

# Robot-assisted kidney transplant

Interventional procedures guidance  
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[www.nice.org.uk/guidance/ipg609](http://www.nice.org.uk/guidance/ipg609)

## 1 Recommendations

- 1.1 Current evidence on the safety and efficacy of robot-assisted kidney transplant is limited in quantity and quality. For patients with obesity who would not otherwise be able to have a kidney transplant without an unacceptable risk of morbidity, this procedure should only be used with special arrangements for clinical governance, consent, and audit or research. In patients for whom open kidney transplant surgery is suitable, this procedure should only be used in the context of research. Find out [what special arrangements and only in research mean on the NICE interventional procedures guidance page](#).
- 1.2 Clinicians wishing to do robot-assisted kidney transplant in people with obesity who would not otherwise be able to have a kidney transplant without an unacceptable risk of morbidity should:
- Inform the clinical governance leads in their NHS trusts.

- Ensure that patients understand the uncertainty about the procedure's safety and efficacy and provide them with clear written information to support shared decision-making. In addition, the use of NICE's information for the public is recommended.
  - Report details about all patients having robot-assisted kidney transplantation to NHS Blood and Transplant and review clinical outcomes locally. NICE has identified relevant audit criteria and has developed NICE's interventional procedure outcomes audit tool (which is for use at local discretion).
- 1.3 Further research should include studies comparing robot-assisted kidney transplant with open surgery. This should collect data on patient selection, warm ischaemia times, the need for conversion to open surgery, graft function, and long-term graft and patient survival.
- 1.4 The procedure should only be done by teams of surgeons with experience in both transplant surgery and robotic surgery.

## 2 The condition, current treatments and procedure

### The condition

- 2.1 End-stage renal disease happens when kidney function is insufficient to maintain health without either dialysis or a kidney transplant. This is typically when the glomerular filtration rate is less than 15 ml/min/1.73 m<sup>2</sup>. End-stage renal disease may be caused by a number of conditions, most commonly diabetes.

### Current treatments

- 2.2 The treatments for end-stage renal disease include conservative treatment, dialysis and kidney transplant. Kidney transplant is considered the treatment of choice for many patients but is not always possible.
- 2.3 Kidney transplant, using a kidney from either a deceased or living donor,

is usually done by open surgery through an incision in the left or right lower abdomen providing a retroperitoneal approach to the iliac fossa.

## The procedure

- 2.4 Robot-assisted kidney transplants may result in decreased blood loss, shorter recovery time, fewer wound complications and improved cosmetic results compared with conventional open surgery.
- 2.5 With the patient under general anaesthesia and placed in a supine position, a periumbilical incision of about 7 cm is made to insert a hand-assist device. Then, 4 or 5 small incisions (0.5 cm to 1 cm) are made to insert robotic arms and instruments into the abdomen. After the ports and the hand-assist device are in place, the patient is usually moved to the Trendelenburg position. The external iliac vessels are prepared and the bladder is filled with normal saline to facilitate its dissection. The graft kidney is put into the peritoneum, and the renal vein and artery are anastomosed to the external iliac vessels using the robot. After completion of vascular anastomoses, an ureteroneocystostomy is done robotically. The patient's wounds are then sutured. Intra-operative Doppler imaging may be used to assess graft vascular flow.
- 2.6 Modifications of the techniques used for robot-assisted kidney transplant have been described.

## 3 Committee considerations

### The evidence

- 3.1 To inform the committee, NICE did a rapid review of the published literature on the efficacy and safety of this procedure. This comprised a comprehensive literature search and detailed review of the evidence from 12 sources, which was discussed by the committee. The evidence included 3 comparative studies, 4 case series (one of which was reported in 2 separate phases), data provided by the ERUS RAKT registry, and safety data from 3 conference abstracts. These are

presented in [table 2 of the interventional procedures overview](#). Other relevant literature is in appendix A of the overview.

- 3.2 The specialist advisers and the committee considered the key efficacy outcomes to be: patient survival, graft survival and renal function.
- 3.3 The specialist advisers and the committee considered the key safety outcomes to be: blood loss, warm ischaemia time, conversion to open surgery, arterial thrombosis, loss of renal function, infection and graft rejection.
- 3.4 Patient commentary was sought but none was received.

## Committee comments

- 3.5 Most of the evidence was from studies in patients with obesity for whom conventional transplant surgery was not suitable, and this supported recommendation 1.1.
- 3.6 Most of the evidence came from studies in which kidneys were retrieved from living donors.
- 3.7 The committee was advised that the placement of the transplant kidney within the peritoneum may increase risk of torsion of the kidney and make biopsy difficult. However, a technique to fix the kidney in an extra-peritoneal pouch has been developed, aiming to prevent vascular torsion and allowing biopsy.
- 3.8 The committee was told that there is a substantial learning curve for surgeons wishing to do this procedure.

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## Endorsing organisation

This guidance has been endorsed by [Healthcare Improvement Scotland](#).

## Accreditation

