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# PRECLINICAL STUDY FOR EVALUATING THE IMPACT OF CHOLANGIOCYTE-COATED SILICONE STENT ON PORCINE MODEL FOR BILE LEAKAGE

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**Background** : Liver transplantation has become the gold standard treatment for end-stage liver disease and hepatocellular carcinoma. However, biliary complications remain a significant challenge, occurring in 15-35% of liver transplant recipients and resulting in substantial morbidity and mortality. This study aims to evaluate the efficacy of a novel approach combining 3D-printed Y-shaped silicone stents with human chemically derived hepatic progenitors differentiated into cholangiocytes (hCdH-chols) in preventing biliary leakage following liver transplantation.

**Methods** : A total of 14 pigs were divided into two groups: control (n=7) and hCdH-chols stent (n=7). The efficacy of the stents was assessed through survival rates, incidence of biliary leakage, and leakage resolution time.

**Results** : Results showed successful engraftment and differentiation of hCdH-chols on the Y-shaped stents, confirmed by qPCR analysis and immunofluorescence staining. While not statistically significant, the hCdH-chols stent group demonstrated higher survival rate (57.1%) than the control group (42.9%). The hCdH-chols stent group showed the lower incidence of biliary leakage (28.6%) compared to the control (57.1%) group, although this difference was not statistically significant (p=592). Importantly, all animals with biliary leakage in hCdH-chols stent group experienced resolution within median of 3.5 days, while none in the control group showed resolution.

**Conclusions** : This study provides insights into the potential use of 3D-printed Y-shaped silicone stents seeded with hCdH-chols for preventing biliary leakage after liver transplantation. This approach combines innovative stent design with cell therapy, offering a new direction for addressing biliary complications in liver transplantation.

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