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Renohepatic crosstalk: Mechanisms and therapeutic approaches

Ho Sik Shin

Kosin University College of Medicine, Gospel Hospital, Korea, Republic of

There is usually a kidney–liver crosstalk in health and certain pathological states. In this sense, there are renal-induced liver damages in acute kidney injury, as well as liver-induced renal damages in hepatic disease. Ischemia, reperfusion, cytokine outflow, pro-inflammatory cascades, metabolic acidosis, oxidative stress, and changes in enzymatic and metabolic pathways provide the bases for this bidirectional kidney–liver damage. Thus, knowing the characteristics of this crosstalk is crucial for handling the complications induced by this vicious circle.

1. One of the mechanisms of renohepatic crosstalk is the regulation of blood flow between the two organs. The kidneys and liver receive blood from the same source, the hepatic artery, and the portal vein. The kidneys receive about 20% of the cardiac output, while the liver receives about 25%. Changes in blood flow to one organ can affect blood flow to the other, leading to alterations in their functions.

2. Another mechanism of renohepatic crosstalk is the regulation of metabolism. The liver plays a vital role in glucose and lipid metabolism, while the kidneys are involved in the regulation of electrolytes and acid-base balance. Changes in the metabolism of one organ can affect the metabolism of the other.

3. Inflammation is also a mechanism of renohepatic crosstalk. Both the kidneys and liver are involved in the immune response, and changes in the inflammatory state of one organ can affect the other. For example, in conditions such as sepsis or acute kidney injury, inflammation can lead to liver dysfunction.

4. Therapeutic approaches to renohepatic crosstalk include the management of conditions that affect both organs, such as chronic kidney disease (CKD) and non-alcoholic fatty liver disease (NAFLD). Lifestyle modifications, such as weight loss and exercise, can improve both CKD and NAFLD. Pharmacological therapies, such as angiotensin-converting enzyme (ACE) inhibitors and angiotensin receptor blockers (ARBs), can also improve kidney and liver function. Additionally, the use of novel therapies, such as mesenchymal stem cell transplantation, has shown promise in improving both kidney and liver function.