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LETTER TO THE EDITOR

Glucose-6-phosphate dehydrogenase deficiency: a contraindication for living donor liver transplantation?

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Living donor liver transplantation (LDLT) is a well-established treatment option for patients suffering from end-stage liver disease with acceptable outcome for the recipient and minimal risk for the donor, given that a suitable donor can be found [1]. But many potential living donors are excluded because of medical reasons, one of which is Glucose-6-phosphate dehydrogenase deficiency (G6PDD) [2].

Glucose-6-phosphate dehydrogenase (G6PD) is a ubiquitous enzyme that plays a key role in the metabolism of glucose and is essential for protecting red blood cells from oxidative stress [3]. G6PDD is the most common enzyme deficiency, and it has been estimated that more than 400 million people worldwide are deficient in this enzyme [4]. The highest frequencies are detected in Africa, Asia, the Mediterranean region, and in the Middle East; owing to recent migrations, however, the disorder is also found in North and South America and in northern European countries.

The X-linked, hereditary genetic defect is caused by mutations in the G6PD gene, which results in protein variants with different levels of enzyme activity, that are associated with a broad range of biochemical and clinical phenotypes. The most common clinical manifestations are neonatal jaundice and acute haemolytic anaemia, which are triggered by oxidative stress [3,5]. Infection, oxidative drugs and ingestion of fava beans are probably the most typical causes of haemolysis in people with G6PDD [3]. Moreover, several clinical disorders, such as pneumonia, viral hepatitis, diabetes, myocardial infarction, and, most important from our point of view, surgical stress have been reported to precipitate haemolysis in individuals with G6PD defect [6–8]. The precise mechanism by which increased sensitivity to oxidative damage leads to haemolysis is not fully understood; furthermore, the exact sequence of events once an exogenous trigger factor is present is also unknown [3]. However, severe consequences of fulminant haemolysis with consecutive haemolytic anaemia associated with G6PDD, such as renal failure, disseminated intravascular coagulation, immunodeficiency and pancreatitis might occur and have been described previously. Therefore, the most important consideration for patients with G6PDD is the avoidance of oxidative stress [8], thus explaining the fact that so far, to our knowledge, there is no published experience in liver resection, particularly in the setting of partial liver donation for LDLT. Therefore, here we report for the first time, a case from a living-donor with G6PDD who donated the right liver lobe for his mother suffering from HCC in chronic hepatitis C cirrhosis.

A 57-year-old female from the Middle East with suspected hepatocellular carcinoma (HCC) in cirrhosis because of chronic hepatitis C was referred to our department for assessment of possible LDLT. In her home country, donation after brain death was uncommon. For LDLT, the 25-year-old son of the patient was intended to act as the donor. It was known that the potential donor had G6PDD, but so far he never had shown any clinical manifestations of the enzyme deficiency. Complete blood count and liver function tests were within normal range. Further evaluation [1] including liver biopsy showed no other contraindications. As, of four potential donors he was the only one with matching blood group, it was decided to proceed with LDLT despite G6PDD by a multidisciplinary team. LDLT was performed as described elsewhere [1], but including the middle hepatic vein with the graft. Surgery and the postoperative course were uneventful for both, the donor and recipient. Liver function tests of the donor showed early postoperative increase of bilirubin to 8.43 mg/dl (unconjugated bilirubin, 4.75 mg/dl; conjugated bilirubin, 3.68 mg/dl), but returned to normal range within 1 week (Fig. 1). Although this increase in bilirubin is unusual in a patient after normal liver resection, we have observed a similar increase in serum bilirubin in almost all our donors for LDLT – a phenomenon not explained yet. Liver function tests of the recipient were also uneventful. Histopathology of the explant showed a HCC of 2 cm diameter in gross cirrhosis. Both recipient and donor were discharged on the 18th postoperative day in good health and liver function tests within normal range. Today, 3 years after the transplantation, they are in good health without signs of liver dysfunction or recurrence of HCC in the recipient.

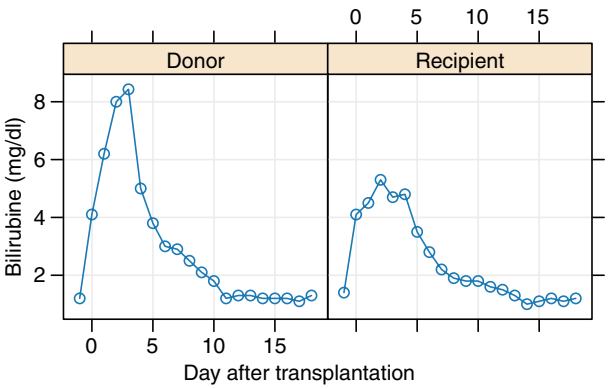

Figure 1 Postoperative bilirubin levels of recipient and donor.

In conclusion, although Baker and colleagues describe G6PDD as a contraindication for partial liver donation, we present a case of LDLT from a donor suffering from G6PDD with uneventful surgical and postoperative course. We suggest that donors suffering from G6PDD, but without clinical manifestation, should not be excluded from further evaluation. If exhaustive evaluation and liver biopsy do not show any non-normal results and the potential donor is in good health, he may be considered for donation. We do not recommend a general change in the usual policy of donor selection, but rather suggest decision-making on a case-by-case basis and a documentation of such cases in an international registry.

Considering the fact that G6PDD has high prevalence in the Middle East and Asia, adoption of this modification to common donor selection algorithms should enlarge the donor pool for LDLT.

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