Endotoxemia in Experimental Acholia

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The intensity of experimental endotoxemia is assessed by serum content of medium molecules. Serum creatinine and bilirubin contents and leukocyte count are also monitored. It is found that acholia leads to pronounced endogenous intoxication which can be prevented by early return of bile into the organism.

Key Words: *medium molecules; reticuloendothelial system*

Endotoxemia is developed in all pathologies associated with enhanced catabolism or blockade of the detoxicating systems [4].

There are no diagnostic techniques for the evaluation of the intensity of endotoxemia, since the specificity of clinical manifestations of this condition is low, routine biochemical tests are relevant only in hepatic or renal dysfunction, the informativeness of the paramecium test is insufficient, and other integral biochemical tests are inconvenient for express diagnostics.

Endotoxemia is often developed in patients with mechanical jaundice. Proceeding from this we have hypothesized that endotoxemia also occurs in external bile loss. So far, the problem of endotoxemia caused by external bile loss remains unsolved. It was noted that some medium-molecular-weight compounds (0.5-5 kD) with distinct biological activity [1] are accumulated in the blood in various pathological states. These compounds were termed medium molecules (MM). Although the composition of the total MM pool is unknown, it was demonstrated that the pool contains peptides and oligoalcohol and glucuronic acid derivatives.

MATERIALS AND METHODS

The intensity of endotoxemia was assessed by the amount of MM measured by the express method [2]. Serum levels of bilirubin and creatinine and the leukocyte count were determined by routine methods.

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The concentration of MM was measured by the screening method. Briefly, serum was treated with 10% trichloroacetic acid (1:0.5) and centrifuged at 3000 rpm for 30 min. The supernatant (0.5 ml) was diluted with distilled water (4.5 ml). The MM concentration was measured in an SF-26 spectrofluorimeter at a wavelength of 254 nm and expressed in units quantitatively equal to extinction. The MM concentration equal to 0.240 OD units was chosen as the borderline value. The choice was based on analysis of sera from 200 healthy donors.

Experiments were performed on 24 male cats weighing 1.5-2 kg. External bile loss was reproduced through the bile fistula; the bile was returned using a previously described technique [3].

RESULTS

The intensity of endotoxemia caused by bile loss increased by the 10th-12h day and tended to decrease by the 20th day of experiment, remaining higher than in the control (Table 1).

On days 10-12, serum content of MM increased 2- and 7-fold, respectively; the leukocyte count being higher than in the norm. Serum bilirubin concentration gradually decreased. These findings are consistent with those of other researchers [2] who believe that even a short-term bile loss leads to increased absorption of endotoxins from the intestine.

Starting from the 1st and 15th day of experiment, bile was returned in the organism in amounts compensating the daily loss. On day 20, serum MM

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TABLE 1. Serum Contents of Medium Molecules (MM) and Creatinine and Leukocyte Count in Uncompensated Bile Loss

Parameter	Control	Acholia		
		day 10	day 15	day 20
MM, OD units	180±10	440±12	340±9	320±11
Creatinine, mmol/liter	61±0.3	430±1.2	290±1.4	247±1.3
Bilirubin, mmol/liter:				
total	16±0.4	9.8±0.5	4.4±0.3	4.2±0.1
conjugated	2.3±0.02	2.8±0.3	1.1±0.1	1.2±0.1
unconjugated	13.7±0.1	7.0±0.3	3.3±0.1	3.0±0.2
Leukocyte count, $\times 10^3$	9±0.4	11±0.3	16.5±0.4	12±0.2

Note. For all the values $p<0.05$ compared with the control.

and creatinine contents remained within the normal range in cats receiving bile from the first day. In cats receiving bile from the 15th day, both MM and creatinine contents increased to 180±1.7 units and 144.2±1.2 mmol/liter, respectively.

Thus, external bile loss leads to endotoxemia reaching the critical level on days 10-12 of bile loss. The return of bile in the organism reduces endotoxemia.

Bile reinfusion should be regarded as an important component of the anti-acholia therapy and should be started on the first day of bile loss.

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