4718

Circulatory Actions of Digitalis and Strophanthus and Comparisons With Histamine and Epinephrine.

M. L. TAINTER AND W. DOCK.

From the Departments of Pharmacology and Medicine, Stanford University School of Medicine, San Francisco, California.

In a previous study[1] of the circulatory actions of digitalis in dogs we showed that the diminution in cardiac output was dependent upon the lowering of venous pressure, rather than upon cardiac depression, *i. e.*, that it was of vascular and not cardiac origin. It was suggested that this lowering of venous pressure from digitalis was mediated by a hepatic vein constriction with pooling of blood in the portal vessels. In the present study we have amplified the evidence and confirmed the importance of the hepatic mechanism previously suggested.

It was found that intravenous injections of digitalis, in doses corresponding to the full therapeutic for man, and of strophanthus, in 5 dogs caused an increase in arterial pressure, fall of venous (intraauricular) pressure, and increase in portal vein pressure. The increase in portal vein pressure was due to hepatic vein constriction, agreeing with the increased liver volume previously observed by us. The latter actions agree also with similar actions on isolated hepatic veins and on those of perfused livers reported in the literature.

After elimination of the liver (6 dogs) from the circulation, by shunting the portal blood into the vena cava, or of the entire splanchnic circulation by ligation, digitalis and strophanthus did not diminish the venous pressure, but increased it, if anything. Accordingly, the fall of venous pressure, after digitalis and strophanthus in dogs with liver intact, was due to diminished venous flow owing to pooling of blood in the splanchnic (mainly portal) region as a result of block in the liver. This mechanism adequately explains the diminution in cardiac output after digitalis, since a diminished venous return must result in deficient cardiac filling and output.

Comparisons were made with known actions of histamine and epinephrine in the same animals. Comparable pooling of portal blood was observed, although modified by the other vascular actions of these drugs.

[1] Dock, W., and Tainter, M. L., PROC. SOC. EXP. BIOL. AND MED., 1929, xxvi, 524.