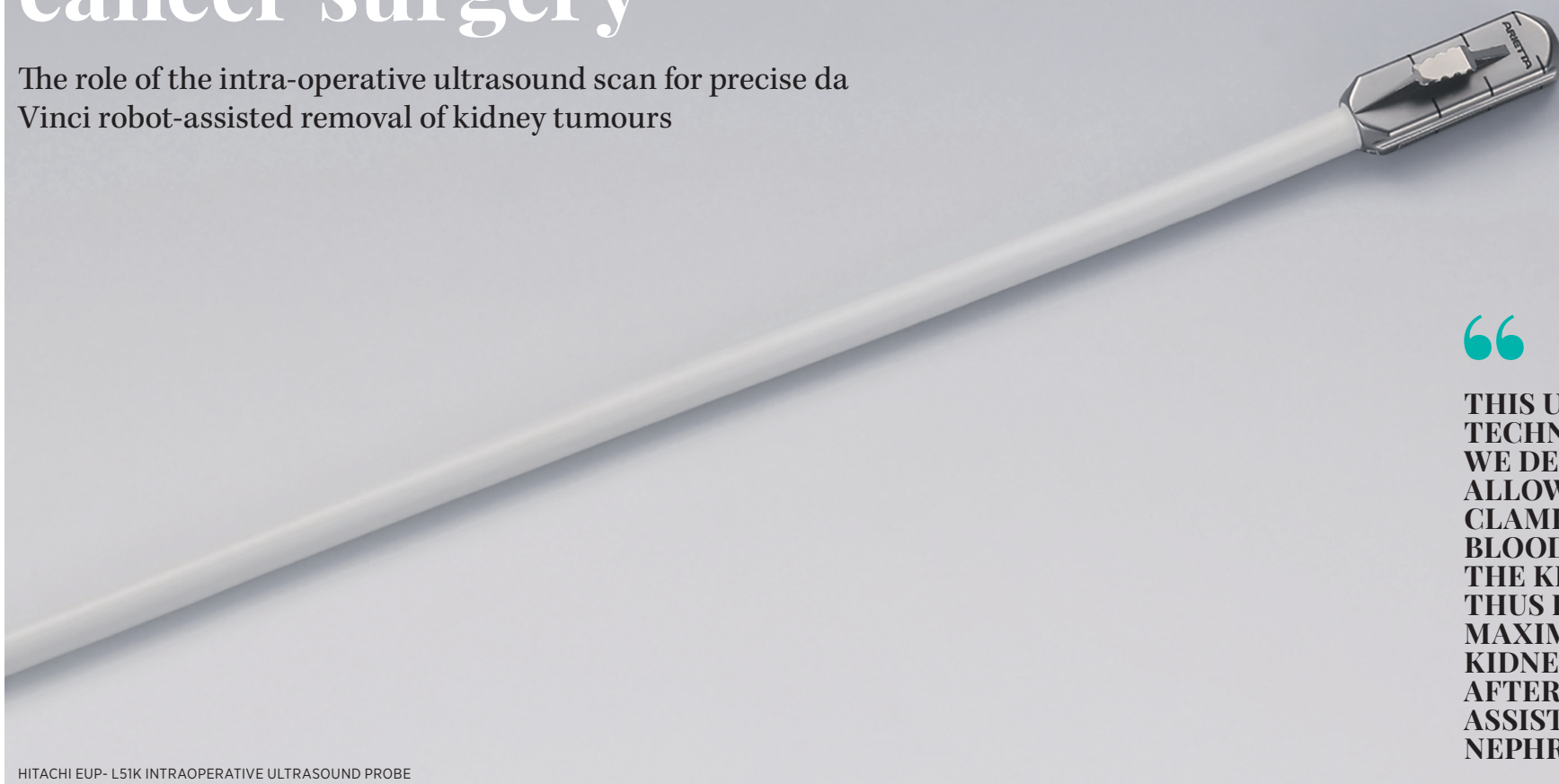


The latest innovation in kidney cancer surgery

The role of the intra-operative ultrasound scan for precise da Vinci robot-assisted removal of kidney tumours



HITACHI EUP- L51K INTRAOPERATIVE ULTRASOUND PROBE

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THIS UNIQUE TECHNIQUE, WHICH WE DEVELOPED, ALLOWS SELECTIVE CLAMPING OF BLOOD VESSELS OF THE KIDNEY AND THUS PRESERVES MAXIMUM KIDNEY FUNCTION AFTER ROBOTIC-ASSISTED PARTIAL NEPHRECTOMY

Kidney cancer accounts for 3% of all cancers affecting patients in the UK and is ranked the eighth most common cancer. With increasing use of ultrasound and CT scans for abdominal symptoms, more kidney tumours are being picked up at an earlier stage. Tumours that are smaller than four centimetres are called Small Renal Masses (SRM). Approximately 70%-80% of these tumours will turn out to be cancerous when removed. In the past, any tumour detected in the kidney would have been treated by removal of the entire kidney (radical nephrectomy). However, it was soon realized that only the tumour along with a rim of normal surrounding tissue could be removed (partial nephrectomy) with good cancer-related outcomes. This has the advantage of better preservation of kidney function as there's less risk of the patient developing high blood pressure if only the small tumour is removed.

INNOVATIONS IN SURGERY

Traditionally, SRMs were removed by a very large incision (open surgery) as

the kidney is tucked away at the back of the abdomen with the large blood vessels that are difficult to access. Over the last 20 years, laparoscopic removal of these tumours (keyhole surgery) has gained popularity, but was restricted to very specialised centres. The advent of the da Vinci Surgical System has seen robotic surgery replace laparoscopic surgery in the most established centres performing these complex operations. At present, robotic-assisted partial nephrectomy (RAPN) is the new gold standard in the United States and certain specialised centres in the UK.

Robotic surgery involves the insertion of tiny wristed instruments into the patient. The precise movement of these robotic instruments is controlled by the operating surgeon while seated at the surgeon's console. RAPN involves precise delineation of the tumour and its relationship with the complex anatomical structures within the kidney. In the past, the assessment of the tumour margins was based upon the surgeon's memory, having studied the CT scan images.

Recently, with the development of revolutionary drop-in ultrasound probes controlled by the operating surgeon, precise location of the tumour and its relation with important structures within the kidney is possible. This has the added advantage of removal of as little normal kidney tissue as possible along with the cancerous tumour, which of course benefits the patient. At the Queen Alexandra Hospital in Portsmouth, we utilise the smallest and most advanced Hitachi EUP- L51K intraoperative ultrasound probe to delineate the margins of a tumour.

We also utilise a novel technique with contrast-enhanced ultrasound scan (CEUS) to aid us in identifying the precise nature of the blood supply to the tumour and its surrounding structures. This unique technique, which we developed, allows selective clamping of blood vessels of the kidney and thus preserves maximum kidney function after robotic-assisted partial nephrectomy. The images obtained by scanning the kidney are directly relayed to the surgeon's console so



THIS IS A CT SCAN DEMONSTRATING A TUMOUR IN THE UPPER PART OF THE KIDNEY

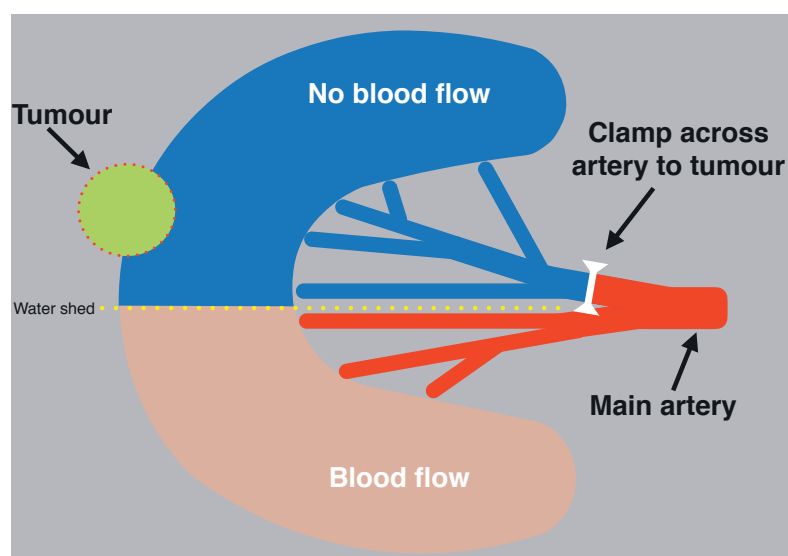


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the operating surgeon can see exactly where to cut the kidney. As the ultrasound probe is directly on the surface of the kidney, the deeper aspect of the tumour can be clearly seen and the tumour can be removed precisely, avoiding any cancer left behind. The state-of-the-art drop-in ultrasound probe, recently acquired by the Queen

Alexandra Hospital in Portsmouth, has therefore revolutionised the way robot-assisted kidney surgery is being performed.

Written by Mr Omer Karim, assisted by Mr Lemke Solomon (both urology consultants at Queen Alexandra Hospital, Portsmouth).



THIS DEMONSTRATES HOW THE ULTRASOUND TECHNOLOGY AND CONTRAST-ENHANCED ULTRASOUND IMAGING CAN SELECTIVELY CUT THE BLOOD SUPPLY TO PART OF THE KIDNEY WHILE SURGEONS REMOVE THE SMALL KIDNEY TUMOUR

ADVANTAGES OF THE ROBOTIC DROP-IN ULTRASOUND PROBE

- Mapping the margins of the tumour precisely
- Assessing the relationship of the tumour to important underlying structures
- Mapping of the renal and tumour blood supply (CEUS technique)

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