

# Preoperative 3D reconstruction images for paediatric tumours: Advantages and drawbacks

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## Abstract

**Rationale:** Three-dimensional reconstruction (3DR) of preoperative images may improve the presurgical assessment of tumours prior to removal. We aimed to analyse the advantages and discrepancies of preoperative 3DR in paediatric tumours.

**Methods:** We conducted a prospective observational study from 2016 to 2019, including patients with thoraco-abdominal tumours having predictable surgical risks on preoperative images (encasement of vessels posing vascular risks, ie, neuroblastic and soft tissue tumours or parenchyma preservation of the invaded organ, ie, liver and kidney). A comparison of 2D/3DR and surgical findings was performed.

**Results:** Twenty-four patients, with a median age at surgery of 68.2 months (13 days-203 months), were operated on for neuroblastoma (n = 7), renal tumour (n = 7), hepatic tumour (n = 4) and others (n = 6; bone sarcoma of the iliac branch, abdominal lymph nodes of a recurrent testicular germ cell tumour, pseudoinflammatory tumour of the omentum, thoracic lipoblastoma, desmoplastic tumour, solid and pseudopapillar tumour of the pancreas). Reconstruction was of poor quality in two patients with renal tumours because computed tomography (CT) had no excretory phase. Discrepancies between 3DR and surgical findings occurred in two patients, one because of poor assessment of caliceal infiltration by renal nodules and the other because of inadequate reconstruction of renal vein thrombosis. For all the other tumours, 3DR improved the visualisation and precise location of vessels during surgery.

**Conclusion:** High-quality preoperative images are mandatory to provide the best 3DR. In the majority of cases, 3DR is of significant help during surgery to better identify vascular structures within tumours and preserve parenchyma.

**Keywords:** 3D reconstruction; Wilms tumour; hepatic tumour; neuroblastoma.