

A prospective study evaluating fluorescence guided minimally invasive paediatric solid tumour surgery using indocyanine green.

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Abstract

Background Indocyanine green (ICG) fluoresces in the near infra-red (NIR) spectrum. It is widely used in adult oncological surgery for identification of tumor margins and lymph node sampling. However, its use in the pediatric population is limited. This is the first study in children to assess its feasibility in minimally invasive surgery (MIS) for oncological disease. **Methods** This was an open label, prospective, single centre, feasibility study recruiting consecutive patients eligible for MIS tumor resection. ICG was injected intravenously at induction of anaesthesia and/or intra-parenchymally for patients having tumor nephrectomy. Patient demographics, intraoperative appearances, nodal fluorescence, post-operative histopathology, and surgeon Likert ratings were collected. Results Seventeen patients conformed to the inclusion criteria. Five had a Wilms tumor, 4 had lung metastases and 8 had other tumors (neuroblastoma, inflammatory myofibroblastic tumor, ganglioneuroma, phaeochromocytoma, adrenal tumor). For those having lymph node sampling, a median of 8(3-9) nodes were sampled. Lung metastases were easily identifiable, and all had negative margins. Tumors containing viable disease fluoresced and were completely resected, whilst benign and heavily treated tumors were afluorescent. There were no adverse events relating to ICG. **Conclusion** Based on this small sample, injection of ICG during induction of anaesthesia is safe and effective in showing tumor margins in patients who have had little or no neoadjuvant chemotherapy as well as in metastectomy in Wilms and osteosarcoma. Its use in renal tumor resection results in adequate nodal sampling. Further studies are needed to confirm these preliminary results.

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