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Sepsis and cirrhosis in pediatrics: revisiting two-hit BDL-CLP rat model and its pathological and immunological reliability

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Cirrhotic patients are significant in terms of infection. Due progressive damage and organ failure, as well as immune dysfunction, they are vulnerable to these complications. Highlighting infants with cirrhosis, the major cause is biliary atresia. It leads to a progressive liver failure. Many individuals undergo surgeries, most of them being submitted to liver transplantation in few years. Spontaneous bacterial peritonitis, ascending cholangitis and bacterial translocation occur in some cases. They aggravate organic injury, which can trigger a septic condition. This work proposed to study conditions overlap by a two-hit of very used animal models: bile duct ligation (BDL) and cecal ligation and puncture (CLP). Procedures were performed in young rats after anesthesia by isoflurane inhalation and ketamine injection. Serum levels of inflammatory biomarkers like IL-1beta TNF-alpha, IL-10 interleukins were analyzed in different periods, as well as clinical scores and histopathological findings. Results indicates that two-hit shows the lowest survival (60%). There were few differences between groups in interleukins values comparison. Two-hit had worst organic and clinical scores. IL-10 had the highest correlation with MSS ($\rho = 0.64$, $p < 0.0001$). Liver and kidney had the highest correlation with MSS ($\rho = 0.65$ and 0.66 , $p < 0.0001$) and MHBS ($\rho = 0.82$ and 0.79 , $p < 0.0001$). As conclusion, the model is a simple and useful tool to study conditions overlap in young rat, despite interleukins do not show a clear pattern. Although it represents well a severe state, it may requires improvements to stratify the diseases.

Keywords: Sepsis; Cirrhosis; CLP; BDL; Children; Animals; Biomarkers.