Great Ormond Street Hospital for Children
NHS Foundation Trust

The role of intra-operative ultrasound in organ-preserving paediatric oncology surgery

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NO CONFLICTS OF INTEREST TO DECLARE

Background

- Oncological surgery in children can lead to lifelong complications, such as renal failure and loss of infertility.
- Organ-preserving surgery can reduce the risk of such complications.
- Organ-sparing surgery carries a risk of incomplete tumour resection.

Intra operative ultrasound

- Real time delineation of tumour margin
- Maximising tissue sparing for function or fertility
- Early experiences with 17 cases
- Radiologist scrubbed in and able to use probe directly on surface of organ in question. Needs trained assistant to help operate the ultrasound
- Probe prepped and draped as per standard sterile technique

Methods

- Cases reviewed retrospectively for period November 2016 to October 2021.
- Performed using a GE logiq S8/E9 with 6-24MHz/8-18MHz hockey stick or 6-15MHz linear probe.
- Pre-operative imaging, intra-operative ultrasound findings and post-resection histopathology results recorded.
- Institutional ethical approval was obtained

Results

Number of cases	Surgical site and lesion type	Outcomes
7	Nephron sparing procedures in Wilm's	5/7 clear margins and 2 /7 nephrogenic rests at margin
4	*Testicular preserving surgery: 2 epidermoid, 2 rhabdomyosarcoma, and 1 mature teratoma*	Clear margins in all cases
3	Cryopreservation: 2 testicular cases in leukemic infiltration and granulosa cell tumour, and 1 ovarian case in disorder of sexual differntiation	Tumour free tissue obtained in all cases
2	Soft tissue sarcomas	Successful resections lesions which were hard to delineate surgically
1	Myofibroblastic bladder tumour	Preserved urinary continence

Results

Figure a. T2 blade sequence demonstrating right upper pole high signal lesions

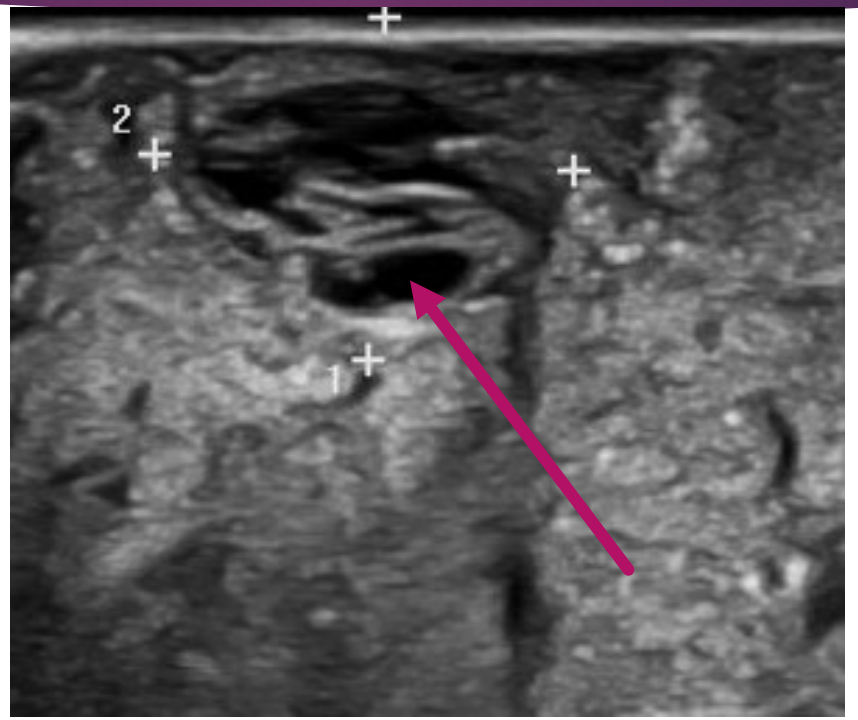

Figure b. Patient 1 Intra-operative US image demonstrating cystic right upper pole lesion

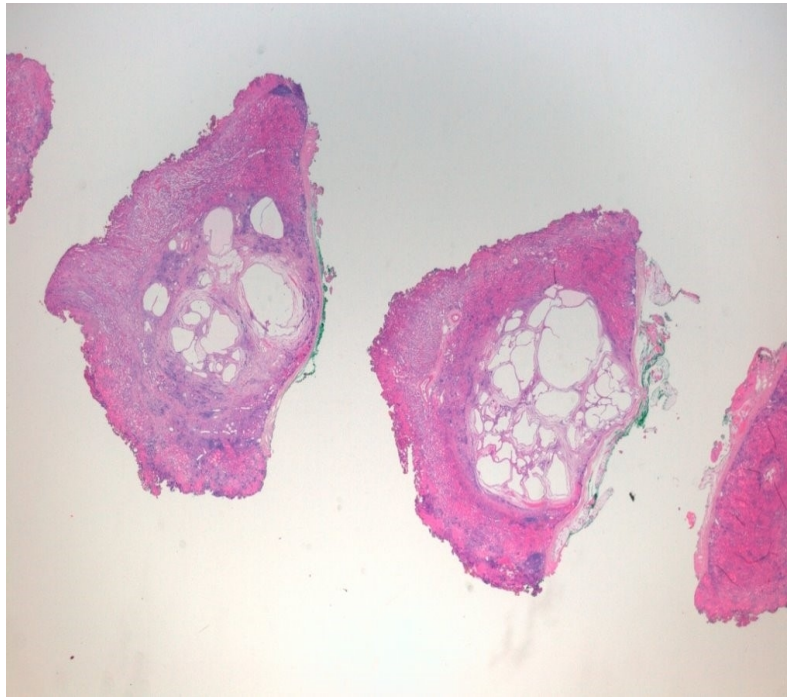

Figure c. Patient 1 Histological specimens.

Results

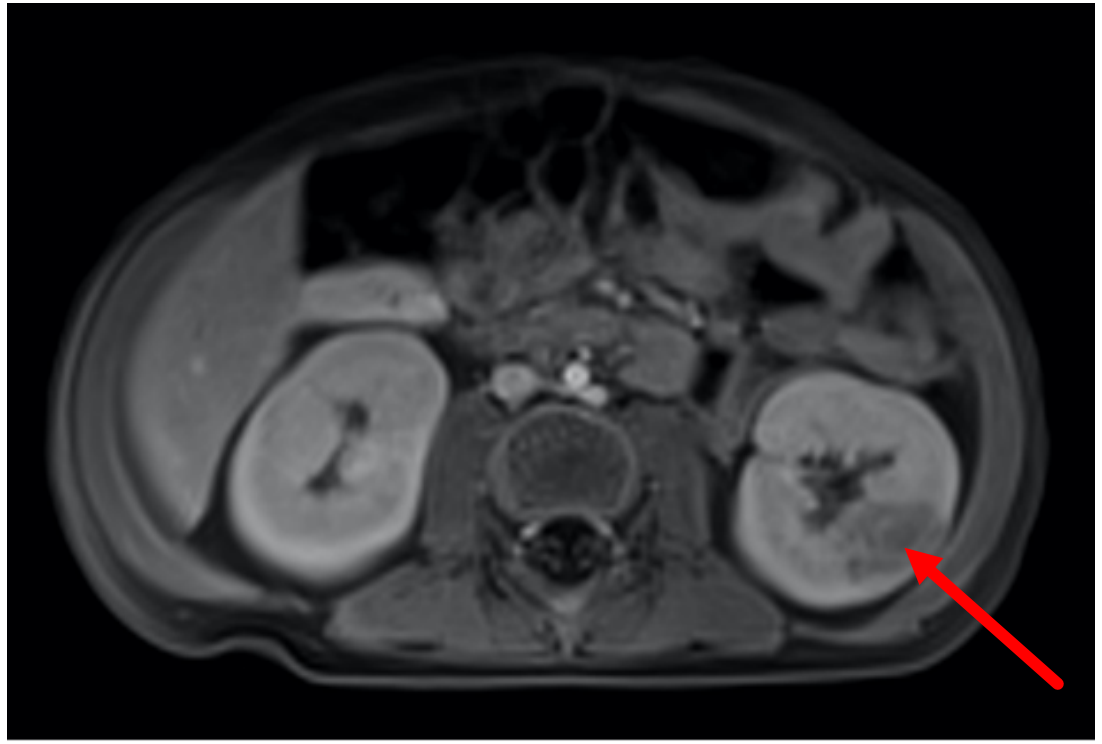

Figure a Left renal midpole lesion on preoperative MRI

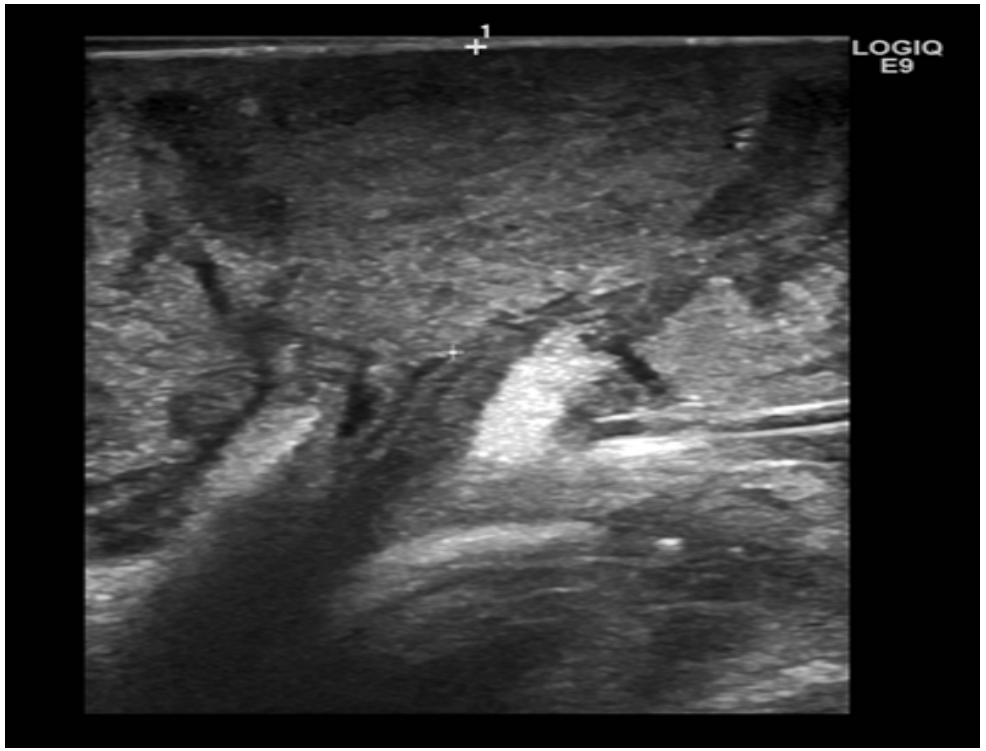

Figure b Intraoperative US

Results

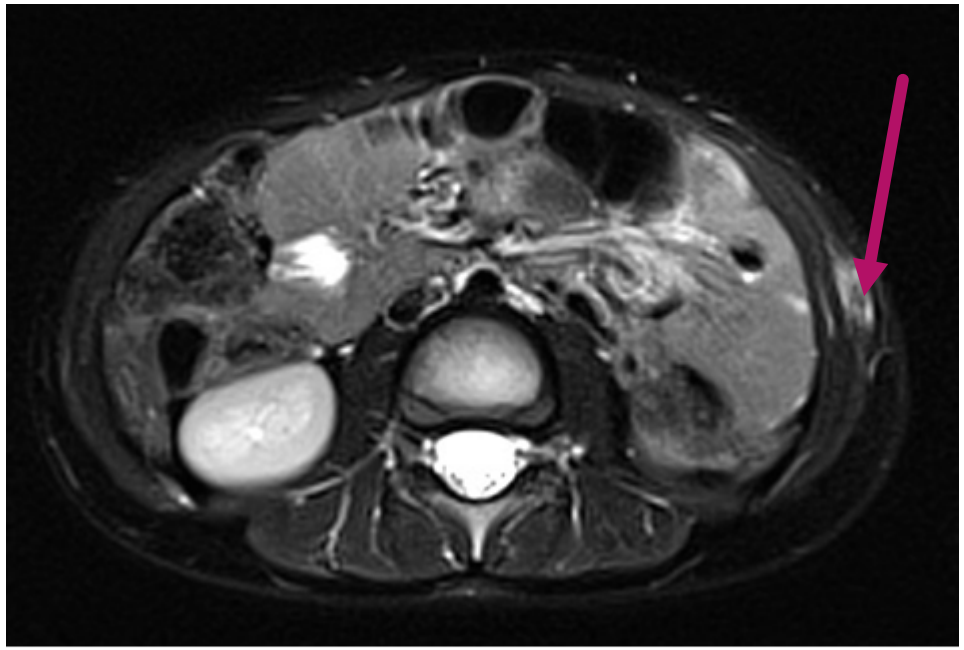

Figure a left chest wall lesion pre-operative post-chemotherapy MRI

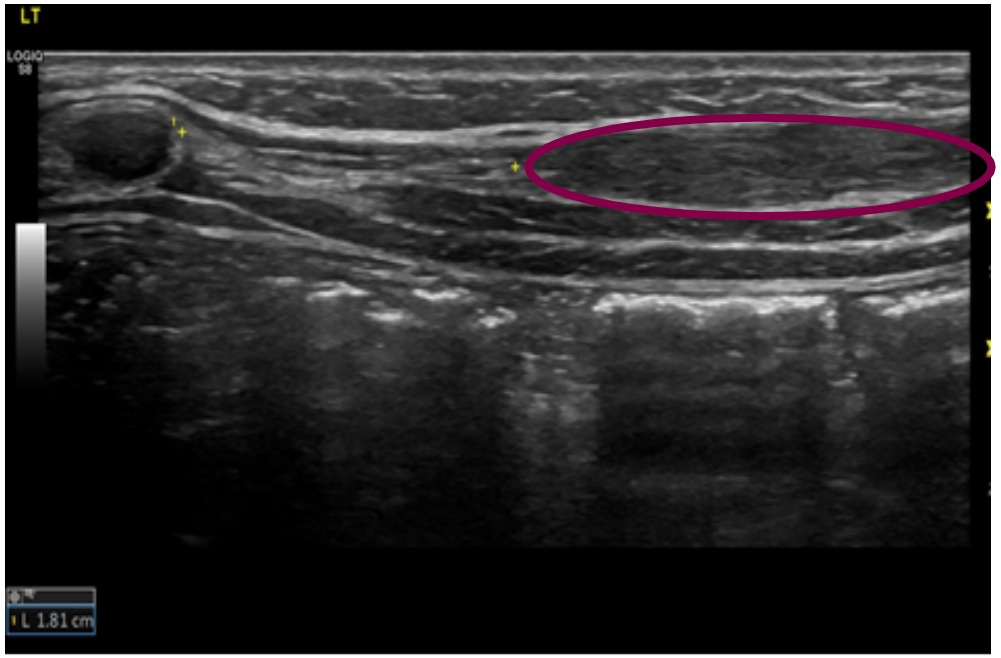

Figure b left chest wall lesion intra-operative ultrasound

Discussion

- Good surgical outcomes with functionally clear margins were achieved in all the patients within our cohort.
- Limitations: Small study size and lack of a control group
- There is wide ranging potential for the use of intraoperative ultrasound in organ-preserving surgery.

References

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Thank you!