Seiten zugänglich:

- Leitlinienprogramm Onkologie (https://www.leitlinienprogramm-onkologie.de/leitlinien/nierenzellkarzinom)
- AWMF (http://awmf.org)
- Guidelines International Network (www.g-i-n.net)

Die Leitlinie ist außerdem in der App des Leitlinienprogramms Onkologie enthalten.

Weitere Informationen unter: https://www.leitlinienprogramm-onkologie.de/app/
### 1.8. Verwendete Abkürzungen

<table>
<thead>
<tr>
<th>Abkürzung</th>
<th>Erläuterung</th>
</tr>
</thead>
<tbody>
<tr>
<td>AHB</td>
<td>Anschlussheilbehandlung</td>
</tr>
<tr>
<td>AWMF-IMWi</td>
<td>Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften – Institut für Wissenschaftliches Wissensmanagement</td>
</tr>
<tr>
<td>ASCO</td>
<td>American Society of Clinical Oncology</td>
</tr>
<tr>
<td>CT</td>
<td>Computertomographie</td>
</tr>
<tr>
<td>EAU</td>
<td>European Association of Urology, Europäische Urologenvereinigung</td>
</tr>
<tr>
<td>MRT</td>
<td>Magnetresonanztomographie</td>
</tr>
<tr>
<td>NCCN</td>
<td>National Comprehensive Cancer Network</td>
</tr>
<tr>
<td>NICE</td>
<td>National Institute for Health and Clinical Excellence</td>
</tr>
<tr>
<td>OL</td>
<td>Onkologisches Leitlinienprogramm</td>
</tr>
<tr>
<td>OP</td>
<td>Operation</td>
</tr>
<tr>
<td>RCT</td>
<td>Randomized clinical trial, Randomisierte Klinische Studie</td>
</tr>
<tr>
<td>SABR</td>
<td>Stereotactic ablative body radiotherapy</td>
</tr>
<tr>
<td>SIGN</td>
<td>Scottish Intercollegiate Guidelines Network</td>
</tr>
</tbody>
</table>
2. Geltungsbereich und Zweck der Leitlinie

2.1. Zielsetzung, Fragestellung und Adressaten

Die Ziele der S3-Leitlinie, die Adressaten sowie die bearbeiteten Fragestellungen sind in der Langversion der Leitlinie beschrieben.

2.2. Gültigkeitsdauer und Aktualisierungsverfahren

Die S3-Leitlinie ist bis zur nächsten Aktualisierung gültig, die Gültigkeitsdauer wird auf 3 Jahre geschätzt. Vorgesehen sind regelmäßige Aktualisierungen, bei dringendem Änderungsbedarf werden Änderungen der Empfehlungen in neuen Leitlinienversionen publiziert. Die Leitliniengruppe behält sich vor, bei akutem Änderungsbedarf, Amendments zur Leitlinie zu erstellen und zu publizieren.

Kommentare und Hinweise für den Aktualisierungsprozess sind ausdrücklich erwünscht und können an: nierenzellkarzinom@leitlinienprogramm-onkologie.de adressiert werden.

3. Zusammensetzung der Leitliniengruppe


4. Aktualisierung der Fragestellungen


Tabelle 1: Bearbeitete Schlüsselfragen in Version 3

<table>
<thead>
<tr>
<th>Fragestellungen der S3-Leitlinie</th>
<th>bearbeitet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Themenkomplex I: Epidemiologie, Risikofaktoren und Prävention</td>
<td></td>
</tr>
<tr>
<td>Wie häufig tritt ein malignes Nierenzellkarzinom, getrennt nach Geschlecht, in Deutschland auf?</td>
<td></td>
</tr>
<tr>
<td>Wie ist die Häufigkeitsverteilung in Bezug auf das Alter?</td>
<td></td>
</tr>
<tr>
<td>Wie ist die Häufigkeit der verschiedenen Stadien des Nierenzellkarzinoms bei Diagnosestellung?</td>
<td></td>
</tr>
</tbody>
</table>
### Fragestellungen der S3-Leitlinie

<table>
<thead>
<tr>
<th>Fragestellung</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gibt es gesicherte/validierte Risikofaktoren für das Auftreten eines Nierenzelltumors?</td>
</tr>
<tr>
<td>Welche hereditären Tumorsyndrome gehen mit einem erhöhten Risiko des Auftretens von Nierenzellkarzinomen einher?</td>
</tr>
</tbody>
</table>

### Themenkomplex II: Diagnostik, Prognosemarker und -scores (klinisch, molekular)

<table>
<thead>
<tr>
<th>Fragestellung</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welche bildgebenden Verfahren sollten zur Diagnostik eines Nierentumors eingesetzt werden?</td>
</tr>
<tr>
<td>In welchen Fällen sollte eine Biopsie des Tumors erfolgen?</td>
</tr>
<tr>
<td>Welche histopathologischen Faktoren sollten bei der Befundung von organerhaltenden Operationspräparaten und Nephrektomiepräparaten bestimmt werden?</td>
</tr>
<tr>
<td>Welche Ausbreitungsdiagnostik sollte bei Diagnose-stellung eines malignen Nierenzellkarzinoms erfolgen?</td>
</tr>
<tr>
<td>Gibt es klinische Parameter, die die Prognose der Erkrankung beeinflussen?</td>
</tr>
<tr>
<td>Gibt es validierte klinische Prognosescores?</td>
</tr>
<tr>
<td>Welche molekularen Marker sind als prognostische oder prädiktive Marker abhängig vom histologischen Subtyp des Tumors gesichert?</td>
</tr>
<tr>
<td>Welche dieser Marker sollten bereits im klinischen Alltag eingesetzt werden?</td>
</tr>
</tbody>
</table>

### Themenkomplex III: Therapie des nicht metastasierten Nierenzellkarzinoms

<table>
<thead>
<tr>
<th>Fragestellung</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welche Nierentumore eignen sich für eine Active Surveillance?</td>
</tr>
<tr>
<td>Welche Patienten/Tumoren kommen für ein lokales Verfahren (Radiofrequenzablation, Kryotherapie, Radiotherapie, High Intensity Focused Ultrasound) in Frage?</td>
</tr>
</tbody>
</table>
### Fragestellungen der S3-Leitlinie

#### Themenkomplex IV: Organgerhaltende Operation, OP-Techniken (offen-operativ, laparoskopisch, Roboter-gestützt), Lymphadenektomie, Adenektomie

<table>
<thead>
<tr>
<th>Fragestellung</th>
<th>bearbeitet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wie sind die Ergebnisse dieser Verfahren?</td>
<td></td>
</tr>
<tr>
<td>Wie ist der Stellenwert fokaler Verfahren in der Situation synchroner und metachroner Metastasierung</td>
<td></td>
</tr>
<tr>
<td>Bei welchen Tumoren, abhängig von Größe/Lage, soll eine organerhaltende Operation angestrebt werden?</td>
<td>X (SR)</td>
</tr>
<tr>
<td>Soll eine organerhaltende Operation ohne oder in Warm- oder Kaltischämie erfolgen?</td>
<td>X (SR)</td>
</tr>
<tr>
<td>Wie verhält man sich bei positivem Absetzungsrand?</td>
<td></td>
</tr>
<tr>
<td>Wie fällt der Vergleich offene – laparoskopische – robotergestützte Operation bei Teil-/Totalnephrektomie im Hinblick auf Operationsdauer, intraoperativen Blutverlust, stationäre Aufenthaltsdauer und tumorchirurgisches Ergebnis aus?</td>
<td>X (SR)</td>
</tr>
<tr>
<td>Welchen Stellenwert hat die Lymphadenektomie beim malignen Nierentumor?</td>
<td></td>
</tr>
<tr>
<td>Gibt es Fälle, wo diese durchgeführt werden soll?</td>
<td></td>
</tr>
<tr>
<td>Wenn ja, in welchem Ausmaß?</td>
<td></td>
</tr>
<tr>
<td>Stellenwert der Adrenalektomie</td>
<td></td>
</tr>
</tbody>
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#### Themenkomplex V: Systemtherapie des metastasierten Nierenzellkarzinoms

<table>
<thead>
<tr>
<th>Fragestellung</th>
<th>bearbeitet</th>
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</thead>
<tbody>
<tr>
<td>Welche Substanzen stehen in der first line-Therapie für die Behandlung des metastasierten Nierenzellkarzinoms zur Verfügung?</td>
<td></td>
</tr>
<tr>
<td>Wie sind die Unterschiede in dieser Gruppe hinsichtlich des Überlebens und des Nebenwirkungsprofils?</td>
<td></td>
</tr>
<tr>
<td>Welche Substanzen stehen in der second line-Therapie zur Verfügung? Wie sind die Unterschiede in dieser Gruppe hinsichtlich des Überlebens und des Nebenwirkungsprofils?</td>
<td></td>
</tr>
<tr>
<td>Fragestellungen der S3-Leitlinie</td>
<td>bearbeitet</td>
</tr>
<tr>
<td>---------------------------------</td>
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</tr>
<tr>
<td>Gibt es bereits empfohlene Sequenzen?</td>
<td></td>
</tr>
<tr>
<td>Gibt es Kombinationstherapien, die empfohlen werden können?</td>
<td></td>
</tr>
<tr>
<td>Soll bei unter einer Therapie langfristig stabilen Patienten die Behandlung pausiert werden? Wenn ja, dann ab welchem Zeitpunkt?</td>
<td></td>
</tr>
<tr>
<td>Für Nicht-Klarzeller auf Subgruppen fokussieren</td>
<td></td>
</tr>
</tbody>
</table>

**Themenkomplex VI: Lokale Metastasentherapie**

| In welchen Fällen soll bei primär metastasiertem Tumor trotzdem eine Entfernung des Primärtumors erfolgen? | | |
| Zuzatzfrage: Welchen Stellenwert haben dabei fokale Verfahren? | | |
| Welchen Stellenwert hat die systemische Therapie vor Metastasenresektion? | | |
| Welchen Stellenwert hat die systemische Therapie nach Metastasenresektion? | | |
| Welchen Stellenwert, in Abhängigkeit von den verschiedenen Metastasenlokalisationen, hat die Metastasenchirurgie, haben die Metastasenchirurgie und Radiochirurgie/stereotaktische Bestrahlung/SABR? | | |
| Vergleich der lokalen Kontrollen nach Organregion (ZNS, Knochen, Lunge, andere Organe) | | |
| Wann sollte nach Metastasenchirurgie eine postoperative Bestrahlung erfolgen? | | |
| Welche Systemtherapie ist parallel zur Radiochirurgie/stereotaktische Bestrahlung/SABR möglich | | |

**Themenkomplex VII: Neo-adjuvante und Adjuvante Therapie**
<table>
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<tr>
<th>Fragestellungen der S3-Leitlinie</th>
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</thead>
<tbody>
<tr>
<td>Gibt es eine Indikationsstellung für neo-/adjuvante Therapie beim Nierenzellkarzinom?</td>
<td></td>
</tr>
<tr>
<td><strong>Themenkomplex VIII: Palliative Lokaltherapie</strong></td>
<td></td>
</tr>
<tr>
<td>Wann ist eine Strahlentherapie beim metastasierten Nierenzellkarzinom sinnvoll?</td>
<td></td>
</tr>
<tr>
<td>Welche palliativen Therapien sind bei Knochenschmerzen sinnvoll?</td>
<td></td>
</tr>
<tr>
<td>Welche palliativen Therapien sind bei Statikgefahr/spinaler Kompression sinnvoll?</td>
<td></td>
</tr>
<tr>
<td>Welche palliativen Therapien sind bei multiplen Hirnfiliae sinnvoll?</td>
<td></td>
</tr>
<tr>
<td><strong>Themenkomplex IX: Supportive Maßnahmen, komplementäre Therapien</strong></td>
<td></td>
</tr>
<tr>
<td>Gibt es validierte komplementäre Therapiemaßnahmen beim metastasierten Nierenzellkarzinom?</td>
<td></td>
</tr>
<tr>
<td>Wie sind typische immuntherapeutische Nebenwirkungen zu managen?</td>
<td></td>
</tr>
<tr>
<td><strong>Themenkomplex X: Rehabilitation und Nachsorge</strong></td>
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<tr>
<td>In welchen Abständen und über wie viele Jahre soll im nicht-metastasierten Stadium nachgesorgt werden?</td>
<td></td>
</tr>
<tr>
<td>Welche Maßnahmen umfasst die Nachsorge?</td>
<td></td>
</tr>
<tr>
<td>Welche Bildgebung für das Abdomen soll erfolgen (Sono, CT, MRT)?</td>
<td></td>
</tr>
<tr>
<td>Wie häufig ist Bildgebung indiziert?</td>
<td></td>
</tr>
<tr>
<td>In welchen Abständen soll im metastasierten Stadium nachgesorgt werden?</td>
<td></td>
</tr>
<tr>
<td>Fragestellungen der S3-Leitlinie</td>
<td>bearbeitet</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Welche Maßnahmen umfasst die Nachsorge?</td>
<td></td>
</tr>
<tr>
<td>Welche Bildgebung für das Abdomen soll erfolgen (Sono, CT, MRT)?</td>
<td></td>
</tr>
<tr>
<td>Wie häufig ist Bildgebung indiziert</td>
<td></td>
</tr>
<tr>
<td>Stellenwert der AHB und der onkologischen Rehabilitation</td>
<td></td>
</tr>
<tr>
<td>Welche Nachsorge ist nach der Radiochirurgie von limitierter Hirnmetastasierung sinnvoll?</td>
<td></td>
</tr>
<tr>
<td>Welche Maßnahmen umfasst die Nachsorge bei lokal kurativer Behandlung (OP/Stereotaxie) einer Oligometastasierung?</td>
<td></td>
</tr>
<tr>
<td><strong>Themenkomplex XI: Psycho-onkologische Aspekte</strong></td>
<td></td>
</tr>
<tr>
<td>Welches psychoonkologische Angebot sollte einem Patienten mit einem Nierenzellkarzinom zur Verfügung stehen?</td>
<td></td>
</tr>
</tbody>
</table>
5. Methodisches Vorgehen

5.1. Systematische Literatursuche

Zur Exposition gegenüber Trichlorethen wurde keine systematische Recherche durchgeführt. Hier erfolgte die Bearbeitung ausschließlich durch die beteiligten Fachexperten.


Es wurden die Datenbanken Medline (via Ovid), Embase (via Ovid), die Cochrane Library und die KSR Datenbank (https://ksrevidence.com/) für die systematischen Literatursuchen verwendet.

Screening der gefundenen Treffer:


In einem zweiten Schritt wurden die Volltexte besorgt und auf Einschluss durch eine wissenschaftliche Mitarbeiterin von UroEvidence überprüft. Bei Diskrepanzen wurde dies mit den AG-Leitungen besprochen.

Die Extraktion der wichtigen Studiencharakteristika und Ergebnisse der eingeschlossenen Studien erfolgte durch eine wissenschaftliche Mitarbeiterin von UroEvidence in entsprechende Evidenztabellen.


5.1.1. Schema der Evidenzklassifikation


Tabelle 2: Schema der Evidengraduierung nach SIGN:

<table>
<thead>
<tr>
<th>Grad</th>
<th>Beschreibung</th>
</tr>
</thead>
<tbody>
<tr>
<td>1++</td>
<td>Qualitativ hochwertige Metaanalysen, Systematische Übersichten von RCTs, oder RCTs mit sehr geringem Risiko systematischer Fehler (Bias)</td>
</tr>
<tr>
<td>Grad</td>
<td>Beschreibung</td>
</tr>
<tr>
<td>------</td>
<td>--------------</td>
</tr>
<tr>
<td>1+</td>
<td>Gut durchgeführte Metaanalysen, Systematische Übersichten von RCTs, oder RCTs mit geringem Risiko systematischer Fehler (Bias)</td>
</tr>
<tr>
<td>1-</td>
<td>Metaanalysen, Systematische Übersichten von RCTs, oder RCTs mit hohem Risiko systematischer Fehler (Bias)</td>
</tr>
<tr>
<td>2++</td>
<td>Qualitativ hochwertige systematische Übersichten von Fall-Kontroll- oder Kohortenstudien oder Qualitativ hochwertige Fall-Kontroll- oder Kohortenstudien mit sehr niedrigem Risiko systematischer Verzerrungen (Confounding, Bias, „Chance“) und hoher Wahrscheinlichkeit, dass die Beziehung ursächlich ist.</td>
</tr>
<tr>
<td>2+</td>
<td>Gut durchgeführte Fall-Kontroll Studien oder Kohortenstudien mit niedrigem Risiko systematischer Verzerrungen (Confounding, Bias, „Chance“) und moderater Wahrscheinlichkeit, dass die Beziehung ursächlich ist.</td>
</tr>
<tr>
<td>2-</td>
<td>Fall-Kontroll Studien oder Kohortenstudien mit einem hohen Risiko systematischer Verzerrungen (Confounding, Bias, „Chance“) und signifikantem Risiko, dass die Beziehung nicht ursächlich ist.</td>
</tr>
<tr>
<td>3</td>
<td>Nicht-analytische Studien, z.B. Fallberichte, Fallserien</td>
</tr>
<tr>
<td>4</td>
<td>Expertenmeinung</td>
</tr>
</tbody>
</table>
5.1.2. Extraktion in Evidenztabellen
Die im Rahmen der Aktualisierung identifizierte Studien wurden entsprechend dem bisherigen Vorgehen (siehe Leitlinienreport zur Version 1) in Evidenztabellen extrahiert.

Die Evidenztabellen der berücksichtigten Studien sind in Kapitel 10.2 dargestellt.

5.2. Formulierung der Empfehlungen und formale Konsensusfindung

5.2.1. Empfehlungsgraduierung
Die vorliegende Leitlinie nutzt als Grundlage zur Evidenzdarlegung die Evidenzkategorien des Scottish Intercollegiate Guidelines Network (SIGN).

Grundsätzlich orientiert sich der Empfehlungsgrad zunächst an der Stärke der verfügbaren Evidenz, d.h. ein hoher Evidenzgrad (z.B. Metaanalysen/systematische Übersichten von RCTs oder mehrere methodisch hochwertige RCTs), d.h. eine hohen Sicherheit bzgl. der Ergebnisse soll in der Regel auch zu einer starken Empfehlung (Empfehlungsgrad A, „soll“) führen.

Zusätzlich müssen aber weitere Kriterien bei der Wahl des Empfehlungsgrades berücksichtigt werden und können diesen beeinflussen. Die Wahl des Empfehlungsgrades ist insbesondere bei Abweichungen zwischen Evidenzstärke und Empfehlungsgrad im Hintergrundtext begründet. Die folgenden Kriterien können zu einem Abweichen der Empfehlungsstärke nach oben oder unten führen:

1. **Konsistenz** der Studienergebnisse
   
   Bsp.: Die Effektschätzer der Studienergebnisse gehen in unterschiedliche Richtungen und zeigen keine einheitliche Tendenz.

2. **Klinische Relevanz** der Endpunkte und Effektstärken
   
   Bsp.: Es liegen zwar Studien mit Ergebnissen in eine Richtung vor, jedoch wird die Bedeutung der gewählten Endpunkte und/oder Effektstärken als nicht relevant eingeschätzt.

3. **Nutzen-Risiko-Verhältnis**
   
   Bsp.: Dem nachgewiesenen Nutzen einer Intervention steht ein relevanter Schadensaspekt gegenüber, der gegen eine uneingeschränkte Empfehlung spricht.

4. **Ethische Verpflichtungen**
   
   Bsp.: Downgrading: Aus ethischen Gründen kann eine Intervention mit nachgewiesem Nutzen nicht uneingeschränkt angeboten werden.
   
   Upgrading: Starke Empfehlung auf Basis von z.B. Fall-Kontroll-Studien, da aus ethischen Gründen ein RCT nicht durchführbar ist.

5. **Patientenpräferenzen**
Bsp.: Eine Intervention mit nachgewiesenem Nutzen wird nicht stark empfohlen, da sie von den Patienten als belastend oder nicht praktikabel abgelehnt wird.

6. Anwendbarkeit, Umsetzbarkeit in der Versorgung

Bsp.: Eine Intervention mit nachgewiesenen positiven Effekten kann nicht empfohlen werden, weil sie im regionalen Versorgungssystem aus strukturellen Gründen nicht angeboten werden kann.

Dem Regelwerk der AWMF entsprechend erfolgte die Vergabe von Empfehlungsgraden durch die Leitlinien-Autoren im Rahmen eines formalen Konsensusverfahrens. Dies erfolgte im Rahmen einer strukturierten Konsensuskonferenz (siehe 5.2.2).

Negative Empfehlungen werden sprachlich ausgedrückt („nicht“). An Stellen, bei denen keine Evidenzquelle verfügbar war oder keine systematische Recherche zugrunde lag, wurden die Statements und Empfehlungen als EK (Expertenkonsens) definiert. Hier wurde die Verwendung der Symbole zur Graduierung der Empfehlungen (A, B, O) verzichtet.

<table>
<thead>
<tr>
<th>Empfehlungsgrad</th>
<th>Beschreibung</th>
<th>Ausdrucksweise</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Starke Empfehlung</td>
<td>soll/soll nicht</td>
</tr>
<tr>
<td>B</td>
<td>Empfehlung</td>
<td>sollte/sollte nicht</td>
</tr>
<tr>
<td>0</td>
<td>Empfehlung offen</td>
<td>kann/kann verzichtet werden</td>
</tr>
</tbody>
</table>

5.2.2. Konsensfindung

Kapitel 6:


Kapitel 3.2.5:

### 6. Aktualisierung der Qualitätsindikatoren

Die Qualitätsindikatoren wurden im Rahmen dieses Aktualisierungsverfahrens nicht überarbeitet. Die Grundlagen der bestehenden Qualitätsindikatoren wurden durch die geänderten und neuen Empfehlungen bei diesem Update nicht verändert.

### 7. Reviewverfahren und Verabschiedung

Während des Aktualisierungsprozesses erfolgten methodische Reviews durch das OL-Office und nach Abschluss der Konsentierung durch das AWMF-IMWi. Im Anschluss wurden ein öffentliches Konsultationsverfahren auf der Webseite der AWMF und dem Onkologischen Leitlinienprogramm vom 20.08. bis zum 19.09.2021 durchgeführt und parallel die formale Zustimmung der beteiligten Fachgesellschaften/Organisationen eingeholt.

Insgesamt gingen im Rahmen der Öffentlichen Konsultation von 3 Personen oder Organisationen Stellungnahmen ein. Die Kommentare wurden zunächst von der Leitlinienkoordination gesichtet und hinsichtlich ihrer inhaltlichen Relevanz klassifiziert. Dabei wurde festgestellt, dass es sich ausschließlich um Kommentare zu redaktionellen Änderungen (Wording) bzw. um Kommentare zu Kapiteln, welche im vorliegenden Update nicht bearbeitet wurden, handelte. Die redaktionellen Änderungen wurden durchgeführt, die Kapitelfremden Kommentare an die zuständigen AGs für ein späteres Update weitergeleitet.

Die redaktionellen, das Wording betreffenden Kommentare wurden eingearbeitet und sind hier nicht gelistet.

---

### Tabelle 4: Bei der Konsensfindung angewendete Klassifikation der Konsensstärke

<table>
<thead>
<tr>
<th>Konsensstärke</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Starker Konsens</td>
<td>Zustimmung von &gt; 95 % der Teilnehmenden</td>
</tr>
<tr>
<td>Konsens</td>
<td>Zustimmung von &gt; 75 – 95 % der Teilnehmenden</td>
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<tr>
<td>mehrheitliche Zustimmung</td>
<td>Zustimmung von &gt; 50 – 75 % der Teilnehmenden</td>
</tr>
<tr>
<td>kein Konsens</td>
<td>Zustimmung von &lt; 50 % der Teilnehmenden</td>
</tr>
</tbody>
</table>
8. Unabhängigkeit und Umgang mit Interessenkonflikten


Zur Beurteilung der Relevanz der Interessenkonflikte wurden beim Kickoff-Treffen die folgenden Vorgaben festgelegt:

- Geringe Relevanz: bei bezahlten Vorträgen,
- Moderate Relevanz: Tätigkeit ins AdvisoryBoards, Gutachten, Drittmittel, Schulungstätigkeiten über längeren Zeitraum für Unternehmen der Gesundheitswirtschaft
- Hohe Relevanz: Aktienbesitz, Patente, Haupteinkommen durch Unternehmen der Gesundheitswirtschaft

Bei Interessenkonflikten von geringer Relevanz sollen Leitungsfunktionen eingeschränkt oder unbelastete Co-Leitungen vorgesehen werden.

Bei moderater Relevanz der Interessenkonflikte sollen sich die betreffenden Personen bei den davana betroffenen Empfehlungen enthalten. Dies kann ggf. auch im Rahmen einer sogenannten verblindeten Doppelabstimmung umgesetzt werden, d.h. das Abstimmungsergebnis wird dahingehend kontrolliert, ob die Beteiligung von Personen mit moderaten Interessenkonflikten an der Abstimmung das Ergebnis beeinflusst hat.

Bei Vorliegen von Interessenkonflikten von hoher Relevanz ist ein Ausschluss von den Beratungen vorgesehen (Schriftliche Stellungnahmen sind möglich).

Für das Themengebiet der Operativen Therapie, das in Version 3 aktualisiert wurde, ergab die Fremdbewertung eine Person mit einem Interessenkonflikt von moderater Relevanz (Beratungstätigkeit im Themengebiet). Entsprechend wurde hier das oben beschriebene Verfahren eingesetzt. Der Ausschluss der Person vom Abstimmungsverfahren hatte keinen Einfluss auf das Ergebnis.

Die systematische Evidenzaufbereitung, die pluralistische Zusammensetzung der Leitliniengruppe, das strukturierte Konsensverfahren, die Diskussion der Interessen und Umgang mit Interessenkonflikten sowie die öffentliche Konsultationsfassung können als protektive Faktoren gewertet werden, die einer Verzerrung durch Interessenkonflikte entgegenwirken.
9. Verbreitung und Implementierung


Daneben werden im Rahmen der Zertifizierungsprozesse uroonkologischer Krebszentren sowohl die Inhalte als auch die Erfüllung der Qualitätsindikatoren nachgefragt.
10. Anlagen

10.1. Recherchen der Aktualisierung zu Version 3.01

10.1.1. Zusammenfassung der Suche

**PRISMA Flow Diagramm Literatursuche**

**OP-Techniken**

---

**Gefunden durch Datenbanksuche**
(n = 621)

---

**Verbleiben nach Entfernen von Duplikaten**
(n = 427 Duplikate)

---

**Durch AG-Mitglieder als relevant identifiziert**
(n = 82)

---

**Ausgeschlossen**
(n = 345)

---

**Durch UroEvidence als relevant identifiziert**
(n = 55)

---

**Ausgeschlossen**
(n = 27)

---

**Eingeschlossene Studien in die qualitative Synthese**
(n = 55)

---

**Gründe zum Ausschluss:**
- Studiendesign
- Inhalt nicht PICO-relevant

---

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10.1.2. Suchfragen

**MEDLINE**

**Suchdatum:** 02.05.2019  
**Datenbank:** Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Daily and Versions(R) 1946 to April 26, 2019

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The Cochrane Library

**Suchdatum:** 14.5.2019

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Embase

**Suchdatum:** 15.05.2019

**Datenbank:** Embase Classic+Embase 1947 to 2019 May 14

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</tr>
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<td>5</td>
<td>Hypernephroma*.tw.</td>
</tr>
<tr>
<td>6</td>
<td>Papillary Renal Cell Carcinoma*.tw.</td>
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<td>Chromophobe Renal Cell Carcinoma*.tw.</td>
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<td>8</td>
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</tr>
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<td>14 or 15 or 16 or 17</td>
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23 19 or 20 or 21 or 22
24 18 and 23
25 13 and 24
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27 25 not 26
28 exp comparative study/
29 exp randomized controlled trial/
30 exp controlled clinical trial/
31 exp meta analysis/
32 exp "systematic review"/
33 (Comparative Stud* or Randomi*ed Controlled Trial* or Controlled Clinical Trial* or Meta-Analy* or Systematic Review*).tw.
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35 27 and 34
36 35
37 limit 36 to yr="2016 – 2019"

KSR Evidence

Suchdatum: 14.05.2019

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# 10.2 Evidenztabellen

**Kapitel 6: Organerhaltende Operation, OP-Techniken (offen-operativ, laparoskopisch, Roboter-gestützt), Lymphadenektomie, Adrenalektomie**


<table>
<thead>
<tr>
<th>Referenz</th>
<th>Studiendesign</th>
<th>Studiencharakteristika</th>
<th>Ziel der Studie</th>
<th>Patientenmerkmale</th>
<th>Intervention</th>
<th>Kontrolle</th>
<th>Ergebnisse</th>
<th>Authors' conclusion</th>
<th>Bemerkungen</th>
<th>LoE/ RoB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cacciamani, 2018b, <em>Journal of Urology</em></td>
<td>Systematic review with meta-analysis</td>
<td>n= 98 comparative studies 2000-2017 Update search date: June 2017</td>
<td>To critically evaluate the impact of surgical factors on the operative, perioperative, functional, oncologic and survival outcomes in patients undergoing robotic partial nephrectomy</td>
<td>n= 20282 patients</td>
<td>open partial nephrectomy</td>
<td>robotic partial nephrectomy</td>
<td>Pooled analysis (n= 9106 patients)</td>
<td>Operative time OPN group had shorter operative times (WMD -15.27, 95% CI -23.66 to -6.88, p= 0.0004) Estimated blood loss RPN group had less estimated blood loss (WMD 85.01, 95% CI 65.14 to 104.87, p &lt;0.0001)</td>
<td>Our comprehensive meta-analysis indicates that robotic partial nephrectomy delivers mostly superior, and at a minimum equivalent, outcomes compared to open and laparoscopic partial nephrectomy.</td>
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**Aggregierte Evidenz**
<table>
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<tr>
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<th>Studien-design</th>
<th>Studien-charakteristika</th>
<th>Ziel der Studie</th>
<th>Patienten-merkmale</th>
<th>Intervention</th>
<th>Kontrolle</th>
<th>Ergebnisse</th>
<th>Authors' conclusion</th>
<th>Bemerkungen</th>
<th>LoE/RoB</th>
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<td>Ficarra, 2018, Kidney Cancer</td>
<td>Systematic review with meta-analysis</td>
<td>n= 36 retrospective studies 2013-2018</td>
<td>We performed an update of previous reviews of the literature to provide an overview on</td>
<td>n= 45786</td>
<td>robot-assisted PN (n= 22) laparoscopic PN (n= 10) open PN (n= 7)</td>
<td></td>
<td></td>
<td>Complications were similar but the RPN group had fewer overall (OR 1.85, 95% CI 1.64 to 2.10, p &lt;0.0001), minor (OR 1.80, 95% CI 1.56 to 2.07, p &lt;0.00001) and major (OR 1.55, 95% CI 1.27 to 1.90, p= 0.0001) postoperative complications. Hospital length of stay shorter in the RPN group (WMD 2.26, 95% CI 1.16 to 3.35, p= 0.0001)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Mean estimated positive surgical margins Overall: 6.7% RPN: 7% LPN: 5% OPN: 4.3%</td>
<td></td>
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<tr>
<td>Referenz</td>
<td>Studien - design</td>
<td>Studien- charakteristika</td>
<td>Ziel der Studie</td>
<td>Patienten- merkmale</td>
<td>Intervention</td>
<td>Kontrolle</td>
<td>Ergebnisse</td>
<td>Authors' conclusion</td>
<td>Bemerkungen</td>
<td>LoE/ RoB</td>
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<td>Grivas, 2019, Minerva urologica e nefrologica</td>
<td>Systematic review</td>
<td>n= 22 comparative studies</td>
<td>To analyze the available literature regarding the outcomes of RPN compared to those of OPN.</td>
<td>Patients with partial nephrectomy</td>
<td>RPN n= 2902</td>
<td>OPN n=3646</td>
<td><strong>Intraoperative complications (n= 6 studies)</strong>&lt;br&gt; Favors RPN: 3&lt;br&gt; Favors OPN: 0&lt;br&gt;No difference: 3</td>
<td>Current evidence demonstrate that RPN is a reasonable alternative to OPN with regard to oncological and early functional outcomes with a straightforward advantage of improved perioperative</td>
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<td>Postoperative complications (n= 20 studies)</td>
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<td>Favors RPN: 11</td>
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<td>Favors OPN: 0</td>
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<td>Favors RPN: 3</td>
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<td>Favors OPN: 1</td>
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<td>Favors RPN: 6</td>
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<td>Favors OPN: 0</td>
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<td>Operative time (n= 18 studies)</td>
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<td>Favors RPN: 1</td>
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<td>Favors OPN: 14</td>
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morbidität, als erwartet durch minimale invasiven Techniken.
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<th>Referenz</th>
<th>Studien-design</th>
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<th>Bemerkungen</th>
<th>LoE/RoB</th>
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<tbody>
<tr>
<td>Perez-Ardavin, 2019, Current</td>
<td>Systematic review</td>
<td>n= 14 (8 comparative retrospective, 6 descriptive)</td>
<td>An endophytic renal tumor represents a special</td>
<td>n= 2383 nephrectomies</td>
<td>robot-assisted partial nephrectomy</td>
<td>mean blood loss (n= 1): RPN 175ml vs. OPN 341ml) p&lt; 0.001</td>
<td>There are few studies that specifically report the experience with completely</td>
<td>2+</td>
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<p>|  |  |  |  |  |  |  |  | Estimated blood loss (n= 20) | Favors RPN: 17 | Favors OPN: 1 | No difference: 2 |
|  |  |  |  |  |  |  |  | Length of hospital stay (n= 19) | Favors RPN: 19 | Favors OPN: 0 | No difference: 0 |
|  |  |  |  |  |  |  |  | Positive surgical margins (n= 19) | Favors RPN: 6 | Favors OPN: 0 | No difference: 13 |</p>
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<th>Referenz</th>
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<tr>
<td>Urology Reports</td>
<td>until August 2018</td>
<td>surgical challenge in terms of location and safe removal. For this reason we wanted to review the existing literature on this subject.</td>
<td>n= 620 endophytic tumors</td>
<td>partial laparoscopic nephrectomy</td>
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<td>complications: no statistically significant differences in any studies analyzed length of hospital stay (n= 1): RPN: 3 days vs OPN 5 days p&lt; 0.001</td>
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<tr>
<td>Shen, 2016, World Journal of Urology</td>
<td>Systematic review with</td>
<td>n= 16 comparative studies</td>
<td>To determine whether RPN is a safe and effective procedure</td>
<td>n= 3024 cases</td>
<td>RPN n= 1103</td>
<td>OPN n= 1921</td>
<td>Operative time shorter in the OPN group (WMD, 27.79) RPN offered a lower rate of perioperative complications, less estimated blood loss</td>
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<td>Referenz</td>
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<tr>
<td>Surgical Oncology</td>
<td>meta-analysis</td>
<td>Search date: 30 September 2015</td>
<td>effective alternative to open partial nephrectomy via the comparison of RNP and OPN.</td>
<td>no significant differences: gender, benign malignant, BMI</td>
<td></td>
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<td>Estimated blood loss</td>
<td>less blood loss when compared to the OPN group (WMD, −105.57 ml; 95 % CI, −160.78 to −50.36; p = 0.0002)</td>
<td>loss, and shorter length of hospital stay than OPN, suggesting that RPN can be an effective alternative to OPN.</td>
<td>studies available for this meta-analysis</td>
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<td>age was lower (p = 0.003) and the tumor size was smaller for RPN group (p &lt; 0.01)</td>
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<td>Length of hospital stay</td>
<td>was significantly shorter in the RPN group (WMD, −2.06 day; 95 % CI, −2.62 to −1.51; p&lt; 0.001)</td>
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<td></td>
<td>Positive margin rate</td>
<td>no difference (OR 0.93 95 % CI, 0.57-1.52; p= 0.7)</td>
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<td>Overall complication rate</td>
<td>RPN was significantly lower than that of OPN</td>
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<td>Referenz</td>
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<tr>
<td>Tsai, 2019, International Journal of Medical Robotics and Computer Assisted Surgery</td>
<td>Systematic review with meta-analysis</td>
<td>n= 34 comparative studies</td>
<td>Search date: April 11, 2018</td>
<td>n= 60808 patients</td>
<td>To compare perioperative outcomes of robotic-assisted partial nephrectomy with open partial nephrectomy</td>
<td>RPN: n= 19638 RPN</td>
<td>OPN: n= 41170</td>
<td>RPN was associated with decreased: overall postoperative complication rate (OR = 0.578, 95% CI 0.514-0.649, p &lt; 0.001) decreased readmission rate (OR = 0.660, 95% CI, 0.524-0.832, P &lt; 0.001)</td>
<td>Compared with OPN, RPN provided lower morbidities and better renal function preservation.</td>
<td>Die Ergebnisse zum Blutverlust und der Operationszeit sind nur in der Fig 1 dargestellt und konnten nicht</td>
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Intra-operative complication rate
no difference (OR 0.86, 95% 0.42-1.76, p = 0.68)

Postoperative complication rate
RPN lower rates of overall postoperative complication (OR 0.64 95% CI 0.51-0.79, p < 0.001)
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<td>shorter hospital stay (Hedges' g = −0.492, 95% CI, −0.588 to −0.396, P &lt; 0.001, difference in means −1.781 d, 95% CI, −2.221 to −1.341)</td>
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<td>No significant difference between RPN and OPN: positive surgical margin (OR = 0.926, 95% CI, 0.657-1.304, p = 0.660) tumor recurrence rates (OR = 0.328, 95% CI, 0.078-1.381, p = 0.129)</td>
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<td>RPN had decreased blood loss, blood transfusion, postoperative complication rate, and length of stay (LOS) when compared with OPN.</td>
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<tr>
<td>Vartolomei, 2018, Current Opinion in Urology</td>
<td>Systematic review</td>
<td>n= 14 studies (7 comparative, 7 case series) 2000-2017</td>
<td>To evaluate current literature reporting oncologic outcomes after robot-assisted partial nephrectomy and laparoscopic partial nephrectomy.</td>
<td>n = 2933</td>
<td>RPN</td>
<td>LPN</td>
<td>n= 1498</td>
<td>LPN series (n= 9 studies)</td>
<td>Positive surgical margin: 0-10%</td>
<td>5y-OS: 86-96%</td>
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<td>LPN n= 1525</td>
<td>LPN vs. OPN (n= 5 studies)</td>
<td>slightly similar oncologic results, but with lower percentages for OPN in some studies (no statistical significance)</td>
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<td>RPN series (n= 4 studies)</td>
<td>positive surgical margin: 1.5-3.77%</td>
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<td>complex (PADUA &gt; 10) and T1b tumors from 4-12.5%</td>
<td>5y-OS: 88-95.1%</td>
<td>Cancer-free-survival: 91.3-97.8%</td>
<td>5y-CSS: 96.6-98.7%</td>
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<td>positive surgical margins (n= 3)</td>
<td>5% PSM in OPN compared to 1.8% in RPN (n= 1), meta-analysis found less prevalence of positive surgical margin after simple enucleation than standard partial nephrectomy</td>
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<td></td>
<td>Local recurrence</td>
<td>T1 renal mass: 1.8% in RPN, 2.4% on LPN</td>
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<td>Local recurrence in RPN series: 0-6.3% (higher rates were related to inclusion of highly complex renal masses)</td>
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<td>Distant metastases</td>
<td>T1 maximum up to 2%</td>
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<td>Metastase-free survival: OPN: 92.3%, LPN: 96.9% (n= 1), because of higher aggressiveness</td>
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<td>Xia, 2017, Journal of Endourology</td>
<td>Systematic review with meta-analysis</td>
<td>n= 19 cohort studies (8 prospective, 11 retrospective) 2012-2015 Belgium, China, France, Italy, Japan, Korea, Turkey, USA Search date: January 31, 2016</td>
<td>To conduct a systematic review and meta-analysis of the literature on the perioperative outcomes of RPN compared with OPN.</td>
<td>n= 3551 patients</td>
<td>RPN n= 1216</td>
<td>OPN n= 2335</td>
<td>Compared with OPN, RPN had lower rates of postoperative complication (RR= 0.60, 95% CI= 0.46–0.78, p = 0.0002) postoperative minor complication (RR = 0.73, 95% CI = 0.56, 0.96, p = 0.02) less estimated blood loss (p&lt; 0.00001) shorter length of stay (p&lt; 0.00001) longer operative time (p = 0.03)</td>
<td>Compared with OPN, RPN appears to have lower morbidity and achieves similar short-term functional outcomes. Evidence is limited regarding the long-term oncologic outcomes even though the positive surgical margin rate is similar between the two groups.</td>
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<td>Einschluss durch UroEvidenc e</td>
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<tr>
<td>Borghesi, 2018, Clinical Genitourinary Cancer</td>
<td>Matched cohort study</td>
<td>n= 104 2011-2015 Italy</td>
<td>To describe perioperative and early oncological outcomes of patients who underwent retroperitoneal robot-assisted partial nephrectomy, and compare the results with a matched series of patients treated with extraperitoneal nephrectomy</td>
<td>RPN: 20-50 mm  OPN: 25-54 mm</td>
<td>retroperitoneal robot-assisted partial nephrectomy n= 52</td>
<td>extraperitoneal open partial nephrectomy n= 52</td>
<td>No significant difference between the groups (RR 0.87 95% CI 0.56-1.34, p= 0.52)</td>
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Kohortenstudien (mit adjustierten Ergebnissen)

- **Borghesi, 2018, Clinical Genitourinary Cancer**
  - Studien-design: Matched cohort study
  - Studien-charakteristika: n= 104, 2011-2015 Italy
  - Ziel der Studie: To describe perioperative and early oncological outcomes of patients who underwent retroperitoneal robot-assisted partial nephrectomy, and compare the results with a matched series of patients treated with extraperitoneal nephrectomy
  - Patientenmerkmale: RPN: 20-50 mm, OPN: 25-54 mm
  - Intervention: retroperitoneal robot-assisted partial nephrectomy n= 52
  - Kontrolle: extraperitoneal open partial nephrectomy n= 52
  - Ergebnisse: No significant difference between the groups (RR 0.87 95% CI 0.56-1.34, p= 0.52)
  - Authors' conclusion: Retroperitoneal robot-assisted partial nephrectomy offered promising perioperative, early oncological, and functional outcomes, reinforcing the role of robotics as an alternative to open approach for partial nephrectomy.
  - Bemerkungen:  
  - LoE/RoB: 2++
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<thead>
<tr>
<th>Referenz</th>
<th>Studien - design</th>
<th>Studiencharakteristika</th>
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<th>Authors' conclusion</th>
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<td>eal open partial nephrectomy for clinically localized renal tumors.</td>
<td>Robotik: 3 cm (2-4 cm) Open: 3 cm (2-4 cm)</td>
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</table>
### Referenz
Chang, 2018, BJU International

#### Studiendesign
Matched cohort study (multicenter)

#### Studiencharakteristika
- **n= 1308**
- 2006-2012
- South Korea
- **Median follow-up**
  - RPN: 60 mo
  - LPN: 59.8 mo
  - OPN: 64.1 mo

#### Ziel der Studie
To compare outcomes at a 5-year median follow-up among different partial nephrectomy approaches: robot-assisted, laparoscopic and open partial nephrectomy.

#### Patientenmerkmale
- **T1a≥T2a**
- **Mean age**
  - RPN: 53.2 ± 12.3 y
  - LPN: 53.5 ± 13.3 y
  - OPN: 53.8 ±12.9
- **Male**
  - RPN: 50.8%
  - LPN: 56.6%
  - OPN: 54.1%

#### Intervention
- RPN (n= 380)
- LPN (n= 206)
- OPN (n= 722)

#### Kontrolle
- Propensity score-matched patients

#### Ergebnisse
- **Mean estimated blood loss**
  - RPN: 167.7 ± 147 ml
  - LPN: 196.1 ± 142 ml
  - OPN: 206.4 ± 135 ml
  - *p= 0.049*

- **Mean operating time**
  - RPN: 182 ± 68.6 min
  - LPN: 241.9 ± 90 min
  - OPN: 172.5 ± 64 min
  - *p= 0.001*

- **Intraoperative complications**
  - RPN: 4.9%
  - LPN: 7.4%
  - OPN: 3.3%
  - *p= 0.314*

#### Authors‘ conclusion
In the present study, RPN, LPN and OPN had similar local recurrence, distant metastasis and cancer-related death rates at a 5-year median follow-up. In terms of functional outcomes, RPN was associated with a lower incidence of chronic kidney disease upstaging compared with OPN and LPN.

#### LoE/RoB
2+
<table>
<thead>
<tr>
<th>Referenz</th>
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<tr>
<td>Garisto, 2019, Minerva Urol Nefrol</td>
<td>Matched cohort study</td>
<td>n= 385 2007-2016 USA</td>
<td>The aim of this study was to compare the perioperativ e and functional outcomes between RPN and OPN using a cold ischemia technique.</td>
<td>T1a-T3b</td>
<td>RPN</td>
<td>n= 51</td>
<td>OPN</td>
<td>n= 102</td>
<td>Propensity-score matching (1:2)</td>
<td>Cold ischemia technique can be effectively reproduced during RPN, with a potential advantage in terms of blood loss, complications rate and hospital stay over the traditional OPN procedure</td>
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</table>

- **Age**
  - RPN: 57.5 y (46-71 y)
  - OPN: 63 y (54.2-70 y)

- **Male**
  - RPN: 58%
  - OPN: 65%

- **Median operative time**
  - RPN: 215 min (184-238 min)
  - OPN: 202 min (170-231 min)
  - p= 0.212

- **Blood loss**
  - RPN: 100 ml (50-200 ml)
  - OPN: 260 ml (200-350 ml)
  - p< 0.001

- **Postoperative complications**
  - RPN: 19.6%
  - OPN: 37.3%

- **LPN: 0.9%**
- **OPN: 1.6%**
- **p= 0.779**
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<tbody>
<tr>
<td>Golombos, 2017, Journal of Endourology</td>
<td>Matched cohort study</td>
<td>n= 815 2008-2012 USA Mean follow-up 3.2 y</td>
<td>To evaluate the comparative effectiveness of robotic radical nephrectomy compared with laparoscopic radical nephrectomy in regard to hospital charges, nonmetastastic renal-cell carcinoma Grade I-IV Mean tumor size: 4.8cm T1-3</td>
<td>robotic radical nephrectomy n= 230</td>
<td>laparoscopic radical nephrectomy n= 230</td>
<td>Matched cohort OS at 3 years Laparoscopic: 87.9% (82.5-91.7%) Robotic: 88% (82.5-91.9%) p= 0.90</td>
<td>Cancer-specific survival at 3 years</td>
<td>The robotic platform showed no benefit over standard laparoscopy for RN, as we found no difference in oncologic efficacy or adverse event rates. Given escalating medical costs and focusing on reducing low value care, robotic nephrectomy offers no advantage over</td>
<td>2++</td>
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<td>complications, and survival.</td>
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<td>Laparoscopic: 74.2 y</td>
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<td>Laparoscopic: 96.4% (92.9-98.2%)</td>
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<td>Robotic: 73.7 y</td>
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<td>Robotic: 88% (95.1-99.3%)</td>
<td>p= 0.25</td>
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<td>Robotic: 62.2%</td>
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<td>Laparoscopic: 3 days (2-5 days)</td>
<td>p= 0.09</td>
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<td>Robotic: 3 days (2-5 days)</td>
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<td>Robotic: 3 days (2-5 days)</td>
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<td>Laparoscopic: 44161 $ (31175–74020 $)</td>
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<td>Laparoscopic: 44161 $ (31175–74020 $)</td>
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<td>Robotic: 53681 $ (38843–92588 $)</td>
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<td>Robotic: 53681 $ (38843–92588 $)</td>
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Authors' conclusion: standard laparoscopy for patient outcomes.
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<tbody>
<tr>
<td>Golombos, 2017, World journal of urology</td>
<td>Matched cohort study</td>
<td>n= 12569 2001-2012 USA  Follow-up 57.1 mo</td>
<td>To evaluate if the widespread adoption of a minimally invasive approach to radical nephrectomy has affected short- and long-term patient outcomes in the modern era.</td>
<td>Tumor Stage: I-III  Mean age: 74.2 y  Male %: 54%</td>
<td>open surgery n= 1775</td>
<td>minimally invasive surgery n= 1775</td>
<td>Propensity-score matching  Mean length of stay  open: 5.41 (SD 5.61)  minimalinvasiv: 4.45 (SD 4.65)  p&lt; 0.001  Inpatients costs  open: $14125 ($10433–17804)  minimalinvasiv: $14411 ($10782–18428)  p= 0.38  Death  open: 574 (32.36%)  minimalinvasiv: 502 (28.30%)  p&lt; 0.01</td>
<td>After widespread adoption of minimally invasive approaches to radical nephrectomy across the US oncologic standards remain preserved with improved perioperative outcomes at no additional cost burden.</td>
<td>Follow-up einmal als mean und einmal als median beschrieben.</td>
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<td>Referenz</td>
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</table>
| Gu, 2018, BJUI | Matched cohort study | n= 293 2008-2015 China  
Median follow-up  
LPN: 35 mo  
RPN: 20.1 mo | To compare perioperative data, functional and oncological outcomes between laparoscopic partial nephrectomy and robot-assisted partial nephrectomy for renal tumours of >4 cm. | renal tumours of >4 cm  
T1b-T3a  
Median age  
LPN: 50 y (39-59 y)  
RPN: 51 y (41-60 y)  
Male  
LPN: 68.8%  
RPN: 74% | LPN n= 96  
RPN n= 96 | Propensity-score matching  
Operating time  
LPN: 128 min (105-160 min)  
RPN: 133 min (110-174 min)  
p= 0.234  
Estimated blood loss  
LPN: 150 ml (120-200 ml)  
RPN: 100 ml (50-200 ml)  
p<0.001  
Positive surgical margins  
LPN: 1% | For patients with renal tumours of >4 cm, RPN is more favourable than LPN in terms of perioperative outcomes (i.e. estimated blood loss, renal artery clamp time and postoperative hospital stay) and early renal functional preservation. | 2+ |
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<tr>
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<tbody>
<tr>
<td>Jin, 2017, Medicine</td>
<td>Matched cohort study</td>
<td>n= 705 2000-2016</td>
<td>To compare the postoperative numerical</td>
<td>Stage Ia-IIa</td>
<td>LPN n= 142</td>
<td>RPN n= 142</td>
<td>Propensity-score matching</td>
<td>Postoperative pain was not significantly different between patients who</td>
<td>2+</td>
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</tbody>
</table>

Median postoperative hospital stay
- LPN: 7 days (5–8 days)
- RPN: 5 days (5–7 days)
- p<0.001

Intraoperative complication
- LPN: 6.3%
- RPN: 3.1%
- p= 0.497

Postoperative complications
- LPN: 20.8%
- RPN: 18.8%
- p= 0.717
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<tbody>
<tr>
<td>South Korea</td>
<td>Matched cohort study</td>
<td>n = 142 2012-2018 Mean follow-up 61.38 mo (58.11-64.82 mo)</td>
<td>To compare the long-term oncological and functional outcomes of LPN and RPN performed in the treatment of renal tumors.</td>
<td>renal tumor size ≤7 cm</td>
<td>Age</td>
<td>RPN n = 71 LPN n = 71</td>
<td>Propensity-score matching Metastasis-free survival</td>
<td>RPN: 97.1% LPN: 95.8% p= 0.891 CSS RPN: 90.1% LPN: 85.9%</td>
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<td>Age</td>
<td>LPN: 52.5 ±11.2 RPN: 52.1 ±11.0</td>
<td>Male</td>
<td>LPN: 64.8% RPN: 68.3%</td>
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<td>Male</td>
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<td>Kizilay, 2018, The kaohsiung journal of medical sciences</td>
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<td>RPN: 56.4%</td>
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<td>p= 0.71</td>
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<td>LPN: 52.2%</td>
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<td>OS</td>
<td>RPN: 82.6%</td>
<td>LPN: 84.8%</td>
<td>p= 0.561</td>
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<td>Total operative time</td>
<td>RPN: 176 min (154-251 min)</td>
<td>OPN: 158 min (128-211 min)</td>
<td>p= 0.524</td>
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<td>Estimated blood loss</td>
<td>RPN: 210 ml (100-385 ml)</td>
<td>OPN: 240 ml (120-330 ml)</td>
<td>p= 0.225</td>
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<td>Length of hospital stay</td>
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Mean follow-up  
RPN: 34.7 ± 18.7 mo  
OPN: 35.1 ± 19.9 mo | To compare long term post-operational renal function change in patients undergoing RPN and OPN.  
Age  
RPN: 52.9 ± 11.8 y  
OPN: 53.3 ± 11.8 y  
Male  
RPN: 70.2%  
OPN: 68.9% | RPN n= 114  
OPN n= 289  
Propensity matching (n= 84)  
Positive surgical margin  
RPN: 0%  
OPN: 2.4%  
p= 0.155  
Mean operation time  
RPN: 216.9 ± 47.1 min  
OPN: 196.9 ± 40.7 min  
p= 0.004 | Long term postoperative reduction in operated renal function was similar between patients who underwent RPN and those who underwent OPN, even when Tc-99m diethylenetriaminepentaacetic acid renal scintigraphy was used to determine | Zusätzlich aufgenommen  
2++ |
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<tr>
<td>Patel, 2017, Journal of endourology / endourologic al society</td>
<td>Matched cohort study</td>
<td>n= 501 2008-2015 Canada</td>
<td>Median follow-up 21.1 mo</td>
<td>To compare outcomes following laparoscopic renal surgery and open renal surgery</td>
<td>pathologic T3a renal cell carcinoma</td>
<td>Laparoscopic radical and partial nephrectomy n= 226</td>
<td>Open radical or partial nephrectomy n= 226</td>
<td>Mean hospital stay RPN: 7.1 ± 1.4 days OPN: 8.4 ± 2.9 days p&lt; 0.001</td>
<td>Overall complication RPN: 14.3% OPN: 23.8% p= 0.116</td>
<td>Severe complication RPN: 1.2% OPN: 2.4% p= 0.560</td>
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</table>

| Mean mass size | RPN: 2.5 ± 1.0 OPN: 2.7 ± 1.7 |
| Mean hospital stay | RPN: 7.1 ± 1.4 days OPN: 8.4 ± 2.9 days p< 0.001 |
| Overall complication | RPN: 14.3% OPN: 23.8% p= 0.116 |
| Severe complication | RPN: 1.2% OPN: 2.4% p= 0.560 |

This study is the largest matched analysis comparing laparoscopic renal surgery and open renal surgery for pT3a RCC. In matched patients, laparoscopic renal
### Referenz

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**Studien-charakteristika**

**Ziel der Studie**

**Patientenmerkmale**

**Intervention**

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**Ergebnisse**

**Authors' conclusion**

**Bemerkungen**

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<td>Laparoscopic: 23%</td>
<td>Open: 29%</td>
<td>p= 0.09</td>
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<td>Recurrence</td>
<td>Laparoscopic: 72</td>
<td>Open: 83</td>
<td>p= 0.36</td>
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<td>Overall 3y-RFS</td>
<td>Laparoscopic: 63%</td>
<td>Open: 50%</td>
<td>p= 0.36</td>
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<td>Radical nephrectomy 3y-RFS</td>
<td>Laparoscopic: 61%</td>
<td>Open: 46%</td>
<td>p= 0.32</td>
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<td>Partial nephrectomy 3y-RFS</td>
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<tr>
<td>Tachibana, 2018, International Journal of Urology</td>
<td>Matched cohort study</td>
<td>n= 253 2010-2015 Japan</td>
<td>To compare surgical outcomes, including renal function and the preserved renal parenchymal volume, between robot-assisted laparoscopic partial nephrectomy and laparoscopic partial nephrectomy using propensity score-matched analyses.</td>
<td>Mean tumor size 22 mm Mean age 56-57</td>
<td>laparoscopic partial nephrectomy n= 64</td>
<td>robot-assisted laparoscopic partial nephrectomy n= 64</td>
<td>Propensity-score matching Mean operative time LPN: 204 ± 41 min RPN: 186 ± 38 min p= 0.01</td>
<td>Robot-assisted laparoscopic partial nephrectomy allows to achieve better preservation of renal function and parenchymal volume than laparoscopic partial nephrectomy.</td>
<td>Follow-up-Zeit signifikant unterschiedlich</td>
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Laparoscopic: 77% Open: 79% p= 0.82
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<tbody>
<tr>
<td>Takagi, 2017, International Journal of Urology</td>
<td>Matched cohort study</td>
<td>n= 163 Japan 2012-2015</td>
<td>To compare surgical outcomes between robot-assisted laparoscopic partial nephrectomy and open partial nephrectomy in patients with chronic T1–2 RCC eGFR between 30 and 60 mL/min/1.73m²  Mean age RPN: 67±8.7 y OPN: 67±9.8 y</td>
<td>T1–2 RCC eGFR between 30 and 60 mL/min/1.73m²  Mean age RPN: 67±8.7 y OPN: 67±9.8 y</td>
<td>RPN n= 40</td>
<td>OPN n= 40</td>
<td>Overall perioperative complications  LPN: 23%  RPN: 16%  p= 0.26  Postoperative length of hospital stay  LPN: 6.3 ± 4.7 days  RPN: 5.5 ± 4.7 days  p= 0.3</td>
<td>After propensity score-matching  Mean operation time  RPN: 194±37 min  OPN: 190±46 min  p= 0.3682  Mean estimated blood loss  RPN: 104±221 ml  OPN 185±200 ml</td>
<td>Robot-assisted laparoscopic partial nephrectomy and open partial nephrectomy provide similar outcomes in terms of functional preservation and perioperative complications among patients with chronic kidney disease. A lower estimated blood loss and shorter</td>
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<tr>
<td>Wang, 2017, World Journal of Urology</td>
<td>Matched cohort study</td>
<td>n= 380 2007-2014 China Median follow-up RPN: 49 mo (12-86 mo)</td>
<td>To compare the surgical, functional and oncological outcomes of patients undergoing robotic partial nephrectomy or open</td>
<td>Male RPN: 75% OPN: 78% Tumor size RPN: 32±10 mm OPN: 30±9.8 mm</td>
<td>RPN n= 190</td>
<td>OPN n= 190</td>
<td>p= 0.0025 Surgical margin negative RPN: 100% OPN: 98% p= 0.3143 Mean postoperative length of hospital stay RPN: 4.1±0.7 days OPN: 7.2±6.9 days p&lt; 0.0001</td>
<td>postoperative length of hospital stay can be obtained with robot-assisted laparoscopic partial nephrectomy. RPN provides acceptable and comparable results in terms of perioperative, functional and oncological outcomes compared to OPN for complex renal tumors with RENAL score ≥7. RPN is a less</td>
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<td>OPN: 52 mo (12-90 mo)</td>
<td>partial nephrectomy for moderately or highly complex tumors (RENAL nephrometry score ≥7).</td>
<td>RPN: 61.8 (SD 12.3) y</td>
<td></td>
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<td>Estimated blood loss</td>
<td>RPN: 196.8 (SD 64.3) ml</td>
<td>invasive approach with the benefit of shorter length of hospital stay, less EBL and lower rate of postoperative complications.</td>
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<td>OPN: 59.8 (SD 11.8) y</td>
<td>Male patients</td>
<td>RPN: 73.2%</td>
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<td>OPN: 240.8 (SD 73.6) ml</td>
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<td></td>
<td></td>
<td>OPN: 69.5%</td>
<td>Tumor size</td>
<td>RPN: 3.8 (SD 2.1) cm</td>
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<td>p&lt; 0.001</td>
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<td>OPN: 3.6 (SD 2.1) cm</td>
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<td>Mean hospital stay</td>
<td>RPN: 7.8 (SD 2.1) days</td>
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<td>OPN: 9.2 (SD 3.8) days</td>
<td>p&lt; 0.001</td>
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<td>Mean direct cost</td>
<td>RPN: 11,872 (SD 809) $</td>
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<td>OPN: 5153 (SD 408) $</td>
<td>p&lt; 0.001</td>
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<td>Positive surgical margin</td>
<td>RPN: 1.6%</td>
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<td></td>
<td>OPN: 4.2%</td>
<td>p= 0.221</td>
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<td>Yerram, 2018, Journal of Endourology</td>
<td>Matched cohort study</td>
<td>n= 110 2009-2016 USA Median functional data follow-up Open: 22.1 mo (1.9-35.4 mo) Robotic: 7.5 mo (0.8-19.8 mo)</td>
<td>To report a comparative analysis of outcomes in patients who underwent multiple excisions for unilateral synchronous multifocal renal tumors using both open and robotic approaches.</td>
<td>clinically localized multifocal renal cell carcinoma Renal cell carcinoma Open: 89.2% Robotic: 88.1% Male</td>
<td>Open n= 42</td>
<td>Robotic n= 68</td>
<td>Intraoperative complications RPN: 5.3% OPN: 7.4% p= 0.398 Postoperative complications RPN: 15.8% OPN: 28.9% p= 0.002</td>
<td>Propensity-weighted adjustment Trifecta Robot: 14.7% Open: 17.0% p= 0.83 Negative margins Robot: 80% Open: 79.4% p= 0.95</td>
<td>Our analysis found that both open and robotic approaches to partial nephrectomy are equally likely to achieve the “trifecta” outcome in an equilibrated high-risk group of patients. The robotic approach for these complex patients may be safe and feasible for</td>
<td>2+</td>
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<td>Open: 80.7%</td>
<td></td>
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<td>Absence of complications</td>
<td>a carefully selected group of patients.</td>
<td>at last follow-up.</td>
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<td>Laparoscopic: 67.9%</td>
<td></td>
<td></td>
<td>Robotic: 67.6% Open: 62.8% p= 0.70</td>
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<td>Follow-up Zeit ist stark unterschiedlich.</td>
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<td>Mean length of stay Robotic: 3.7 days Open: 5 days p&lt; 0.001</td>
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<td>Estimated blood loss Robotic: 280 ml Open: 357 ml p= 0.33</td>
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<td>Operative time Robotic: 224 min Open: 221 min p= 0.86</td>
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**Authors’ conclusion**:

Absence of complications
- Robotic: 67.6%
- Open: 62.8%

Mean length of stay
- Robotic: 3.7 days
- Open: 5 days

Estimated blood loss
- Robotic: 280 ml
- Open: 357 ml

Operative time
- Robotic: 224 min
- Open: 221 min

p-values:
- 0.70
- < 0.001
- 0.33
- 0.86
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<th>Bemerkungen</th>
<th>LoE/RoB</th>
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</table>
| Zhao, 2018, Urology | Matched cohort study | n= 383 2012-2016 China | To compare perioperative results and early oncological outcomes of endoscopic robot-assisted simple enucleation and laparoscopic simple enucleation by using a propensity score-matched analysis. | Mean age  
Endoscopic: 55.6 ± 13.7 Y  
Robotic: 55.5 ± 13.4 Y  
Male  
Endoscopic: 57.4%  
Robotic: 59.4%  
Tumor size  
Endoscopic: 3.8 ± 1.6 cm  
Robotic: 3.9 ± 1.5 cm | Endoscopic robot-assisted simple enucleation  
n= 101 | Laparoscopic simple enucleation  
n= 101 | Recurrence  
Robotic: 2/68  
Open: 3/42 | Propensity-score matching  
Operative time  
Endoscopic: 171.9 ± 50.1 min  
Robotic: 188.2 ± 45.1 min  
p= 0.016  
Estimated blood loss  
Endoscopic: 167.7 ± 116 ml  
Robotic: 183.3 ± 104.3 ml  
p= 0.315  
Length of stay  
Endoscopic: 8.2 ± 2.1 days  
Robotic: 8.2 ± 3.9 days | Endoscopic robot-assisted simple enucleation is a safe and acceptable alternative to laparoscopic simple enucleation. Endoscopic robot-assisted simple enucleation appears to confer shorter operative time, shorter warm ischemic time and lower rate of intraoperative complication. | 2+ |
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<th>Authors' conclusion</th>
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<td>p = 0.964</td>
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<td>Robotic: 8.9%</td>
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<td>p = 0.03</td>
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<td>Endoscopic: 8.9%</td>
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<td>Robotic: 12.9%</td>
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<td>Robotic: 3%</td>
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<td>p = 0.614</td>
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<td>Local recurrences</td>
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<td>Endoscopic: 0%</td>
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<td>Robotic: 2%</td>
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<tr>
<td>Abdel Raheem, 2019, Journal of Laparoendoscopic &amp; Advanced Surgical Techniques</td>
<td>Retrospective cohort study</td>
<td>n= 89 2005-2015</td>
<td>To compare outcomes between RAPN and OPN cohorts.</td>
<td>T1a-b Clinical tumor size RPN: 2.8 ± 1.3 cm OPN: 2.5 ± 1.1 Mean age RPN: 49.8 ± 11.7 y OPN: 50.9 ± 10.3 y</td>
<td>RPN n= 52</td>
<td>OPN n= 37</td>
<td>Metastasis Endoscopic: 2% Robotic: 2% p= 0.477</td>
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Kohortenstudien

- Design: Retrospective cohort study
- Number: n= 89, 2005-2015
- Median follow-up:
  - RPN: 59 mo (30-73 mo)
  - OPN: 53 mo (43-71 mo)
- Objective: To compare outcomes between RAPN and OPN cohorts.
- Clinical tumor size:
  - RPN: 2.8 ± 1.3 cm
  - OPN: 2.5 ± 1.1
- Mean age:
  - RPN: 49.8 ± 11.7 y
  - OPN: 50.9 ± 10.3 y
- Results:
  - Total operative time:
    - RPN: 170 min (132-219 min)
    - OPN: 161 min (131-226 min)
    - p= 0.774
  - Estimated blood loss:
    - RPN: 300 ml (100-550 ml)
    - OPN: 200 ml (100-500 ml)
    - p= 0.435
- Conclusion: RPN is a safe and feasible option for treatment of totally endophytic renal tumors. Despite the increased prevalence of high tumor complexity and lower baseline renal function in the RPN group, it achieved equivalent long-term oncologic control and functional outcome compared to OPN.
- Level of Evidence/ Risk of Bias: 2+
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<td></td>
<td>Male</td>
<td>Male</td>
<td>Hospital stay</td>
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<td>RPN: 71.2%</td>
<td>OPN: 56.8%</td>
<td>RPN: 4.6 ± 1.8 days</td>
<td>OPN: 5.1 ± 2.3 days</td>
<td>p = 0.154</td>
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<td>Local recurrence</td>
<td>RPN: 1</td>
<td>Local recurrence</td>
<td>RPN: 2</td>
<td>p = 0.577</td>
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<td>Distant metastasis</td>
<td>RPN: 1</td>
<td>Distant metastasis</td>
<td>RPN: 1</td>
<td>p = 0.854</td>
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<td>5y-Metastasis-free survival</td>
<td>5y-Metastasis-free survival</td>
<td>97.1%</td>
<td>p = 0.822</td>
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<td>5y-PFS</td>
<td>5y-PFS</td>
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<tr>
<td>Abdelhafez, 2017, Anticancer Research</td>
<td>Retrospective cohort study</td>
<td>n= 356 2005-2012 Germany</td>
<td>To analyse perioperativen functional outcomes, primarily defined as the intraoperative and postoperative complication</td>
<td>Laparoscopic group</td>
<td>laparoscopic partial nephrectomy n= 186</td>
<td>open surgery n= 170</td>
<td>Mean operative time</td>
<td>Mean blood loss</td>
<td>Use of LPN is associated with favorable tumor characteristics. Although no advantage was shown for LPN for tumors with higher complexity (PADUA&gt;8), this large series confirmed the</td>
<td>2+</td>
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</tbody>
</table>

|  |  |  |  |  |  |  | RPN: 94% | OPN: 95.8% | p= 0.781 |
|  |  |  |  |  |  |  | 5y-CSS | RPN: 100% | OPN: 93.8% | p= 0.102 |
|  |  |  |  |  |  |  | 5y-OS | RPN: 95.5% | OPN: 93.8% | p= 0.796 |

5y-OS: 95.5%  
5y-CSS: 100%  
5y-OS: 95.5%  
5y-CSS: 100%  
Mean operative time: LPN: 142 min, OPN: 160.2 min, p<0.01  
Mean blood loss: LPN: 244 ml, OPN: 370 ml  
Use of LPN is associated with favorable tumor characteristics. Although no advantage was shown for LPN for tumors with higher complexity (PADUA>8), this large series confirmed the
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|          |                |                        | rate, at a large single-center comparison between laparoscopic and open nephron-sparing surgery. | Open group | Mean age: 61.3 y Male:Female: 1.7:1 Mean PADUA score: 7.7 |           | p= 0.02 | Intraoperative complications LPN: 4.3% OPN: 8.2% p= 0.95 | Superiority of LPN for imperative indication or multifocal tumors. |}

Intraoperative complications
LPN: 4.3%
OPN: 8.2%
p= 0.95

Postoperative complications
LPN: 18.8%
OPN: 32.9%
p<0.01

Hospital stay
LPN: 6.5 days
OPN: 8.6 days
p<0.01

Subgroup analysis of PADUA >8 tumors (n=85) showed no significant difference between LPN and OPN.
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</table>
| Alimi, 2018, Journal of Laparoendoscopic & Advanced Surgical Techniques | Prospective cohort study | n= 100 2013-2016  
Median follow-up  
RPN: 19 mo (1-33 mo)  
LPN: 14 mo (1-48 mo) | To compare the short-term outcomes of robot-assisted partial nephrectomy and laparoscopic partial nephrectomy when performed by highly experienced surgeons. | T1-2  
Mean age  
LPN: 63.8 y  
RPN: 57.6 y | LPN  
n= 50 | RPN  
n= 50 | Operative time  
RPN: 134 min (±4.9 min)  
LPN: 146.6 min (± 4.9 min)  
p= 0.10  
Postoperative complications  
RPN: 32%  
LPN: 38%  
p= 0.53 | In this series, perioperative and short-term oncological and functional outcomes appeared broadly comparable between RPN and LPN when performed by highly experienced surgeons. | | 2+ |
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<td>Positive surgical margins</td>
<td>RPN: 1</td>
<td>LPN: 3</td>
<td>p= 0.36</td>
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<td></td>
<td>Length of stay</td>
<td>RPN: 3.6 (±0.3)</td>
<td>LPN: 4.6 (±0.3)</td>
<td>p= 0.01</td>
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<td>1y-RFS</td>
<td>RPN: 94.7%</td>
<td>LPN: 88.9%</td>
<td>p= 0.89</td>
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<td></td>
<td>1y-CSS</td>
<td>RPN: 100%</td>
<td>LPN: 100%</td>
<td>1y-OS</td>
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<tr>
<td>Anele, 2019,</td>
<td>Retrospektive cohort study</td>
<td>n= 941 2004-2017</td>
<td>To compare the outcomes of robotic radical nephrectomy to those of laparoscopic radical nephrectomy for large renal masses.</td>
<td>≥ cT2 renal masses M0-M1 cN0-1 Age: 63 y (56-71 y) Male: 69.2% Clinical size: 8.6 cm (7.8-10.0 cm)</td>
<td>Radical robotic nephrectomy</td>
<td>Laparoscopic radical nephrectomy n= 404</td>
<td></td>
<td>RPN: 97.4% LPN: 98.6% p= 0.38</td>
<td>The two procedures seem to offer similar perioperative outcomes. Radical robotic nephrectomy has been increasingly utilized, especially in the setting of more advanced and surgically challenging disease without increasing the risk of perioperative complications.</td>
<td>Follow-up-Zeit signifikant unterschiedlich</td>
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<td>Robotic: 3 days (2-4 days)</td>
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<td>Laparoscopic: 5 days (4-7 days)</td>
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<td>p &lt; 0.001</td>
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Authors' conclusion

Bemerkungen

LoE/RoB
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<th>Studien­charakteristika</th>
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<th>Authors’ conclusion</th>
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<tr>
<td>Benoit, 2018, Clinical Genitourinary Cancer</td>
<td>Retrospective cohort study</td>
<td>n = 57 2014-2017 France</td>
<td>To compare the short­term oncological and functional outcomes of LPN after selective embolization of tumor blood vessels in a hybrid operating room with those of RPN.</td>
<td>Mean age LPNE: 61.3 y (SD 5.85 y)  RPN: 61.9 y (SD 5.33 y)  Male/female ratio LPNE: 1.3/1  RPN: 3.1  Mean tumor size LPNE: 3.29 cm (SD 0.73 cm)</td>
<td>LPNE n = 57  RPN n = 48</td>
<td>Mean surgery time LPNE: 150 min (SD 19 min)  RPN: 195 min (SD 21 min)  P &lt; 0.001  Mean estimated blood loss LPNE: 185 ml (SD 116 ml)  RPN: 354 ml (SD 316 ml)  p = 0.04  Median length of stay LPNE: 3 days (3-4 days)</td>
<td>No difference was found in OS between groups (p= 0.06). There was a higher disease­free survival among patients undergoing laparoscopic radical nephrectomy.</td>
<td>The short­term oncological and functional outcomes for LPNE were comparable with those for RAPN.</td>
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<td>Blair, 2018, Annals of Surgical Oncology</td>
<td>Retrospective cohort study</td>
<td>n= 470 1998-2015 Follow-up 30 days</td>
<td>The purpose of the study was to evaluate the accuracy of the American College of Surgeons NSQIP Surgical Risk Calculator for predicting risk-adjusted 30-day outcomes for patients undergoing partial nephrectomy for renal cell carcinoma</td>
<td>RPN: 3.55 cm (SD 0.7 cm)</td>
<td>Open partial nephrectomy n= 209</td>
<td>Minimal invasive partial nephrectomy n= 261 (n= 111 laparoscopic, n= 150 robot-assisted)</td>
<td>RPN: 4 (3-5 days) p= 0.08</td>
<td>Open partial nephrectomy (n= 209) Severe complications Observed: 8.13% Predicted: 8.28% p= 0.144 Overall complications Observed: 11.94% Predicted: 23.44% p &lt; 0.001 Length of stay Observed: 4.5 days Predicted: 4.1 days p &lt; 0.001 Death Observed: 0.48%</td>
<td>The American College of Surgeons NSQIP Surgical Risk Calculator had significant discrepancies among observed and predicted outcomes. Additional analyses confirmed these differences remained significant irrespective of surgical approach. These findings emphasize the need for urologic oncology-specific calculators to better predict surgical outcomes in this complex patient population.</td>
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<td>Predicted: 5.01%</td>
<td>p &lt; 0.001</td>
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<td>Predicted: 0.44%</td>
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<td>Predicted: 2.68%</td>
<td>Observed: 2.68%</td>
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<td>Predicted: 11.49%</td>
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<td>Observed: 11.49%</td>
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<td>Observed: 6.93%</td>
<td>Predicted: 6.93%</td>
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<td>Observed: 3.11 days</td>
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<td>Observed: 6.93%</td>
<td>Predicted: 11.49%</td>
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Minimalinvasive partial nephrectomy (n= 261)
Severe complications

Overall complications

Length of stay

Death

Authors' conclusion

Bemerkungen

LoE/RoB
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<td>Pure laparoscopic (n=111)</td>
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<td>Severe complications</td>
<td>Observed: 1.8%</td>
<td>Predicted: 5.05%</td>
<td>p &lt; 0.001</td>
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<td>Overall complications</td>
<td>Observed: 15.23%</td>
<td>Predicted: 6.88%</td>
<td>p &lt; 0.001</td>
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<td>Overall complications</td>
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<td>p &lt; 0.001</td>
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<td>Bragayrac, 2016, Journal of Endourology</td>
<td>Retrospective cohort study</td>
<td>n= 172 1998-2015 Median follow-up 32.8 mo (0-138 mo)</td>
<td>We compare oncologic outcomes of minimally invasive and open nephrectomy for locally advanced kidney cancer.</td>
<td>pT3-4 Pathologic size: 8.5 Median age Open: 62 y Minimal invasive: 65 y Male Open: 69.5% Minimal invasive: 55.2%</td>
<td>minimally invasive nephrectomy (laparoscopic and robotic) n= 67</td>
<td>open nephrectomy n= 105</td>
<td>Predicted: 0.23% p &lt; 0.001</td>
<td>Mean estimated blood loss Open: 1423.79 Minimal invasive: 277.42 p&lt; 0.001 Mean surgery duration Open: 213.45 min Minimal invasive: 231.66 min p= 0.033 Mean length of stay Open: 5.67 days Minimal invasive: 3.55 days p&lt; 0.001 Complications</td>
<td>Minimal invasive nephrectomy is a safe approach with similar oncologic outcomes to open nephrectomy for select patients with locally advanced RCC.</td>
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<td>Open: 37.1%</td>
<td>Minimalinvasive: 23.9%</td>
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<td>Positive margins</td>
<td>Open: 17.6%</td>
<td>Minimalinvasive: 12.1%</td>
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<td>3-y OS</td>
<td>Open: 0.68 (0.57-0.77)</td>
<td>Minimalinvasive: 0.68 (0.54-0.78)</td>
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<td>5-y OS</td>
<td>Open: 0.42 (0.29-0.54)</td>
<td>Minimalinvasive: 0.48 (0.33-0.61)</td>
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<td>Median OS</td>
<td>Open: 28.4 (17.1-46.9)</td>
<td>Minimalinvasive: 32.2 (14.6-66.5)</td>
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<td>Ebbing, 2019, BMC</td>
<td>Retrospektive cohort study</td>
<td>n= 444 1999-2010 Germany</td>
<td>To investigate the relative short- and long-term changes in estimated glomerular filtration rate after ischaemic or zero-ischaemic open and laparoscopic NSS for RCC, and to analyse prognostic factors for postoperative acute kidney injury and chronic kidney disease stage ≥3.</td>
<td>T1a-T4 M0</td>
<td>Laparoscopic nephron-sparing surgery n= 211</td>
<td>Zero-ischaemic open nephron-sparing surgery n= 233</td>
<td>Operative time in min</td>
<td>Ischaemia time is a significant risk factor for acute kidney injury. The short-term effect of ischaemia time is not always linear, and the impact also depends on baseline estimated glomerular filtration rate. Unlike LNSS, ONSS is associated with the development of acute kidney injury. Our findings are helpful for surgical planning, and suggest either the application of a clampless nephron-sparing surgery technique or at least the shortest possible ischaemia time to reduce the risk of short-term impairment of the renal function, which might prevent acute kidney injury,</td>
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<td>Latest recorded follow-up 50 mo (35-81 mo)</td>
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<td>Age 63 y (54-68 y)</td>
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<td>Estimated intraoperative blood loss in ml</td>
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<td>Sex m/f 74.5%/25.5%</td>
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<td>LNSS (n=49): 150 (50-425)</td>
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<td>ONSS (n=39): 400 (200-800)</td>
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<td>LNSS: 16.1%</td>
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<td>ONSS: 12.9%</td>
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<td>p = 0.33</td>
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<td>Postoperative complications</td>
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<td>Referenz</td>
<td>Studien -design</td>
<td>Studien -charakteristika</td>
<td>Ziel der Studie</td>
<td>Patienten -merkmale</td>
<td>Intervention</td>
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<td>Authors‘ conclusion</td>
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<tr>
<td>Garisto, 2018, Urol Oncol</td>
<td>Retrospective cohort study</td>
<td>n= 297 2006-2016 Median follow-up 25 mo (7-43 mo)</td>
<td>We aimed to compare perioperative, functional and oncological outcomes between robot-assisted partial nephrectomy and open partial nephrectomy for highly complex renal tumors.</td>
<td>RENAL score &gt;9  T1a-T2b  Age OPN: 60.7 y (SD 11.2 y)  RPN: 59.8 (SD 12.1 y)  Male OPN: 57.9%  RPN: 61.6%</td>
<td>OPN n= 76  RPN n= 203</td>
<td>Blood loss OPN: 300 ml (200-500 ml)  RPN: 200 ml (100-350 ml) p&lt; 0.001</td>
<td>Operative time OPN: 213.5 min (178-244 min)  RPN: 208 min (170-262 min) p= 0.757</td>
<td>In our large single-institutional series of patients who underwent partial nephrectomy for highly complex renal tumors, robotic approach appeared to be a valuable alternative to OPN, with the advantages of reduced blood loss, ischemia time, transfusions rate, and length of stay.</td>
<td>Zusätzlich aufgenommen</td>
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</table>

LNSS: 23.2%  ONSS (n=39): 39.1% p< 0.001  
Hospitalization in days  LNSS: 6 (5-8)  ONSS: 8 (6-10) p< 0.001  
particulary regarding patients with baseline estimated glomerular filtration rate category ≥G3.
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<th>Referenz</th>
<th>Studiendesign</th>
<th>Studiencharakteristika</th>
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<td>OPN: 5 days (4-5.5 days)</td>
<td>RPN: 3 days (3-4 days)</td>
<td>p &lt; 0.001</td>
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<td>Overall postoperative complications</td>
<td>OPN: 42%</td>
<td>RPN: 28.1%</td>
<td>p = 0.027</td>
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<td>Minor complications</td>
<td>OPN: 30.2%</td>
<td>RPN: 21.2%</td>
<td>p = 0.116</td>
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<td>Major complications</td>
<td>OPN: 11.8%</td>
<td>RPN: 6.9%</td>
<td>p = 0.186</td>
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<td>Hamilton, 2018, World Journal of Urology</td>
<td>Retrospective cohort study</td>
<td>n= 728 2002-2015 Italy, USA Mean follow up 33.3 ± 11.9 mo</td>
<td>To compare perioperativ e and renal functional outcomes of OPN vs. RPN in patients with pre-existing chronic kidney disease. cT1a ≥ cT2+ baseline chronic kidney disease: Stage 3a ≥ 4a Mean age OPN: 66.8 ± 10.3 y RPN: 67.4 ± 10.1 y</td>
<td>OPN n= 426</td>
<td>RPN n= 302</td>
<td>Median estimated blood loss OPN: 200 ml (150-350 ml) RPN: 100 ml (50-175 ml) p&lt; 0.001 Positive margins OPN: 3.3% RPN: 5% p= 0.256</td>
<td>Positive surgical margins OPN: 14.9% RPN: 10% p= 0.497 Overall actuarial rate of recurrence or metastasis RPN: 3.95% OPN: 4.43%</td>
<td>RPN and OPN demonstrated similar renal functional outcomes when stratified by tumor complexity group. Increasing tumor age and tumor complexity were primary drivers associated with functional decline. RPN provides similar renal functional outcomes to OPN in 2+</td>
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<tr>
<td>Han, 2017, Journal of Endourology</td>
<td>Retrospektive cohort study</td>
<td>n= 590 South Korea 2011-2014</td>
<td>To evaluate the validity of hand-assisted laparoscopic partial nephrectomy for small renal masses, patients who underwent hand-assisted laparoscopic partial</td>
<td>Male</td>
<td>hand-assisted laparoscopic partial nephrectomy (n= 89) robot-assisted laparoscopic partial nephrectomy (n= 147) open partial nephrectomy (n= 354)</td>
<td>Operative time</td>
<td>Hand-assisted laparoscopic partial nephrectomy associated with shorter operative and convalescence times compared with open partial nephrectomy. hand-assisted laparoscopic partial nephrectomy was generally not inferior to robot-assisted laparoscopic partial</td>
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<td>Male</td>
<td>OPN: 70.2% RPN: 64.9%</td>
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<td>30 days complications</td>
<td>OPN: 20.2% RPN: 16.2% p= 0.208</td>
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<td>Median length of hospital days</td>
<td>OPN: 5 (4-6) RPN: 3 (2-4) p&lt; 0.001</td>
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<td>Length of hospitalization</td>
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<tr>
<td>Harke, 2018, J Surg Oncol</td>
<td>Retrospective cohort study</td>
<td>n= 140 2008-2016 Germany</td>
<td>To compare the outcomes of robot- assisted and open partial nephrectomy for completely endophytic renal tumors.</td>
<td>completely endophytic tumors</td>
<td>OPN n= 76</td>
<td>RPN n= 64</td>
<td>Laparoscopic: 5.9 days (SD 1.6 days) Robotic: 5.3 days (SD 1.41 days) Open: 7.3 days (SD 2.06 days) p&lt; 0.0001 Postoperative complications Laparoscopic: 4.49% Robotic: 3.4% Open: 7.91% p= 0.13</td>
<td>nephrectomy in terms of perioperative outcomes, although it associated with a longer convalescence.</td>
<td>For entirely endophytic tumors, both RPN and OPN offer good TRIFECTA achievement. This encourages the use of nephron sparing surgery even for these highly complex tumors using the surgeon’s preferred approach.</td>
<td>2+</td>
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### Referenz: Helmers, 2016, Can J Urol

<table>
<thead>
<tr>
<th>Studien-design</th>
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<th>Patientenmerkmale</th>
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<th>Bemer- kungen</th>
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</thead>
</table>
| Retrospektive cohort study | n= 319 | We analyzed perioperatives outcomes and hospital charge difference among patients undergoing laparoscopic radical nephrectomy and robotic radical nephrectomy. | Male  
OPN: 60.5%  
RPN: 68.8%  
Clinical tumor size  
OPN: 25 mm (19-32 mm)  
RPN: 26 mm (20-31 mm) | robotic radical nephrectomy  
n= 76 | laparoscopic radical nephrectomy  
n= 243 | RPN: 21.9%  
p= 0.91  
Severe complication  
OPN: 11.8%  
RPN: 10.9%  
p= 0.87 | Robotic radical nephrectomy appears to be a clinically equivalent alternative to laparoscopic radical nephrectomy with similar perioperative outcomes, albeit at greater hospital charges. | Zusätzlich aufgenommen 2+ |

| Male  
OPN: 60.5%  
RPN: 68.8%  
Clinical tumor size  
OPN: 25 mm (19-32 mm)  
RPN: 26 mm (20-31 mm) | Male  
64.6% | cT1a-3b  
pN0-1  
Age  
63 y (52.9-70.3 y) | Operative time  
Laparoscopic: 136 min (108-167 min)  
Robotic assisted: 139 min (112-167 min)  
p= 0.513  
Estimated blood loss  
Laparoscopic: 50 ml (50-100 ml)  
Robotic assisted: 100 ml (50-150 ml)  
p= 0.041 |
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<td>Intraoperative complications</td>
<td>Laparoscopic: 2.8%</td>
<td>Robotic assisted: 2%</td>
<td>p = 0.650</td>
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<td>Postoperative complications</td>
<td>Laparoscopic: 19%</td>
<td>Robotic assisted: 5.6%</td>
<td>p = 0.273</td>
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<td>Length of stay</td>
<td>Laparoscopic: 2 days (2-3 days)</td>
<td>Robotic assisted: 2 days (2-3 days)</td>
<td>p = 0.745</td>
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<td>Total charges</td>
<td>Laparoscopic: $14,913 ($12,107-$18,486)</td>
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### Referenz: Jelley, 2017, *Journal of Clinical Urology*

**Studien-Design**: Prospektive cohort study

**Studien-Charakteristika**:
- **n** = 159
- **United Kingdom** 2010-2015
- **Follow-up period**
  - OPN: 18-84 mo
  - RPN: 3-34 mo

**Ziel der Studie**: To compare robotic partial nephrectomy with open partial nephrectomy to assess efficacy and impact of learning curve.

<table>
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<tr>
<th>Resultantenmerkmale</th>
<th>OPN</th>
<th>RPN</th>
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<tbody>
<tr>
<td><strong>Mean age</strong></td>
<td>59 y (27-86 y)</td>
<td>61 y (24-79 y)</td>
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<tr>
<td><strong>Mean tumor size</strong></td>
<td>34 mm (10-90 mm)</td>
<td>30 mm (12-66 mm)</td>
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</table>

**Intervention**: OPN

**Kontrolle**: RPN

**Ergebnisse**:
- **Overall complication rate**
  - OPN: 14.6%
  - RPN: 13%
  - p = 0.8
- **Grade III complications**
  - OPN: 3.7%
  - RPN: 6.5%
  - p = 0.5
- **Median estimated blood loss**
  - OPN: 3.7%
  - RPN: 3.9%
  - p < 0.001
- **Median length of stay**

**Authors’ conclusion**: RPN is superior to OPN in terms of reduced hospital stay and estimated blood loss without compromising oncological outcomes.

**Bemerkungen**: Einschluss durch UroEvidenc

**LoE/RoB**: 2+
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<th>Authors' conclusion</th>
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<tbody>
<tr>
<td>Jeong, 2017, JAMA</td>
<td>Retrospektive cohort study</td>
<td>n= 23753 2003-2015 USA</td>
<td>To examine the trend in use of robotic-assisted operations for radical nephrectomy in the United States and to compare the perioperative outcomes and costs with laparoscopic radical nephrectomy</td>
<td>Mean age: 61.4 y, Male: 58%</td>
<td>laparoscopic radical nephrectomy n= 18573</td>
<td>robotic-assisted radical nephrectomy n= 5180</td>
<td>Adjusted outcomes&lt;br&gt;Any postoperative complication&lt;br&gt;Laparoscopic: 23.4%, Robotic: 22.2%, RR: 0.95 (95%CI 0.78 to 1.15)&lt;br&gt;Major postoperative complications&lt;br&gt;Laparoscopic: 3.8%, Robotic: 3.5%, RR: 0.93 (95%CI 0.75 to 1.16)</td>
<td>The use of robotic-assistance was not associated with increased risk of any or major complications but was associated with prolonged operating time and higher hospital costs compared with laparoscopic surgery.</td>
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<td>Referenz</td>
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<tr>
<td>Kara, 2016, BJUI</td>
<td>Retrospektive</td>
<td>n= 143 USA</td>
<td>To compare outcomes between robot-</td>
<td>completely endophytic</td>
<td>RPN n= 87</td>
<td>OPN n= 56</td>
<td>Mean intraoperative time</td>
<td>For completely endophytic renal tumours, both OPN and RPN have</td>
<td>Einschluss durch</td>
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**Operating time (>4 hours)**
- Laparoscopic: 25.8%
- Robotic: 46.3%
- RR: 1.79 (95% CI 1.52 to 2.11)

**Length of hospital stay (>4 days)**
- Laparoscopic: 24.7%
- Robotic: 24.2%
- RR: 0.98 (95% CI 0.86 to 1.11)

**90-day direct hospital costs**
- Laparoscopic: $16851
- Robotic: $19530
- difference: $2678 (95% CI $838 to $4519)
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<tbody>
<tr>
<td>cohort study</td>
<td>2011-2016 cohort study</td>
<td>2011-2016 cohort study</td>
<td>assisted partial nephrectomy and open PN for completely endophytic renal tumours.</td>
<td>renal tumours</td>
<td>RPN: 185 min (SD 60.3 min)</td>
<td>OPN: 206 min (SD 63.1 min)</td>
<td>positive margin when performed by experienced surgeons at a high-volume centre. For skilled robotic surgeons, RPN is a safe and effective alternative to OPN with the advantages of shorter length of stay and less blood loss.</td>
<td>UroEvidenc e</td>
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<tr>
<td>Khan, 2019, Journal of Minimal Access Surgery</td>
<td>Prospective cohort study</td>
<td>n= 60 2012-2014 India</td>
<td>To analyse the feasibility of laparoscopic radical nephrectomy for renal tumours &gt;7 cm and to renal tumours &gt;7 cm</td>
<td>laparoscopic radical nephrectomy n= 30</td>
<td>open radical nephrectomy n= 30</td>
<td>Overall postoperative complications</td>
<td>RPN: 20.7%</td>
<td>OPN: 35.7%</td>
<td>p= 0.08</td>
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<td>Major postoperative complications</td>
<td>RPN: 4.5%</td>
<td>OPN: 8.9%</td>
<td>p= 0.85</td>
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<td>No local recurrence or metastasis during follow-up in both groups.</td>
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<td></td>
<td>Recurrence-free survival</td>
<td>Open: 90%</td>
<td>Laparoscopic: 93.3%</td>
<td>p= 0.63</td>
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<td>Mean operative time</td>
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<td>Referenz</td>
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<tr>
<td>Kim, 2019, PLoS ONE</td>
<td>Retrospective cohort study</td>
<td>n= 149 2003-2017 South Korea</td>
<td>To compare the outcomes of RPN with those of T1a≥T2 patients with open partial nephrectomy n= 64</td>
<td>robotic partial nephrectomy</td>
<td>Median operation time</td>
<td>RPN performed in patients with highly complex renal tumors offers perioperative,</td>
<td>Medianes follow-up ist in beiden Gruppen 2+</td>
<td>2+</td>
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**Laparoscopic:**
- 17.5 mo

**Compare the operative and oncologic outcomes with open radical nephrectomy.**

**Male**
- Open: 63.3%
- Laparoscopic: 53.3%

**Open:**
- 163.6 ± 46.35 min
- Laparoscopic: 187.5 ± 48.49 min

**Mean hospital stay**
- Open: 6.1 days
- Laparoscopic: 4.2 days

**Complications**
- Open:
  - Atelectasis (n= 1)
  - Wound infection (n= 2)
  - Prolonged ileus (n= 1)
  - Pneumothorax (n= 1)

- Laparoscopic:
  - Atelectasis (n= 1)
  - Wound infection (n= 1)
<table>
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<tr>
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<th>Authors’ conclusion</th>
<th>Bemerkungen</th>
<th>LoE/RoB</th>
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<tbody>
<tr>
<td></td>
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<td>Median follow-up 30 mo (7-54 mo)</td>
<td>OPN in patients with highly complex renal tumors defined as RENAL nephrometry score ≥ 10</td>
<td>Median age 52 y (42-59 y)</td>
<td>Male 65.1%</td>
<td>n= 85</td>
<td>RPN: 150 min (110-190 min) p= 0.709</td>
<td>Estimated blood loss OPN: 200 ml (100-300 ml) RPN: 200 ml (100-300 ml) p= 0.888</td>
<td>Intraoperative complications OPN: 6.3% RPN: 9.4% p= 0.556</td>
<td>Overall postoperative complications OPN: 23.4% RPN: 18.8% p= 0.544</td>
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<td>Referenz</td>
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Lee, 2018, PLOS One

Retrospektive cohort study

n= 835
1994-2015
Median follow-up 46 mo (34-73 mo)

We aimed to compare the outcomes of LRN with those of ORN in patients with localized clinical T2 RCC (≥7 cm)

pT1-4

Median age

ORN
n= 578

LRN
n= 257

No complications
ORN: 88.6%
LRN: 87.9%
p= 0.595

Estimated blood loss

Major complications
OPN: 14.1%
RPN: 9.4%
p= 0.44

Length of hospital stay
OPN: 7 days (5-9 days)
RPN: 5 days (5-7 days)
p< 0.001

Kaplan-Meier survival analysis showed no significant differences in RFS and OS between the two groups (log-rank test, all p > 0.05)

The LRN and ORN groups showed similar oncological outcomes in patients with clinical T2 renal cell cancer. Early postoperative complications were also comparable

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</thead>
<tbody>
<tr>
<td>Luciani, 2017, Journal of Robotic Surgery</td>
<td>Prospective cohort study</td>
<td>n= 253 2005-2016 Italy</td>
<td>To compare the surgical outcomes of partial nephrectomy, performed via three different approaches: RPN, LPN, and OPN, in a single non-academic regional center.</td>
<td>clinical T2 RCC.</td>
<td>56 y (48-64 y)</td>
<td>RPN (n= 110)</td>
<td>ORN: 200 ml (100-500 ml) LRN: 300 ml (125-400 ml)</td>
<td>between LRN and ORN.</td>
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<td></td>
<td>Male</td>
<td>63.4%</td>
<td>OPN (n= 73)</td>
<td>p= 0.381</td>
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<td>pT1a-pT3a</td>
<td>p= 0.070, CSS (p = 0.472), or OS (p = 0.249) were found between the two groups.</td>
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<td>Mean age</td>
<td>No significant differences in PFS (p = 0.070), CSS (p = 0.472), or OS (p = 0.249) were found between the two groups.</td>
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<td></td>
<td>RPN: 61 y (SD 12 y)</td>
<td>Median operative time</td>
<td>OPN offered faster operative and ischemia times at the expense of greater blood loss and hospital stay. Transfusion and overall complication rates were significantly lower in the RPN group as compared to OPN and LPN groups. Although for some respects RPN completes the</td>
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<td>LPN: 62 y (SD 11 Y)</td>
<td>RPN: 200 min (120-385 min)</td>
<td>The surgical approach depended on the technique used at our Department at that time: OPN was the standard from 2005 to 2008, LPN from 2009 to</td>
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</table>
### Referenz

Malkoc, 2017, World J Urol

### Studien- design

Retrospektive cohort study

### Studien- charakteristika

n= 110
2009-2015
USA

### Ziel der Studie

To compare perioperative outcomes between robotic partial nephrectomy and open

### Patienten- merkmale

LPN: 42%
OPN: 51%

### Intervention

- RPN: 200 cc (0–1700 cc)
- OPN: 200 cc (0–1700 cc)

### Kontrolle

- OPN: 200 cc (0–1700 cc)
- p=0.510 (RPN vs. OPN)
- p= 0.103 (RPN vs. LPN)

### Ergebnisse

- Median hospital stay
- RPN: 6 days (4–22 days)
- LPN: 7 days (4–23 days)
- OPN: 8 days (5–30 days)
- p<0.0001 (RPN vs. OPN)
- p= 0.003 (RPN vs. LPN)

### Authors‘ conclusion

- Positive margins
- RPN: 6.3%
- LPN: 4.2%
- OPN: 0%

- evolution of OPN to LPN.

### Bemerkungen

- Zusätzlich aufgenommen 2011, and RARP from 2012 until now.

### LoE/ RoB

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<td>partial nephrectomy for localized &gt;7 cm tumors.</td>
<td>T21-b</td>
<td>Age</td>
<td>RPN: 61.7 ± 12y</td>
<td>OPN: 61.5 ± 12.5</td>
<td>Male</td>
<td>RPN: 63%</td>
<td>OPN: 76.8%</td>
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<td></td>
<td>Intraoperative complications</td>
<td>RPN: 1.9%</td>
<td>OPN: 5.4%</td>
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<td></td>
<td>Length of stay</td>
<td>RPN: 1.5%</td>
<td>OPN: 2.1%</td>
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<td>Positive surgical margins</td>
<td>RPN: 5.6%</td>
<td>OPN: 3.6%</td>
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<td>Referenz</td>
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<td>Maurice, 2017, BJUI</td>
<td>Retrospective cohort study</td>
<td>n= 615 2011-2015</td>
<td>Median follow-up 6 mo</td>
<td>T1a-T1b</td>
<td>RPN (n= 415) n= 301 T1a n= 114 T1b</td>
<td>OPN (n= 190) n= 110 T1a n= 80 T1b</td>
<td>Positive surgical margins T1a RPN: 4.1% OPN: 3.7% p= 1 T1b RPN: 6.2% OPN: 5.1% p= 1 Overall complications T1a RPN: 20.3% OPN: 35.5% p&lt; 0.01 T1b RPN: 20.2%</td>
<td>Optimum outcomes are readily achieved regardless of partial nephrectomy approach. The robot-assisted approach may facilitate optimum outcome achievement for 4–7 cm masses by minimizing wound complications.</td>
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<td>OPN: 46.3%</td>
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<td>p&lt;0.01</td>
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<td>T1a</td>
<td>RPN: 1.7%</td>
<td>OPN: .1.8%</td>
<td>p= 1</td>
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<td></td>
<td>T1b</td>
<td>RPN: 1.8%</td>
<td>OPN: 0%</td>
<td>p= 0.51</td>
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<td>Postoperative complications</td>
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<td>T1a</td>
<td>RPN: 18.9%</td>
<td>OPN: 33.6%</td>
<td>p= 1</td>
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<td>Referenz</td>
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| Mearini, 2016, *Journal of Robotic Surgery* | Retrospective cohort study | n= 295 2006-2015 Italy | To perform a single-institution comparison of clampless open, laparoscopic or robot-assisted partial nephrectomy as well as to evaluate pre-, intra- and postoperative factors that may influence achievement of ideal formula margin, ischemia and complication rates | Median tumor size: 2.9 cm  
Median age: 66 y (34-84 y)  
Male: OPN: 77.5%  
LPN: 75.7%  
RPN: 67.7% | OPN (n= 80)  
LPN (n= 66)  
RPN (n= 31) | | **T1b**  
RPN: 18.4%  
OPN: 46.3%  
p< 0.01 | Mean hospital stay  
OPN: 9.1 days (3-32 days)  
LPN: 7.9 days (4-21 days)  
RPN: 9 days (4-23 days)  
p= 0.099 | Operative time  
OPN: 201 min (120-300 min)  
LPN: 180.3 min (95-280 min)  
RPN: 190 min (85-300 min)  
p= 0.019 | Overall complication rates | According to this study, clampless LPN and RPN have a safety profile that is on par with traditional clampless open surgery, while offering the additional benefits of a reduced operative time, blood loss, on demand ischemia and rate of high-grade complications. In view of these promising findings, and considering the margin, ischemia and complication score as a measure of the overall surgical efficacy, LNP and RPN seem... | Sehr unterschiedliche Follow-ups | 2+ |
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<tr>
<td>Nelson, 2018, Urology Annals</td>
<td>Retrospective cohort study</td>
<td>n= 201 2011-2016 USA</td>
<td>To compare the perioperative and functional outcomes after open</td>
<td>Median tumor size 4.6 (3.3-5.8 cm)</td>
<td>Open Cold Ischemia n= 170</td>
<td>Robotic Cold Ischemia n= 31</td>
<td>Median operative time</td>
<td>Open: 218 min (179-253 min) Robotic: 223 min (201-264 min)</td>
<td>We demonstrate an effective and simplified method of intracorporeal ice cooling during robotic partial</td>
<td>Sehr unterschiedliche Follow-ups (Open: 24.1 mo,</td>
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</table>

**Authors' conclusion**

- OPN: 37.5%
- LPN: 24.2%
- RPN: 35.4%
- p= 0.125

- Positive margins
  - OPN: 11.2%
  - LPN: 7.5%
  - RPN: 6.4%
  - p= 0.624

- Mean intraoperative blood loss
  - OPN: 807.7 (100-4300)
  - LPN: 291.5 (40-1600)
  - RPN: 420 (40-2000)
  - p= 0.001

- to overcome some limitations of open surgery.
Median follow-up 19.4 mo (7.4-35.6 mo) and robotic partial nephrectomy performed with cold ischemia.

**Ziel der Studie**

**Patientenmerkmale**

**Intervention**

**Kontrolle**

**Ergebnisse**

**Authors' conclusion**

**Bemerkungen**

**LoE/RoB**

**Referenz**

**Studien-design**

**Studien-charakteristika**

**Author's conclusion**

Bemer - kung

LoE/RoB

**Median age**

62 y (54-70 y)

**Male**

64.6%

p = 0.28

**Median estimated blood loss**

Open: 300 ml (200-400 ml)

Robotic: 100 ml (50-150 ml)

p < 0.01

**Positive surgical margins**

Open: 10.2%

Robotic: 6.5%

p = 0.48

**Operative complications**

Open: 4.7%

Robotic: 0%

p = 0.6

**Minor postoperative complications**

nephrectomy. Our data suggests that results with this approach compare favorably to open cold ischemia technique. Intracorporeal ice cooling can be considered when performing complex partial nephrectomies with ischemia times expected to exceed 25 minutes.

Robotic: 6.1 mo)
### Referenz  
**Oh, 2016, PLOS ONE**  
**Studien-design**  
Retrospektive cohort study  
**Studiencharakteristika**  
- n = 702  
- 2003-2015  
- South Korea  
- Median follow-up: 48.3 mo  
**Ziel der Studie**  
To compare the surgical margin status after open partial nephrectomy and robotic partial nephrectomy performed in patients with T1a renal  
**Patientenmerkmale**  
- cT1a RCC  
  - Mean age  
    - OPN: 54.88 ± 13.08 y  
    - RPN: 52.13 ± 12.24 y  
**Intervention**  
- OPN  
  - n = 385  
- RPN  
  - n = 317  
**Kontrolle**  
**Ergebnisse**  
- Estimated blood loss  
  - OPN: 214.26 ± 202.66 ml  
  - RPN: 167.16 ± 236.63 ml  
- p = 0.006  
- Intraoperative complications  
- RPN may result in a narrower peritumoral surgical margin than OPN.  
- Zusätzlich aufgenommen.  
-Nicht alle Endpunkte wurden gematched berichtet.  
**Authors' conclusion**  
- Major postoperative complications  
  - Open: 14.7%  
  - Robotic: 3.2%  
- Length of stay  
  - Open: 5 days (4-6 days)  
  - Robotic: 3 days (2-4 days)  
- p < 0.01  

**Authors' conclusion**  
- Open: 24.7%  
- Robotic: 9.7%  
- p = 0.02
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<td></td>
<td>Male</td>
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<td>OPN: 3.6%</td>
<td>RPN: 3.5%</td>
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<td></td>
<td></td>
<td></td>
<td>RPN: 69.6%</td>
<td></td>
<td></td>
<td>OPN: 3.5%</td>
<td>RPN: 72.6%</td>
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<td></td>
<td>Tumor size</td>
<td></td>
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<td>Postoperative complications</td>
<td>OPN: 10.4%</td>
<td>RPN: 4.7%</td>
<td>p= 0.008</td>
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<td>OPN: 23.05 ± 8.36 mm</td>
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<td>Propensity score matching (n= 299)</td>
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<td>RPN: 21.68 ± 8.19 mm</td>
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<td>Operative time</td>
<td>OPN: 140.89 ± 46.21 min</td>
<td>RPN: 137.45 ± 59.06 min</td>
<td>p= 0.428</td>
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<td>Resection margin positive</td>
<td>OPN: 1.67%</td>
<td>RPN: 1.33%</td>
<td>p= 0.5</td>
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<td>Referenz</td>
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<tr>
<td>Peyronnet, 2016, Annals of Surgical Oncology</td>
<td>Retrospektive cohort study</td>
<td>n= 1800 2006-2014 Follow-up OPN: 13 mo RPN: 39 mo</td>
<td>To compare perioperative and oncologic outcomes of RPN and OPN.</td>
<td>Tumor size RPN: 32.9 ± 0.6 mm OPN: 39.9 ± 0.6 Mean age RPN: 69.6 ± 3.4 y OPN: 57.5 ± 3.6 y Male RPN: 63.7% OPN: 64.8%</td>
<td>RPN n= 937</td>
<td>OPN n= 863</td>
<td>Mean operative time RPN: 153.2 ± 2 min OPN: 146.6 ± 2.3 min p= 0.02 Postoperative complications RPN: 17.9% OPN: 28.6% p&lt; 0.001 Major postoperative complications RPN: 7.8% OPN: 11% p= 0.02 Mean hospital stay RPN: 4.7 ± 0.2 days OPN: 10.1 ± 0.2 days p&lt; 0.001</td>
<td>RPN was less morbid than OPN, with lower complications, less blood loss, and a shorter hospital of stay. The intermediate-term oncologic outcomes were similar in the two groups.</td>
<td>Signifikant unterschiedliche Follow-ups-Zeiten.</td>
<td>2+</td>
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<td>Referenz</td>
<td>Studien Design</td>
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| Porpiglia, 2016, Urology | Retrospective cohort study | n= 285 2009-2012 Italy | To evaluate perioperativeresults of open, laparoscopic, and robot-assisted partial nephrectomies and to cT1b renal tumors | Mean age: 60.3 y (SD 14.3 y) | OPN (n= 133) LPN (n= 57) RPN (n= 95) | | Positive surgical margins  
RPN: 5.2%  
OPN: 6.5%  
p= 0.22 | 5y-RFS  
RPN: 78.1%  
OPN: 81.3%  
p= 0.37 | 5y-CSS  
RPN: 97.9%  
OPN: 96.3%  
p= 0.14 | | | T1b renal tumors suitable for nephron sparing surgery can be safely treated by LPN or RPN in high-volume centers. RPN allows for significantly lower warm ischemia time and estimated blood |

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<td></td>
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<td>identify predictive factors of Trifecta achievement for clinical T1b renal tumors in a multicenter prospective dataset.</td>
<td>Male: 60%</td>
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<td>p= 0.46 (OPN vs. LPN), p= 0.04 (LPN vs. RPN), p= 0.01 (RPN vs. OPN)</td>
<td>Operative time</td>
<td>loss with higher rate of Trifecta achievement compared with LPN.</td>
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<td>Operative time</td>
<td>OPN: 135 min (110-170 min)</td>
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<td>Operative time</td>
<td>LPN: 129 min (110-150 min)</td>
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<td>Operative time</td>
<td>RPN: 155 min (120-196 min)</td>
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<td>Intraoperative complications</td>
<td>p= 0.33 (OPN vs. LPN), p= 0.001 (LPN vs. RPN), p= 0.002 (RPN vs. OPN)</td>
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<td>Intraoperative complications</td>
<td>OPN: 6%</td>
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<td>Intraoperative complications</td>
<td>LPN: 3.5%</td>
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<td>Intraoperative complications</td>
<td>RPN: 1.1%</td>
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<td>Intraoperative complications</td>
<td>p= 0.48 (OPN vs. LPN), p= 0.29 (LPN vs. RPN), p= 0.05 (RPN vs. OPN)</td>
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</table>
|          |                |                        |                 |                   |             |          | Medical postoperative complications | OPN: 12.8%  
LPN: 1.8%  
RPN: 2.1%  
p = 0.02 (OPN vs. LPN),  
p = 0.88 (LPN vs. RPN)  
p = 0.04 (RPN vs. OPN) |          |         |
|          |                |                        |                 |                   |             |          | Surgical postoperative complications | OPN: 17.3%  
LPN: 14%  
RPN: 8.4%  
p = 0.58 (OPN vs. LPN),  
p = 0.27 (LPN vs. RPN)  
p = 0.04 (RPN vs. OPN) |          |         |
|          |                |                        |                 |                   |             |          | Positive surgical margins | OPN: 6.8%  
LPN: 1.9%  
RPN: 2.5% |          |         |
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<tbody>
<tr>
<td>Rezaeetalab, 2016, Urology Journal</td>
<td>Prospective cohort study</td>
<td>n= 65 Iran 2013-2014</td>
<td>Partial nephrectomy is the gold standard treatment for small kidney masses.</td>
<td>with single renal mass of ≤ 4 cm</td>
<td>LPN n= 34</td>
<td>OPN n= 31</td>
<td>p= 0.18 (OPN vs. LPN), p= 0.82 (LPN vs. RPN), p= 0.16 (RPN vs. OPN)</td>
<td>Hospital stay</td>
<td>Einschluss durch UroEvidenc e.</td>
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<td>Data on the comparison of laparoscopic (LPN) versus open partial nephrectomy</td>
<td>Mean age 52.4 y</td>
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<td>OPN: 4.1 days, LPN: 4.6 days, p= 0.37</td>
<td>Unklar, auf welcher Basis durch Gruppen gebildet wurden:</td>
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<td>(OPN) are based on retrospective studies. Thus, we planned to compare these</td>
<td>Male 70.8%</td>
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<td>Mean surgery time</td>
<td>The study arms were not randomize d due to patients’ preference; Neverthele ss, they were matched considerin g age distributio</td>
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<td>two techniques in a prospective trial.</td>
<td>Mean tumor size 35.4 mm</td>
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<td>OPN: 180 min, LPN: 127 min, p&lt; 0.001</td>
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<td>Overall complications</td>
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<td>OPN: 9.7%, LPN: 29%</td>
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<td>LPN was accompanied with</td>
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<td>higher rate of urologic complications (p=.04), satisfaction rate was</td>
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<td>This clinical trial shows that LPN has some benefits over OPN, including</td>
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<td>decreased post-operative pain and higher patient satisfaction.</td>
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</table>

Mean operation time:
- LPN: 180 minutes
- OPN: 127 minutes

Overall complications:
- OPN: 9.7%
- LPN: 29%

LPN was accompanied with higher rate of urologic complications (p=.04), satisfaction rate was higher in the OPN group (p=.07).
<table>
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<tr>
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<th>Bemerkungen</th>
<th>LoE/RoB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sagalovich, 2018, Journal of Endourology</td>
<td>Retrospective cohort study</td>
<td>n= 164 2011-2016 Median follow-up RPN: 16.6 mo (7.7-27.2 mo) OPN: 29.3 mo (12.3-44.8 mo)</td>
<td>To report a comparative analysis of outcomes in patients who underwent excisions of renal hilar tumors using both open and robotic approaches.</td>
<td>Hilar tumor</td>
<td>RPN n= 100</td>
<td>OPN n= 64</td>
<td>higher ($P = .02$) and dose of narcotics necessary for controlling postoperative pain was lower ($p=.04$).</td>
<td>Postoperative complications RPN: 26.2% OPN: 38.7% $p= 0.1$</td>
<td></td>
<td>n, gender, American Society of Anesthesiologists classification for health status, tumor size and location and renal nephrometry score.</td>
</tr>
</tbody>
</table>

| Tumor size | | | | | | | | | | |
| RPN: 3.5 cm (2-7-4.5 cm) | OPN: 4.3 cm (3.5-5.5 cm) | | | | | | | | | |

| Age | | | | | | | | | | |
| RPN: 60.3 y (SD 13.48 y) | | | | | | | | | | |

| Negative margins | | | | | | | | | | |

Our analysis both open and robotic partial nephrectomy for hilar tumors were equally likely to achieve a low "trifecta" outcome with a shorter mean length of stay in the robotic cohort.
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<th>LoE/ RoB</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>OPN: 32.8 y (SD 11.27 y)</td>
<td>Male</td>
<td>RPN: 60%</td>
<td>OPN: 50%</td>
<td>RPN: 72.8%</td>
<td>OPN: 90.4%</td>
<td>p = 0.124</td>
<td>Absence of complications</td>
<td>RPN: 68.6%</td>
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<td></td>
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<td>Mean length of stay</td>
<td>RPN: 3.8 days</td>
<td>OPN: 5 days</td>
<td>p = 0.012</td>
<td>Estimated blood loss</td>
<td>RPN: 253.3</td>
<td>OPN: 357.1</td>
<td>p = 0.091</td>
<td>Operating time</td>
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<td></td>
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<td>Estimated blood loss</td>
<td>RPN: 357.1</td>
<td>OPN: 253.3</td>
<td>p = 0.091</td>
<td>Operating time</td>
<td>RPN: 199.8 min</td>
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<tr>
<td></td>
<td></td>
<td>Operating time</td>
<td>RPN: 199.8 min</td>
<td>OPN: 357.1</td>
<td>p = 0.091</td>
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<td></td>
<td></td>
<td>Operating time</td>
<td>RPN: 199.8 min</td>
<td>OPN: 357.1</td>
<td>p = 0.091</td>
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<td>Operating time</td>
<td>RPN: 199.8 min</td>
<td>OPN: 357.1</td>
<td>p = 0.091</td>
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<td>p = 0.091</td>
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<td></td>
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<td>Operating time</td>
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<td>p = 0.091</td>
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<td>Simsek, 2017, Archivio Italiano di Urologia, Andrologia</td>
<td>Retrospektive cohort study</td>
<td>n= 42 Turkey 2006-2016 Mean follow-up LPN: 49.1 ± 12.6 mo RPN: 35.4 ± 7.3 mo</td>
<td>To evaluate a single surgeon oncolgical and functional outcomes of laparoscopic partial nephrectomy compared to robotic partial nephrectomy for pT1a renal tumours.</td>
<td>pT1a renal tumours Male LPN: 15/20 RPN: 12/22 Mean age LPN: 50.2 ± 11.3 y RPN: 54.8 ± 9.6 y</td>
<td>LPN n= 20 RPN n= 22</td>
<td>Operation time LPN: 227.5 ± 56.3 min RPN: 176 ± 23.6 min p= 0.001 Estimated blood loss LPN: 218.8 ± 60.7 cc RPN: 182.5 ± 50.4 cc p= 0.04 Hospital stay LPN: 4.4 ± 1.9 days RPN: 6.1 ± 2.4 days p= 0.01 Positive surgical margin LPN: 1 RPN: 0</td>
<td>RPN is a developing procedure, and technically feasible and safe for small-size renal tumours. Moreover RPN is a comparable and alternative operation to LPN, providing equivalent oncological and functional outcomes, as well as saving more healthy marginal tissue and easier and faster suturing.</td>
<td>Einschluss durch UroEvidenc e 2+</td>
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| Tan, 2018, ANZ Journal of Surgery | Retrospective cohort study | n= 200 2010-2016 Australia Median follow-up OPN: 29 mo RPN: 18 mo | To compare perioperative, renal and oncological outcomes after robotic-assisted partial nephrectomy versus open partial nephrectomy for the treatment of renal tumours. | **Mean age**  
OPN: 64.64 (±11.67) y  
RPN: 57.68 (±10.79) y  
**Male**  
OPN: 70.91%  
RPN: 63.45% | OPN n= 55  
RPN n= 145 | **Mean operative time**  
OPN: 137.2 (±48) y  
RPN: 146.07 (±35.91) y  
p= 0.16  
**Median estimated blood loss**  
OPN: 700 ml  
RPN: 50 ml  
p< 0.0001  
**Intraoperative complications recorded**  
OPN: 25.45%  
RPN: 9.66%  
**Median length of stay**  
OPN: 6 days  
RPN: 3 days  
p< 0.0001 | We present the largest reported Australian series on partial nephrectomy, confirming that a robotic-assisted approach is equivalent to OPN, with reduced complications, estimated blood loss, length of hospital stays and fewer positive margins, even when resecting more complex tumours. | Follow-up Zeit signifikant unterschiedlich | 2+ |
### Referenz

Wang, 2016, BJU

### Studien-Charakteristika
- **Studien-design**: Retrospektive cohort study
- **Referenz**: Wang, 2016, BJU
- **Referenz-Studien-Charakteristika**: n= 216 (2008-2014) China
- **Referenz-Studien-Charakteristika**: Mean follow-up
  - RPN: 16.5 mo
  - LPN: 31.4 mo

### Ziel der Studie
- To evaluate the peri-operative, functional and oncological outcomes of robot-assisted partial nephrectomy and laparoscopic partial nephrectomy for RENAL scores ≥ 7 T1a-T3

### Patientenmerkmale
- **RENAL scores**: ≥ 7
- **T1a-T3**: Age
- **RPN**: 61.2 y
- **LPN**: 63.5 y
- **Male patients**: RPN: 67.9%

### Intervention
- **RPN**: n= 81
- **LPN**: n= 135
- **Mean operating time**: RPN: 135.6 (SD 37.8) min
  - LPN: 149.6 (SD 43.5) min
  - p= 0.017
- **Mean estimated blood loss**: RPN: 196.5 (SD 63.6) ml
  - LPN: 220.8 (SD 72.9) ml
  - p= 0.013

### Kontrolle

### Ergebnisse
- **Positive resection margins**:  
  - OPN: 10.91%
  - RPN: 3.45%
  - p= 0.039
- **Tumor recurrence**:  
  - OPN: 0%
  - RPN: 0%

### Authors’ conclusion
- In patients with complex tumours, RPN and LPN provided acceptable and similar results in terms of peri-operative, functional and oncological outcomes. RPN was superior to LPN in terms of estimated blood loss and operating time, and LPN was the more cost-effective approach. Both Einschluss durch UroEvidenc e

### Bemerkungen
- The follow-up period was significantly longer in the LPN group.
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<td>moderately or highly complex tumours (defined as RENAL nephrometry score ≥ 7).</td>
<td>LPN: 65.9%</td>
<td>Tumor size</td>
<td>RPN: 3.8 cm</td>
<td>LPN: 3.6 cm</td>
<td>Mean length of hospital stay</td>
<td>RPN: 7.6 (SD 1.8) days</td>
<td>LPN: 8.1 (SD 2.4) days</td>
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<td>Mean direct cost</td>
<td>RPN: 76 240 (SD 5 235) ¥</td>
<td>LPN: 42 356 (4 138) ¥</td>
<td>p&lt; 0.001</td>
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<td></td>
<td></td>
<td>Intraoperative complications</td>
<td>RPN: 4.9%</td>
<td>LPN: 5.9%</td>
<td>p= 0.759</td>
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<td>Postoperative complications</td>
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<td>LPN: 22.2%</td>
<td>surgery techniques remain viable options in the management of complex tumours with RENAL scores ≥ 7.</td>
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<td>Intervention</td>
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Legende: BMI=Body Mass Index; CFS=Cancer-Free Survival; CI=Confidence Interval; CSS=Cancer-Specific Survival; LNSS=Laparoscopic Nephron-Sparing Surgery; LPN=Laparoscopic Partial Nephrectomy; LPNE=Laparoscopic Partial Nephrectomy after selective embolization of tumor blood vessels; LRN=Laparoscopic Radical Nephrectomy; ONSS=Open Nephron-Sparing Surgery; OPN=Open Partial Surgery; OR=Odds Ratio; ORN=Open Radical Nephrectomy; OS=Overall Survival; PADUA=Preoperative Aspects and Dimensions Used for an Anatomical; PFS=Progression Free Survival; RCC=Renal Cell Carcinoma; RFS=Recurrence-Free Survival; RPN=Robotic Partial Nephrectomy; SD=Standard deviation; USA=United States of America; USD=United States Dollar; WMD=Weighted Mean Difference

$p=0.383$
### 10.3. Ergebnisse der Interessenkonflikterklärungen

#### Tabelle 5: Ergebnisse der Interessenkonflikterklärungen

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<th>Tätigkeit als Berater<em>in und/oder Gutachter</em>in</th>
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### 10.3 Ergebnisse der Interessenkonflikterklärungen

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Mitglied: DGU, EAU, AUA, DKG, Wissenschaftliche Tätigkeit: operative und medikamentöse Therapie urologischer Tumoren, Wissenschaftliche Tätigkeit: operative und medikamentöse Therapie urologischer Tumoren, Beteiligung an Fort- und/oder Ausbildung: Intensivkurse Uroonkologie


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### 10.3 Ergebnisse der Interessenkonflikterklärungen

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DKG, Mitglied Interdisziplinäre Arbeitsgruppe Nierentumore (IAGN) der DKG

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- Nein
- Nein
- Nein

Prof. Dr. Junker, Kerstin
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- Nein
- Nein
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- Nein

Prof. Dr. Klotz, Theodor
- Bayer, BMS, Roche
- Nein
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Prof. Dr. Kotzerke, Jörg
- Nein
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- Mitglied: Deutsche Gesellschaft für NuKlearmedizin, Altpresident

**Interessenkonflikte**

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DKG, Mitglied Interdisziplinäre Arbeitsgruppe Nierentumore (IAGN) der DKG

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- Mitglied: Deutsche Gesellschaft für NuKlearmedizin, Altpresident

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### 10.3 Ergebnisse der Interessenkonflikterklärungen

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Austausches dr Urologen im Nordosten Berlins e.V., Pierre Fabre Pharma GmbH Novartis Pharma GmbH Astellas Pharma GmbH Chugai Pharma Europe St. Gallen Oncology Conferences AstraZeneca Janssen-Cilag GmbH PROMEDICIS GmbH

Uropathologie (ENUP) Deutsche Prostatakarzinom Konsortium (DPKK) Internationale Akademie für Pathologie, Wissenschaftliche Tätigkeit: Klinische und Molekulare Pathologie

Mitglied: Keine, Wissenschaftliche Tätigkeit: Keine, Wissenschaftliche Tätigkeit: Keine, Beteiligung an Fort-/Ausbildung: Keine, Persönliche Beziehung: Keine

Mitglied: Dachverband für Technologen und Technologinnen, Analytiker und Analytikerinnen in der Medizin (DVTA e.V.) - Präsidentin, Wissenschaftliche Tätigkeit: pädagogische Arbeiten, Wissenschaftliche Tätigkeit: keine, Beteiligung an Fort-/Ausbildung: MTA-Schule Hannover

Mitglied: AG Prio der DKG, BvDSt, DEGRO, Wissenschaftliche Tätigkeit: Seltene Tumoren, gutartige
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### 10.3 Ergebnisse der Interessenkonflikterklärungen

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