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INNOVATIVE SURGERY

**Comment**

Clinical application of cold plasma coagulation apparatus CPC-1000 manufactured by SOERING” Co (Germany)

Within the period from September 2002 to January 2004 in the clinic of general surgery 56 surgical operations were performed with the use of cold plasma coagulation apparatus CPC-1000:

Surgical operation title	Operations q-ty
Hemihepatectomy	4
Right hepatic lobectomy	7
Left hepatic lobectomy	6
Hydatidectomy at hydatid disease of liver	3
Immediate distant splenorenal anastomosis at portal hypertension	6
Application of mesentery anastomosis at portal hypertension	3
Splenectomy	2
Surgeries on pancreas (pancreatic cysts, lithiasis )	4
Laparoscopic surgeries	
«Complicated» cholecystectomy at chronic calculous cholecystitis	5
Cholecystectomy at acute calculous cholecystitis	8
Operations at cholelithiasis complicated by choledocholithiasis	3
Drainage of omental bursa at acute pancreatitis and omental bursitis	3
Adhesive obstruction of small intestines	2

In the the process of the CPC application the following parameters were estimated:

1. Hemostasis efficiency and reliability

2. Extent of tissue damage in the coagulation area and wounds repair after cold plasma coagulation.
  3. Patient's safety.
  4. Useability and controlability of the apparatus operation modes.
  5. Opportunity of nozzles and connecting cables sterilization, assurance factor of the main components and aggregates.
1. In the process of surgical operations cold plasma coagulation was applied mainly to stop bleeding from parenchymatous organs, sometimes to stop capillar and small blood vessels of soft tissues bleeding. It was noticed that in the process of bleeding surfaces treatment coagulation renders very favourable effect. The intensity of exposure was possible to regulate smoothly changing the distance from the guide to the source of bleeding. Plasma beam made possible to take an aim exactly and to affect more intensely by means of guide moving closer. At the distance of 4-5 cm arc discharge occurred and sealed vessels walls. It is especially important for endoscopic surgical interventions where viewing angle is rather static.

It should be noted that cholestasis is of particular value in treatment of liver wound surface. There was essentially not any case of bile leaking after hepatectomy. In the course of a laparoscopic cholecystectomy the surgeons encountered bile leaking from the gall-bladder bed. Coagulation was not a success. But the time wasted for cold plasma coagulation device engaging was compensated by the effectiveness of the solution – the bleeding has been stopped after a few minutes of cold plasma exposure. Bleeding recurrence from parenchymatous organs after CPC application has not been observed.

2. After CPC treatment of parenchymatous organ wound surface (for instance in the process of cholecystectomy) thin coat of dull whitish colour has been formed. When employing argon- plasma method and especially monopolar electrical coagulation a scab of different thickness emerged. The scab being an evidence of underlying tissues necrosis, its thickness depended on exposure intensity.

Cold plasma use to stop capillar bleeding from soft tissues of anterior abdominal wall has not resulted in abnormalities in the course of wound repair process. All wounds have been repaired by primary intention. Soft action of cold plasma in the absence of ion currents made possible to apply the method on bleeding surfaces of small intestine (after

adhesiotomy at bowel obstruction). The effect of electrocoagulation and in monopolar mode in particular, in such cases are impermissible due to hollow organs perforation danger.

3. CPC apparatus has high protection rate with the main units self-testing that excludes unauthorized patient's exposure to CPC action. The nozzles are reliably insulated and gas pipes are effectively sealed.

4. Apparatus CPC-1000 is easy operated, its main unit is rather mobile as it is placed on a special hand cart saving place in a surgery room. Mode selection is easy understood and exercised, the information is displayed in large and bright figures. Due to the operation mode programming function the apparatus is quick in adjustment for current needs. Simultaneous use of several tools connected up the same device for assistants' work is also available. The nozzles both for open and endoscopic operations as a unit with the apparatus are handy in configuration. The probe with lateral plasma jet outlet is especially adapted for endoscopy. All nozzles diameter is 5 mm that eliminates the need in trocars of a larger diameter

5. All sterilized components are easily dismantled and cleaned before sterilization with the application of special detergents and antiseptics. Nozzles and cables are accommodated to sterilization in autoclave chamber and in formalin vapour as well. In doing this no signs of unfavourable chemical effect on tools has not been observed.

Gas -cylinders are easily exchangeable, gas connections are reliable and effectively sealed, gas pressure regulator manometer in proper time displays the necessity in gas filling up.

Clinical application of CPC-100 apparatus made by "SOERING" company (Germany) showed its high efficiency, reliability and useability that makes possible to recommend it to the operating surgeons especially for performing surgeries accompanied by trauma of parenchymous organs.

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