INDOCYANINE GREEN GUIDED NAVIGATION SURGERY FOR HEPATOBLASTOMA IN MALAYSIA - THE NEXT LEVEL OF SEEING THE UNSEEN

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Introduction

Indocyanine Green (ICG) is a water-soluble tricarbocyanine dye that emits light when illuminated with near-infrared light. It is used widely in various fields of surgeries as well as hepatobiliary surgery including hepatocellular carcinoma and hepatoblastoma. However the utilization of the ICG guided surgery has never been done in paediatric oncosurgery Malaysia. We reported 2 cases of the first ICG guided surgery in our local setting.

Case Summary

Case #1:

A 3 year old boy was diagnosed with PRETEXT IV hepatoblastoma and had undergone extended left hepatectomy in 2021. He was presented with tumour recurrence as evidence by raised AFP. MRI showed a small liver nodule. Thus underwent nodulectomy with intraoperative ultrasound and ICG navigation which revealed two nodules; one was not visualised on imaging. (Figure 1)

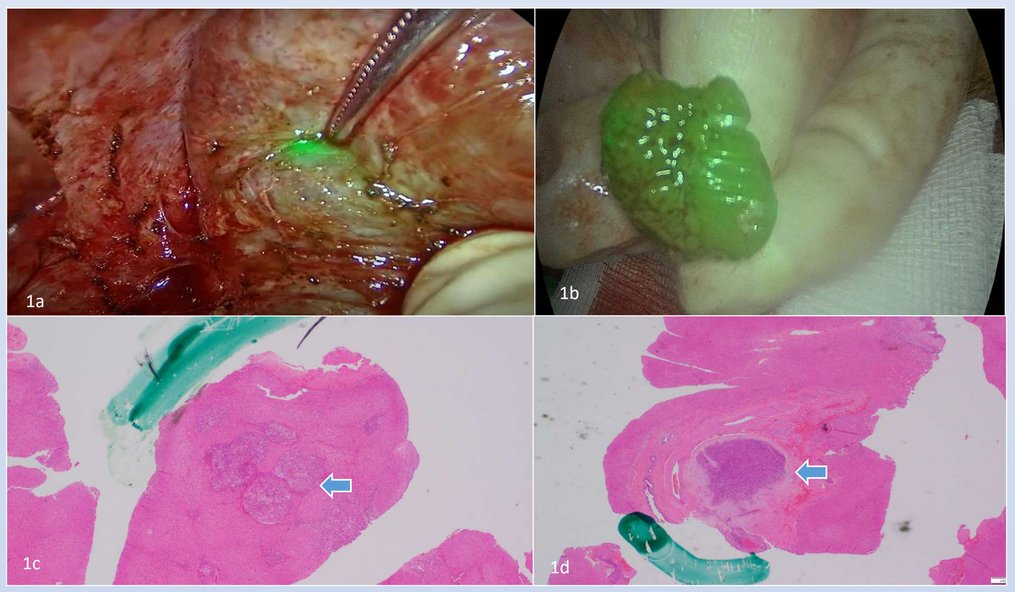

Figure 1(a)(b) - Nodule with ICG positivity and post nodulectomy in case #1, **Figure 1(c)** - Nodule (H&E) which light up with ICG and detectable from preoperative imaging, **Figure 1(d)** - Nodule (H&E) which light up with ICG but was not detectable by preoperative imaging

Case #2:

An 8 year old girl presented with abdominal mass and diagnosed as multifocal PRETEXT IV hepatoblastoma. Neoadjuvant chemotherapy started and extended right hepatectomy with segment II/III nodulectectomy performed - with the guidance of intra operative ultrasound and ICG navigation. Histopathology report revealed clear margin on resected nodules and this proves the accuracy of ICG guided navigation. (Figure 2 &3)

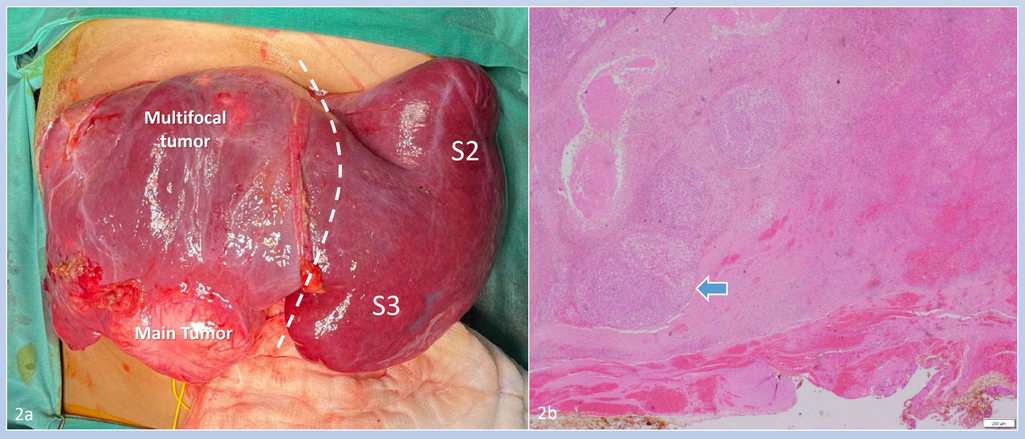

Figure 2(a) - Extreme resection in case #2: Extended right hepatectomy and segment 2/3 nodulectomy, **Figure 2(b)** - Tumour nodules (H&E) 2mm from capsular margin post segment 2/3 nodulectomy

Discussion

The option treatment for multifocal liver tumour is to resect completely either by hepatectomy with nodulectomy or by the use of primary liver transplant. When the transplant service is not readily available, extreme resection for multifocal tumour may be considered. The ability to identify remote satellite lesions within the liver remnant that may or not have been seen with preoperative imaging specifically in multifocal hepatoblastoma has become the benefit of ICG [2] and like in one of our cases, ICG can detect the lesion which not detected by ultrasound. The smallest lesion detected was 0.062mm which was too small for detection by imaging or palpation as described in one study[3]. The duration of administration of ICG also is important as this will ensure detection of tumour as compared to remaining liver tissue is easier as the excretion time is different between them. Suggested duration of administration is 2-3 days prior to resection[4]. Easy method of administration is another advantage with the proposed dosage of 0.5mg/kg[6] and it also carry no adverse effect at all[5]. The only limitation is that the ICG could not detect lesion more than 10mm from the liver surface [1][6], but with the benefits outweigh the risks, ICG has become the jewel in the crown in the line of treatment of multifocal hepatoblatosma nowadays.

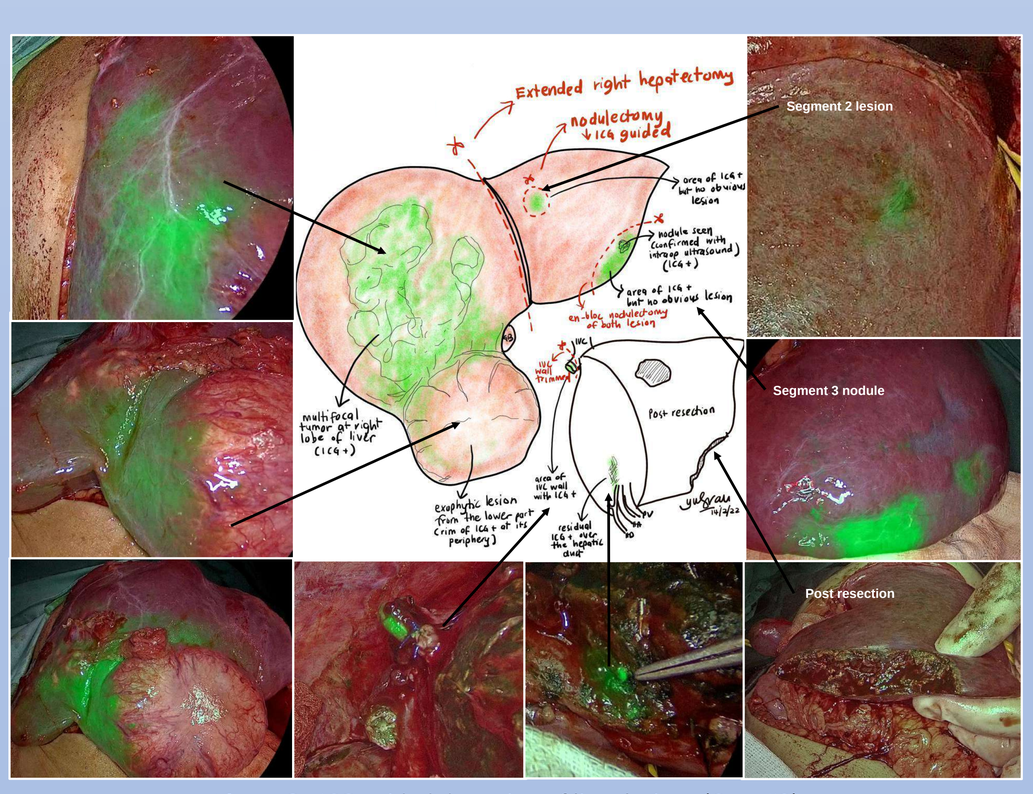

Figure 3 - ICG guided detection of liver lesions (Case #2)

Conclusion

ICG navigated surgery in oncology cases should be considered to be used regularly in the future for better outcome of the patient.

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