

## AN EXCESS IN POST-OPERATIVE SERUM PHOSPHATE DROP PREDICTS THE DEVELOPMENT OF POST-HEPATECTOMY LIVER FAILURE: A PROSPECTIVE PRELIMINARY ANALYSIS..

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**Background** : Hypophosphatemia is associated with increased metabolic demands, and a greater post-hepatectomy reduction in serum phosphate levels has been linked to hepatic hypertrophy. Post-hepatectomy liver failure (PHLF) remains a major cause of morbidity and mortality, with no reliable biomarker available for early diagnosis, particularly for milder cases. This study evaluates whether serum phosphate dynamics can predict PHLF development.

**Methods** : Serum phosphate levels and other clinical and biochemical parameters were prospectively collected from all patients undergoing hepatic resection at a single institution between July 2023 and July 2024. PHLF was defined according to the criteria of the International Study Group of Liver Surgery (ISGLS).

**Results** : Data from 160 patients were analyzed, including 116 with colorectal liver metastases, 23 with hepatocellular carcinoma, and 21 with intrahepatic cholangiocarcinoma. PHLF occurred in 29 (18.1%) patients, categorized as 23 Grade A, 5 Grade B, and 1 Grade C. All patients experienced a significant postoperative drop in serum phosphate levels, with a nadir at postoperative day (POD) 3. Phosphate levels returned to preoperative values by POD5 in patients without PHLF (median change: -0.03 [IQR: -0.20, 0.12]), whereas patients with PHLF showed persistently low levels at POD5 (median change: -0.28 [IQR: -0.14, -0.44],  $p < 0.001$ ). A phosphate drop exceeding -0.12 at POD5 predicted PHLF development with an area under the curve (AUC) of 0.832 (95%CI:0.752-0.911).

**Conclusions** : While phosphate concentration is linked to hepatic hypertrophy, the inability to restore serum phosphate levels by POD5 may indicate impaired hepatic regeneration, representing a potential early biomarker for PHLF.

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