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Isolated slaughterhouse liver as model for normothermic perfusion after warm and cold ischemia: single case report

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Abstract

Liver transplantation is an ultimate procedure in patients suffering end-stage liver diseases. In these last years the donation after cardiac death (DCD) has increased the pool of potential liver donors. Different studies and procedures are involved in the prevention of the main ischemic problems during the reconditioning and resuscitation of the marginal livers. Normothermic extracorporeal liver perfusion (NELP) avoids prolonged cold storage damage that is the main cause of steatosis and biliary tract ischemia in transplanted patients. Different porcine models have been studied and developed to understand the ischemia mechanism and to select the better technique for NELP (Bellomo *et al.*, 2012). We conducted our study using a DCD pig liver model collected from slaughterhouse (Grosse-Siestrup *et al.*, 2002). Using extracorporeal membrane oxygenation, 2000 ml of total fluid containing autologous blood, lidocaine, heparin, antibiotics, glucose 10 % solution and flunixin, the NELP was achieved (Guibert *et al.*, 2011). The liver was perfused over 7 hours after 48 hours of cold storage (4°C), using Eurocollins solution. During the liver withdrawal in the slaughterhouse 20 minutes were waited to simulate the warm ischemia (WI) time. Histological samples, swab for bacterial grow, blood sample from venous drainage line, temperature and pulse oximetry saturation were collected to assess the liver viability and function. Liver function, reflected by urea, albumin, total cholesterol, total bilirubin was seen during NELP. Biochemical and microscopic assessment and an improved oxygen uptake revealed minimal injury sustained during perfusion. These analyses revealed stable metabolism throughout perfusion identifying a cycles 2 hours length, coinciding with recovery of oxygen uptake rates to fresh liver, as described in literature. In summary the preliminary established model of isolated hemoperfused slaughterhouse liver reveals the important role of the relation between cold storage and normothermic perfusion. Moreover this preliminary study justifies further investigation of the optimization of the treatment protocols and perfusion media.

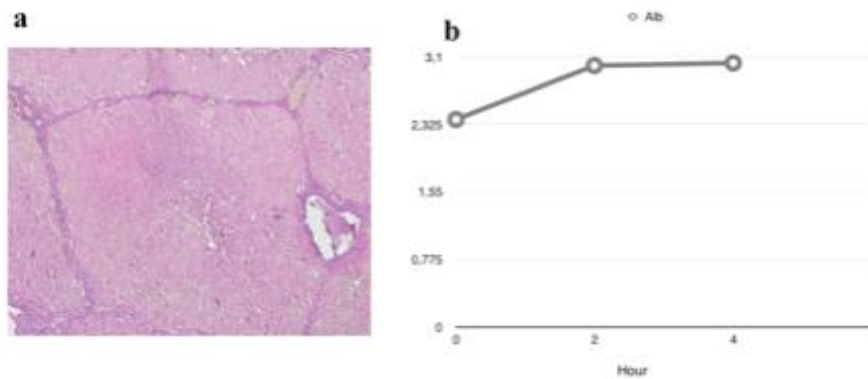


Fig.1: Results obtained during normothermic preservation. (a) Haematoxylin-eosin-stained liver histology, X 4 magnification. Biopsies taken after 7 hours of perfusion. (b) Graph displaying

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