The results are evidence that burn trauma is accompanied by disturbances of the microcirculation, hemoconcentration, and increased viscosity of the blood, which are especially marked in vessels with low pressure. Changes in the mesenteric microcirculation coincided with changes in the dynamic viscosity of the blood and hematocrit index determined in vitro. These disturbances were more marked after extensive and deep burns with a fatal issue than after moderately severe burns, the consequences of which were less serious. This investigation confirms the important role of changes in the blood rheology and disturbances of the microcirculation in the early period of burns.

LITERATURE CITED


PERMEABILITY OF TISSUE-BLOOD BARRIERS OF THE SMALL INTESTINE DURING PERFUSION WITH CERTAIN PRESERVATIVE SOLUTIONS

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The effect of some preservative solutions on changes in permeability of tissue-blood barriers of isolated loops of small intestine was studied in laboratory albino rats during perfusion of their vessels with 0.85% sodium chloride solution, with Ringer-Locke, Hanks', and Collins-2 solutions, and with the Soviet preparations Gemodez and Aminopeptid. The volume of fluid flowing from the vessels, penetration of perfusion fluid into the lumen of the intestine, and its elimination through the serous membrane were determined. It was concluded that the least disturbance to the tissue-blood barriers of the small intestine is observed during perfusion of its vessels with Collins-2 solution. This method is recommended as a test for comparing the properties of preservative solutions.

KEY WORDS: small intestine; tissue-blood barriers; perfusion; preservative solutions.

Of the many methods of keeping organs and tissues viable in vitro the most promising at this stage seems to be their preservation in cold liquid media. In this connection many solutions balanced with the extracellular or intracellular fluids and containing electrolytes, carbohydrates, amino acids, and antibiotics, have been studied [1, 6, 8]. However, no general criterion for comparison of these solutions could be found in the accessible literature.

It has been shown [2, 3, 7, 9, 10] that during perfusion of the vessels of the small intestine with various solutions the latter penetrate through the vascular wall and tissue-blood barriers into the lumen of the intestine and emerge on its serous membrane. The writers have used this phenomenon to compare the properties of preservative solutions used in experimental and clinical transplantation.

Fig. 1. Diagram of microperfuser with heat exchanger for perfusing blood vessels of isolated loops of small intestine. 1) Reservoir with perfusion fluid; 2) drip-cock; 3) regulator of rate of flow of perfusion fluid; 4) cannulas for draining perfusion fluid from intestinal lumen; 5) cannula for draining vascular component of perfusion fluid; 6) cannula conducting perfusion fluid into mesenteric artery; 7) intestine placed on surface of heat exchanger; 8) connecting tube of heat exchanger for outflow of heat carrier; 9) heat exchanger with heat carrier; 10) connecting tube for inflow of heat carrier into heat exchanger; 11) vessel for collecting extra-intestinal component of perfusion fluid; 12) receiver for collecting vascular perfusion fluid; 13) receiver for collecting intestinal perfusion fluid.

It is convenient to use the small intestine because fluid passing out of the vessels does not accumulate in the tissues, as it does in the liver, kidneys, pancreas, and other parenchymatous organs, but penetrates through tissue-blood barriers and enters the lumen of the intestine [11, 13, 14]. A certain proportion of the solution escapes to the serous membrane of the intestine and into its lymphatic system. This fraction was conventionally called the extraintestinal component of the perfusion fluid.

**EXPERIMENTAL METHOD**

Experiments were carried out on 37 laboratory albino rats weighing 200-250 g. The animals were divided into seven groups with at least five rats in each group. The animals of group 1 (seven rats) were used to develop an experimental model. In the remaining six groups changes in the tissue-blood barriers were studied during perfusion of the intestine with 0.85% sodium chloride solution, with the Soviet preparations Gemodez (see below) and Aminopeptid (a product of enzymic hydrolysis of bovine blood proteins), and Ringer-Locke, Hanks', and Collins-2 solutions.

Perfusion systems of different designs [4, 5, 8, 12] are used to perfuse the small intestine. In the present investigation the writers used a microperfuser consisting of a reservoir for the test fluid, a system of tubes, and a regulator of the perfusion fluid drip system and heat exchanger, on top of which the isolated loop of intestine for perfusion was placed (Fig. 1). Fluid escaping through the serous membrane of the intestine and lymphatic ducts was collected through the central outlet of the heat exchanger. The vessel containing perfusion fluid was placed 150 cm above the level of the heat exchanger, equivalent to a pressure of 110 mm Hg. The experiment continued for 1.5-2 h. The rate of flow of the solution was kept stable at 5 ml/min.