



# Laparoscopic anatomical segment III resection for a giant focal nodular hyperplasia (FNH): advantages of the extraglissonian approach – a case report

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**Abstract:** In recent years the laparoscopic approach in liver surgery has gained wide acceptance compared to open surgery, especially in cases of benign liver lesions. Many of these, i.e., focal nodular hyperplasia (FNH), have an important vascular inflow depending from nutrient vessels, which hamper sometimes a proper resection. We report in this video a 24-year-old male with a fortuitous diagnosis of a 10×8×7 cm FNH in the left hepatic lobe, with its characteristic central nutrient vessel. Given the size of the lesion, surgical excision was indicated and performed a laparoscopic resection of segment III following an extraglissonian approach. This approach enables an intrahepatic identification of the targeted glissonian pedicle for segment III without dissecting the hepatoduodenal ligament. It also permits the localization and clamp of the vascular inflow of the tumor leading to tumor shrinkage, which facilitates the resection without invading the tumor capsule and thus respecting the portal pedicles for the other segments. The patient did not present postoperative complications and was discharged on the third postoperative day. The definitive pathology confirmed the diagnosis of FNH. A detailed preoperative anatomical study of the liver segments allows a better planning of liver surgeries. More specifically, this selective transfulsural glissonian approach avoids a dissection of the hepatoduodenal ligament and therefore the risk of a postoperative bile leak.

**Keywords:** Focal nodular hyperplasia (FNH); laparoscopic liver surgery; anatomical resection

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## Introduction

Focal nodular hyperplasia (FNH) is the second most common benign tumor of the liver and mainly affects young people (1). Despite surgical resection is currently accepted in symptomatic patients, laparoscopic approach is sometimes challenging depending on the size and location of the tumor due to the inherent aberrant vessels surrounding the FNH. In this regard, the preoperative identification in the imaging of the arterial inflow might help in the vascular control achieving a very significant decrease in the tumor size before starting the resection.

Furthermore, an extraglissonian approach favors the identification of the intrahepatic portal pedicle (2), which supplies the correspondent liver segment without any need of further dissection of the hepatoduodenal ligament. We present the following article in accordance with the CARE reporting checklist (available at <http://dx.doi.org/10.21037/ls-20-132>).

## Case presentation

We present the case of a 24-year-old male patient with

no relevant medical-surgical history, who presented with upper-right abdominal pain. In the work-up hepatocyte-specific liver magnetic resonance it was identified a 10×8×7 cm mass arising from the segment III of the liver, suggestive of FNH, with a central nutrient vessel. Given the large size of the lesion, it was decided to perform a laparoscopic anatomical segmentectomy.

The patient is placed in French position, with the main surgeon located between the legs and two assistants on each side of the patient. The first 12 mm trocar is placed supra-umbilically using an open laparoscopy technique, and then pneumoperitoneum performed. Firstly, the external Pringle maneuver is placed using a tape around the hepatoduodenal ligament and extracted through a 5 mm trocar to stop the inflow in case a hemorrhage occurs. The umbilical fissure is addressed after dividing the falciform ligament and the view facilitated by grasping upwards from the round ligament. Before starting the transection a nutritive vessel of the lesion arising from the left hepatic artery is identified and selectively clamped to reduce the blood flow into the FNH and avoid a total Pringle maneuver. According to the extraglissonian approach, liver parenchyma transection is carried out following the umbilical fissure, which enables a direct access to the targeted subsegmentary pedicle of segment III (*Video 1*) and the division of the same with stapler without invading the tumor capsule and thus respecting the portal pedicles for other hepatic segments. At this point of the operation to complete the resection it remains only the liver parenchyma beyond the glissonian pedicle, which is transected with an ultrasonic dissector. The patient had no postoperative complications and was discharged home on the third postoperative day. The definitive pathology confirmed the diagnosis of FNH.

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committees and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient.

## Discussion

FNH is currently a rare indication for liver resection however when necessary it might require a major liver resection in up to 33% of the cases (3). From a surgical point of view, the resection could be as hazardous as the location of the HNF is and the most frequent postoperative complication is described to be postoperative abscesses secondary to bile leak (4). By implementing the selective

transfissural glissonian approach, the targeted pedicle is directly addressed and stapled, therefore the liver hilum is not exposed preventing thus a bile leak (2). The detailed preoperative study of the liver anatomy allows a better planning of liver surgeries. In patients with FNH, the identification and dissection of the typical central nutrient artery allows selective clamping of the problem region, reducing the risk of hemorrhage and avoiding the clamping of the entire hepatic hilum (5).

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