emphasized that the data given in this paper provide no basis for the conclusion that virus particles can enter the cell only through receptors for LDL. It is perfectly probable that viruses may also have specific receptors through which they can penetrate into tissue cells.

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CHOICE OF ADEQUATE METHOD OF DETOXICATION AND IMMUNOCORRECTION IN EXPERIMENTAL DESTRUCTIVE PANCREATIS

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UDC 616.37-002:612.017.1:61.5-091

KEY WORDS: experimental pancreatitis; detoxication; immunocorrection.

One of the most difficult problems in emergency abdominal surgery is that of acute pancreatitis, which is usually accompanied by a marked toxic syndrome (pancreatogenic toxemia). This syndrome develops in the initial period of the disease [9], and if detoxication therapy is not instituted during this period, a vicious circle develops. The barrier inhibitory mechanisms are disturbed, the local pathological process is intensified, and progresses under the influence of generalized microcirculatory disturbances and a syndrome of disseminated intravascular clotting. Only timely differential detoxication treatment can prevent subsequent progression of the pathological process in its local and general manifestations. In recent years, besides traditional methods of treatment, much attention has been paid to the use of detoxication methods: hemoperfusion (HP), plasmapheresis (PPh), ultraviolet irradiation (UVI) of autologous blood, and xenosorption (XS). However, these methods are often used unsystematically, without any attempt at differentiation for scientifically based choice, disregarding the particular features of the course of pancreatogenic toxemia, manifested as massive release of activated pancreatic enzymes and proteolysis products into the portal circulation, and also by immunologic disturbances in the body.

The aim of this investigation was to develop an effective, pathogenetically based method of detoxication and immunocorrection in destructive pancreatitis with a marked toxemia syndrome.

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(Presented by Academician of the Academy of Medical Sciences of the USSR A. D. Ado.) Translated from Byulleten' Éksperimental'noi Biologii i Meditsiny, Vol. 112, No. 11, pp. 517-519, November, 1991. Original article submitted April 15, 1991.

EXPERIMENTAL METHOD

Experiments were carried out on 40 mongrel male dogs weighing 13-15 kg. A model of destructive pancreatitis was produced by injection of up to 4-4.5 ml of autologous bile in camphor oil in fractional doses into the head, body, and tail of the pancreas [1]. The animals were divided into four groups depending on the method of detoxication. Sorption therapy was carried out 3-4 days after injection of the bile. HP was performed on standard apparatus by the usual method. As adsorbents we used Soviet activated charcoal of the SKN-4M and SKN-1K brands. PPh was carried out by a discrete method, the essence of which was consecutive collection, centrifugation, and fractionation of the plasma and cellular components of the blood. A Mark K-70 refrigeration centrifuge was used. Continuous flow of UVI of the blood was carried out on a standard Soviet Izol'da apparatus, through the working part of which blood was passed continuously with a volume velocity of 50-60 ml/min and for 30-40 min. Extracorporeal connection of the donor's spleen was carried out by the method developed at the Research Institute of Transplantology and Artificial Organs, Ministry of Health of the USSR. The efficacy of treatment was estimated by the clinical manifestations of poisoning and by laboratory tests, and also by laparoscopy and by inspection during the operation. A parallel study was made of the general toxicity of the blood and the animal's immune status. The absolute (in 1 liter) and relative (in %) numbers of T- and B-lymphocytes were determined by the method of spontaneous rosette formation with sheep's and mouse erythrocytes, and the rosette-forming ability of the neutrophils was studied to reveal their functional activity [4]. The time course of changes in the serum lysozyme activity [3] and complementary activity (by the 50% hemolysis method) were recorded simultaneously.

EXPERIMENTAL RESULTS

Destructive pancreatitis usually develops on the 3rd-4th day. By this time the clinical manifestations of toxemia were distinctly observed, in the form of changes in the color of the skin and sclera, tachycardia of an excessive degree for the temperature, dyspnea, instability of the blood pressure (BP), low values of the central venous pressure, encephalopathy, diminution of 24-hourly diuresis, evidence of hepatorenal failure, and intestinal paresis. Meanwhile increased trypsin and amylase activity was recorded in the blood and urine. The dogs' immune status was significantly disturbed, as shown mainly by a significant decrease in the number of T lymphocytes in the peripheral blood (from 50.45 ± 0.81% in the initial state to 41.82 ± 3.31%), and with a greater increase in the number of low-avidity lymphocytes (rosettes with 3-5 erythrocytes).

Less marked changes were discovered in the humoral component of immunity. The number of B-lymphocytes fell from 25.0 ± 0.8% in the initial state to 22.7 ± 2.02%; $p < 0.05$). There was a sharp rise in the number of O-lymphocytes (from 24.55 ± 0.12 to 35.91 ± 0.3%; $p < 0.05$), which is itself an unfavorable sign, for it is due mainly to a decrease in the ability of T lymphocytes to induce expression of E receptors, probably under the influence of endogenous toxic factors. An increase in serum lysozyme activity of the blood also was noted (from 41.35 ± 0.87 to 49.6 ± 0.91%), which could be the result of increased functional activity of the neutrophils during this period, for the absolute number of rosette-forming neutrophils in the blood was almost doubled. Activity of complement was considerably depressed. However, the toxemic syndrome in pancreatitis follows a different course from that accompanying peritonitis: in the initial period (1st-2nd days) the toxemia was mainly enzymic, whereas later (3rd-4th days) tissue (suppurative) toxicosis was added, to complicate the course of the disease [2]. Consequently, detoxication treatment must be applied differentially.

The detoxication methods which we used differed in their efficacy on the toxemia syndrome in the experimental animals. The strongest positive effect, judging by the criteria of evaluation used, was produced by PPh and XS, and UVI of autologous blood had a weaker effect.

After a single session of PPh and XS on 36 animals (92%) positive clinical and laboratory changes were observed, the general condition of the dogs improved, and they became more active. Toward the end of the 1st day, signs of toxemia in 32 dogs (90%) were much weaker, as shown by a decrease in the degree of tachycardia, a rise of body temperature, and increased tone of the abdominal wall. Toward the end of the 2nd day, intestinal movements were restored in 28 animals (89%). The number of leukocytes in the blood was reduced on the 1st day after PPh and XS – from (18.3 ± 1.1)·10^9/liter to (8.52 ± 0.67)·10^9/liter, the degree of the nuclear shift of the neutrophils was reduced, and the erythrocyte count was slightly lowered. Blood amylase activity after treatment of this kind fell virtually to normal (from 173 ± 19.5 to 47 ± 2.6 g/g-liter); similar changes took place in the composition of urine (from 351 ± 34.9 to 106 ± 15.7 g/g-liter). The concentration of trypsin, and also of bilirubin, urea, and creatinine, was lowered as a result of treatment by 70-80% Blood toxicity

parameters were reduced, from 0.795 ± 0.046 to 0.301 ± 0.027 conventional unit with respect to concentration of molecules of average molecular weight, and from 9.3 ± 0.65 to 14.3 ± 0.84 min as regards paramecin time.

No marked positive changes of this kind were observed after UVI of autologous blood. Signs of toxemia remained basically unchanged as regards both clinical and laboratory data: fever, tachycardia, dyspnea, and, in 45% of the animals, intestinal paresis. The laboratory tests showed evidence of toxicity of the blood: 0.598 ± 0.17 conventional unit relative to molecules of average molecular weight and 10.1 ± 0.96 min for paramecin time. Blood amylase and trypsin activity and blood levels of creatinine, urea, and bilirubin were reduced by only 20-30% of their initial values (at the climax of the disease).

In acute pancreatitis, the detoxication methods used in the investigation had a varied degree of immunocorrective action on the animal. The greatest immunocorrecting effect was observed after the use of UVI and HP in the early stage (until 1 day). In this case the number of E and B lymphocytes in the peripheral blood were restored to normal in the case of increased avidity of the lymphocytes (the higher percentage of rosettes with 5-10 erythrocytes). The level of O lymphocytes was considerably lowered, probably due to removal of endotoxins, which block the surface receptors of the lymphocytes [6], from the blood.

HP also led to an increase in activity of the rosette-forming function of the neutrophils. The lysozyme level was reduced a little compared with its value at the height of the disease, possibly as a result of its rapid breakdown. Activity of complement was close to normal.

During PPh some increase was observed in activity of the immunity system of the animals, but it did not reach the initial level. This was perhaps due to the characteristics of action of the method. We know that during PPh immune and other biologically active substances are removed from the blood stream [2]. This state of affairs may introduce a negative component into the process of normalization of the immunity system when PPh is used in the treatment of acute pancreatitis.

Extracorporeal connection of the spleen on the 1st day caused certain positive changes in T- and B-lymphocyte levels in the peripheral blood, and also led to stimulation of the rosette-forming capacity of the neutrophils and to an increase in lysosome activity. This points to enhancement of the general functional activity of the neutrophils, and is confirmed by data in [8]. In the later stages after treatment (3rd-7th days) normalization and even some degree of stimulation of parameters of the immune system were observed when extracorporeal connection of the spleen was used also.

Thus on the basis of these investigations it was concluded that destructive pancreatitis is always accompanied by a toxemic syndrome, which has certain particular features. These are: the toxemia develops in the initial period of the disease through massive release of activated pancreatic enzymes and proteolysis products, and later it is aggravated by the onset of inflammation. Under these circumstances significant weakening of the mechanisms of immunity takes place, mainly of its T-cell component. Detoxication methods of treatment have a varied action on the body. The best detoxication effect is given by PPh and by the use of a xenogeneic spleen, which considerably reduces the hyperenzymemia and toxemia The most favorable and earliest immunocorrective action was observed with the use of HP and UVI blood. The use of a xenogenic spleen was found to restore the normal mechanisms of immunity in the later stages of experimental acute pancreatitis.

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