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Antiseptic method of 1-moment colon resection

- *Aseptics, antiseptics?*
- *It's ignored nightmare in coloproctology!*

From the conversation in operation room.

Contents of slides

1. Mortality and anastomotic leak following operations on large intestine

Mortality figures after large intestine cancer operations are highly heterogeneous. For example, according to Germany data, during 30 days after primary anastomosis died **12%** of patients, and after Hartmann operation - **25%** [1]; in an article from UK the last figure is higher - **30%** [2]. Usually: **6-39%** [3], **6-22%** [4], **25%** [5] of mortality is associated with anastomotic leak.

An average leak rate of **11%** disorientates. Being increased as anastomosis shifts down, a leak after rectal resections reached **50%** [6]; other data are much lower: **10-20%** [7], **15%** [8], **2,5-20%** [9], **10-19%** [10]. High data dispersion excludes its generalization, requires a particular analysis of each of five colon resection methods.

A leak is the result of poor preparation of large intestine for application of anastomosis. The impossibility of its emptying and lavage in case of ileus has born 4 groups of combined methods, including acts of intestines formation for withdrawal of contents. However, both primary and secondary anastomosis, as well as unloading stoma, are leaking. It should be noted that forming, keeping, closing of stoma requires considerable efforts.

2. *Miasmas* of large intestine - the main reason of anastomotic leak

The frequency of inflammation-suppuration of the surgical wound after large intestine resection has some proximity to the figures of anastomotic leak: **13,7%** [11], **12,5%** [12], **23,5%** [13], which can be explained by common reasons and pathogenesis of these complications. The reasons lies in violation of general surgery rules: aseptics, antiseptics, atraumatic manipulations. The general pathogenesis ends by formation of a purulent cavity; opening of anastomotic ligature abscess under pressure in intestine will lead to leak.

Aseptics *is a method of surgical work which provides prevention of entry of microbes into the surgical wound.*

Antiseptics *is a system of measures which reduce the number of microbes in a wound, the threat of their penetration into the wound and development inside it.*

200 years of aseptics and antiseptics have not given any technologies which provide large intestine disinfection. Its infection rate after on-table lavage with antegrade or retrograde systems such as Coloclean [14], [11], Retrowash [15], is convincingly illustrated by the data of colonoscopes processing [16]:

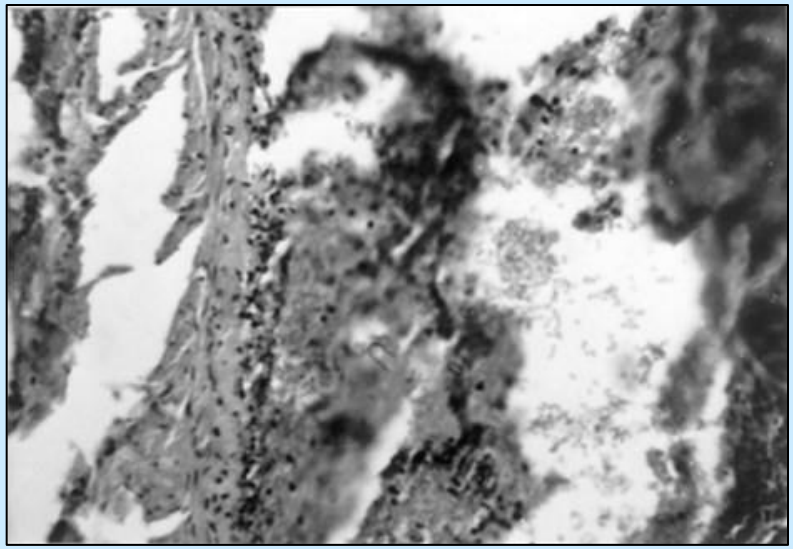
1. Contamination of apparatus after procedure is approaching to 9 units (lg CFU/ml).
2. Washing with water reduces its infection rate by 20%.
3. High-level disinfection (HLD) approache contamination of colonoscope to 0.

Thus, in connection with unreality of large intestine's HLD and the possibility to reduce its contamination at best by 20%, anastomoses are formed in an microbial environment; if the cavity was prepared, intestinal sutures will "breath" by it, if there was an ileus and afferent loops enclose liters of a microbial suspension, sutures will plunge into it.

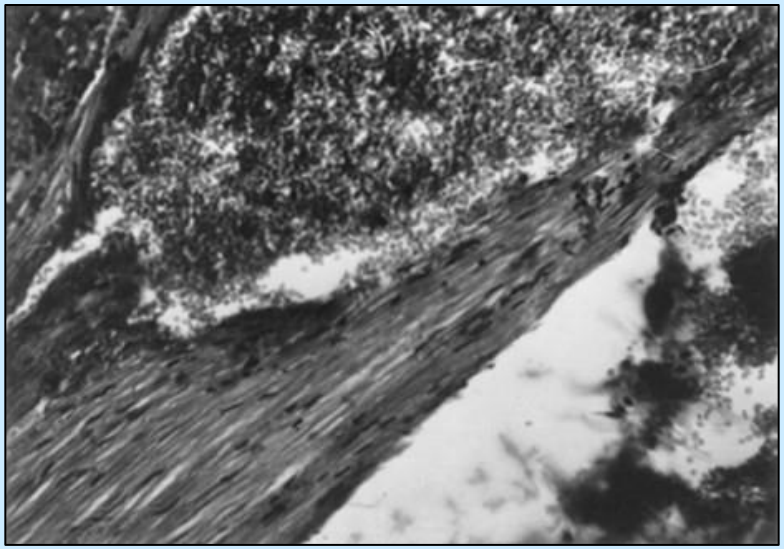
3. Palpatory intestinal trauma – the second reason of anastomotic leak

On-table intestinal lavage [17] requires palpatory intubation of intestine, emptying without intubation - “milking". The refusal from these manipulations in favor of unloading stomas is argued by intestinal trauma, drop in blood pressure during and after palpation, clogging of tubes, threat of contact sores [18].

The picture of palpatory trauma was received by experiments; microscopy study of canine’s intubated intestines preparations revealed a gross damage of all its layers [19]. It is important that the healing of anastomosis is affected not only by the physical intestinal trauma, but also by the neuro-reflex reaction to it, expressed by vasospasm, ischemia ...



Intubational intestinal trauma:
stratification of mucosal and muscular layers



Intubational intestinal trauma:
hematoma of muscular layer

4. Ideology and differences of Antiseptic method

The novation is devoted in memory of my grandfather, Sarkys Abramyanc from Van, who died after surgery on sigmoid colon.

The method is intended to prevent the leak of colon anastomosis. It is actual, first of all, in case of urgent resection, conducted in connection with ileus. The essence of prevention lies in:

1. Intensive antegrade lavage of intestinal cavity in course of operation.
2. Extended irrigation and aspiration of intestinal cavity during post-operational period.

Postoperative irrigation will provide X-ray control of anastomosis tightness and lavage of mucosa; continuous aspiration will exclude gases and liquid in an intestinal cavity, will provide a flat state of intestine and closing of anastomosis mucous lips and, as a result, its healing by primary and even by secondary tension.

Lavage, irrigation and aspiration of intestines are realized by new systems integrated into the complex Intestinal Intubator with Drain-Irrigator (IIDI) [20-28], as well as new 1-moment colon resection. New systems are distinguished by:

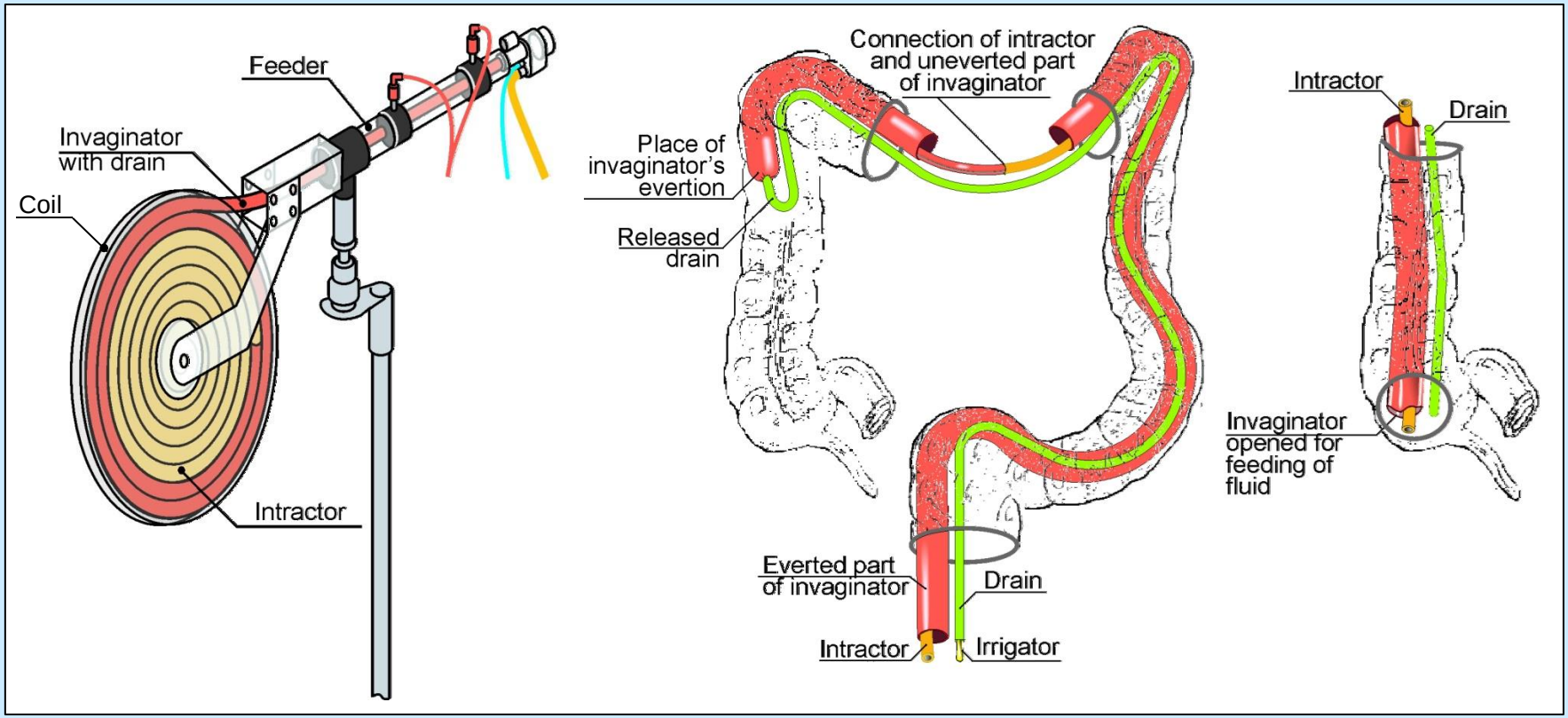
- Atraumatic transanal intubation of the intestine at the required depth.
- Intensive flow of fluid delivered to the endpoint of intubation.
- Dosed fluid delivery along all the intubated intestine.
- 100% reliability of emptying and aspiration of the intubated intestine.

The new 1-moment colon resection is different by:

1. Technical connection of resected colon ends.
2. Transanal intubation and lavage of resected colon.
3. Disconnection of resected colon ends and application of anastomosis.

5. IIDI; system “Intubator”

Atraumatic transanal intubation of large intestine is carried out by 2 forces that cooperate under the "pull-&-push" principle. The "pull" force is created by an invaginator, which everts out like a finger of gloves; together with the drain enclosed therein, it is rolled onto the mucous surface. Source of "push" force is the mechanism that feeds invaginator with drain and then intractor into the everted and inflated part of the invaginator.

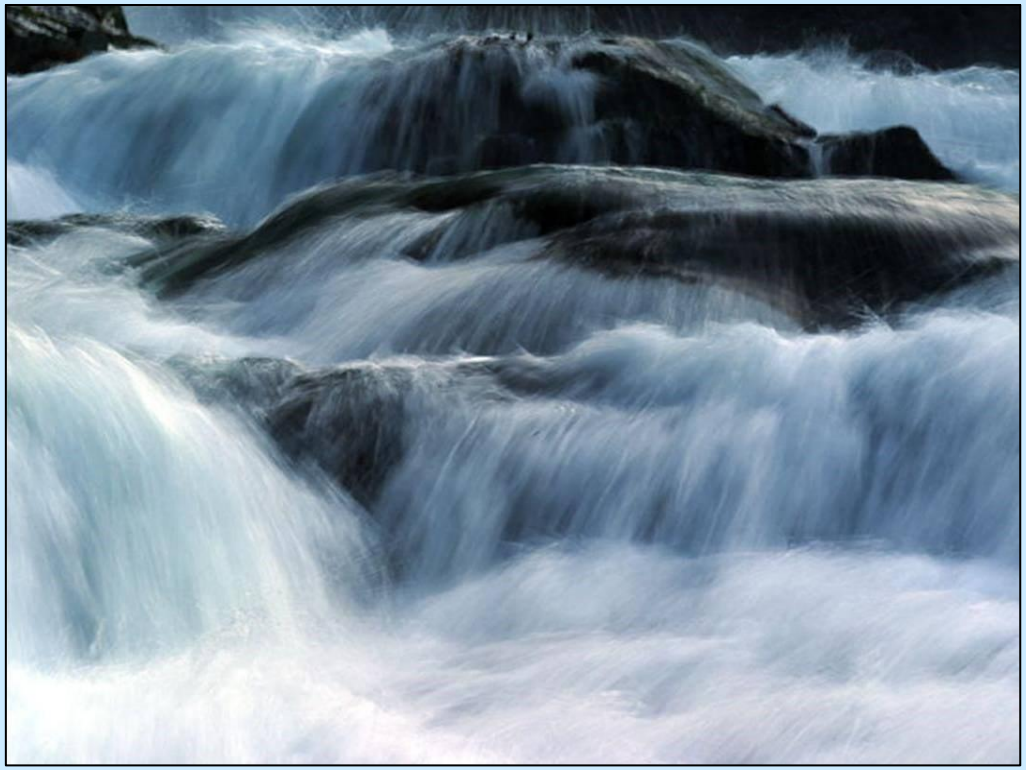


6. IIDI; intubation management

Intubation of the intestine (see record) is performed by surgeon by periodically pressing the pedal of the feeder mechanism; by hands he controls direction of invaginator's evertion. The intubation step is 5-10 cm, the total duration is no more than 1 min.

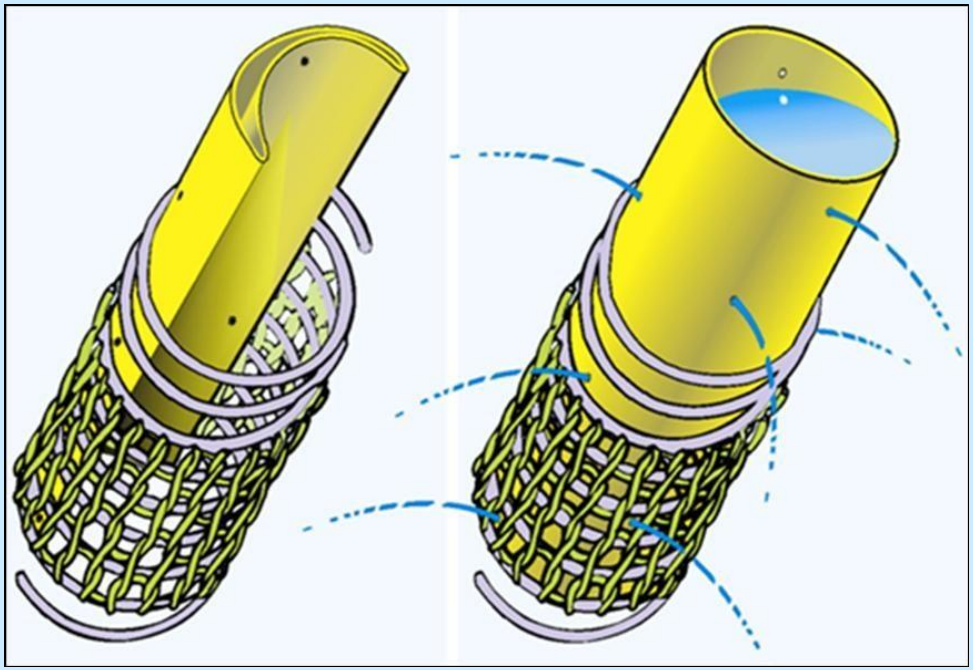
7. IIDI; lavage system “Stream”

The basis of the system is an everted invaginator, opened after intubation to the endpoint of intubation (see slide 5 on the right). Its diameter (18 mm) will provide a stream of lavage fluid with a speed of up to 10 l/min; after filling, for example, the cecum, it flows down along the colon into the rectum, and then into the pipeline and the receiving container, carrying with it intestinal *miasmas*. On-table lavage up to "clean water" requires dozens of liters of liquid, its level above the intestines can be about 5-10 cm wg.



8. IIDI; aspiration system “Drain-Irrigator”

The system includes a sleeve, punctured along the circumference and length, enclosed in a flexible spiral-net drain [22]. Feeding of a fluid into the sleeve will squeeze out the contents of drain, and washes its mesh. Such recanalization of drain guarantees full emptying of intestines before application of anastomosis, lavage and aspiration of intestinal cavity in post-operational period; the sleeve could be also used for feeding of the radiocontrast fluid, and thus – for checking of anastomosis tightness. A local lavage of caecum, which is required in connection with the receipt of ileum contents, will be provided by the Intractor tube (see slide 5 on the bottom right).



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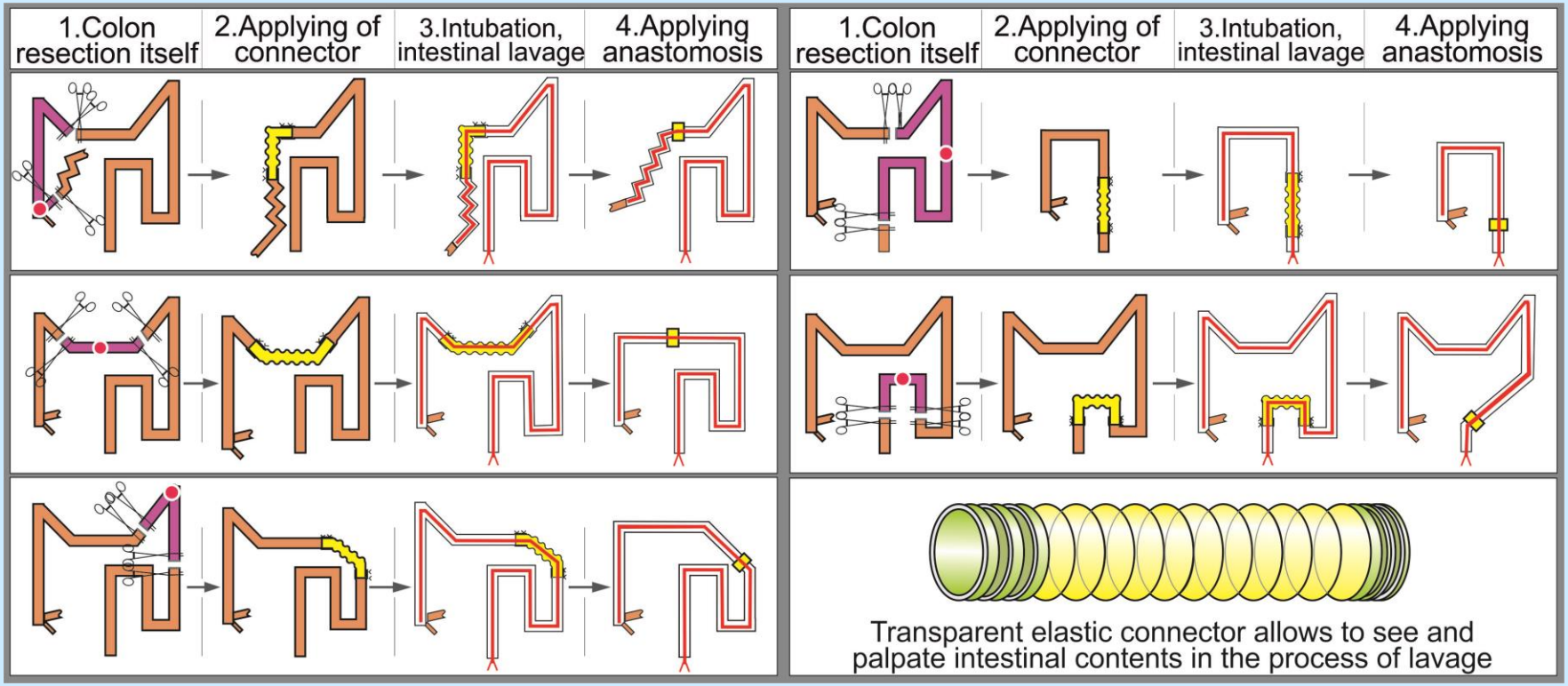
9. Algorithm of new 1-moment colon resection

The new resection consistently includes :

1. Colon resection [29] itself according to one of the 5 classic variants [30].
2. Technical connection of the resected intestine's ends by means of a connector.
3. Intubation and lavage of technically connected colon.
4. Removal of connector and manual application of anastomosis bypassing inserted elements.

By p. 4: Putting of a mechanical suture will require extubation and re-intubation.



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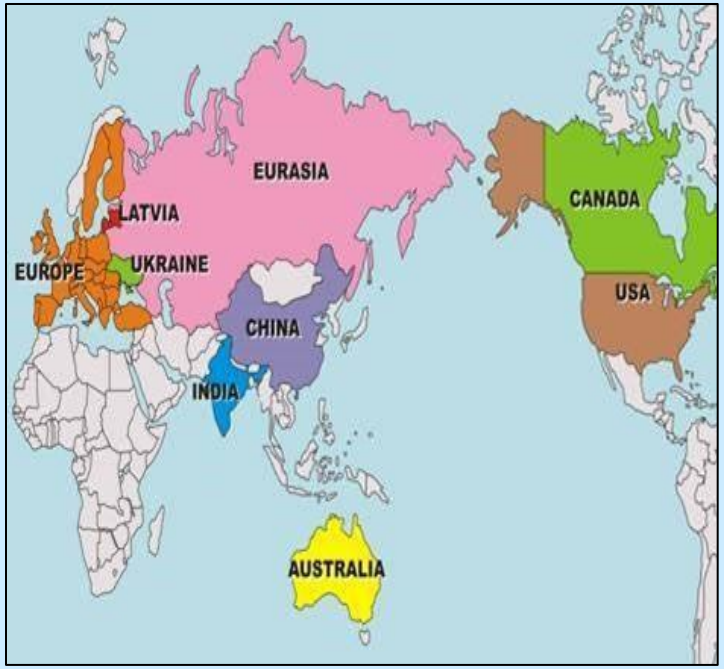
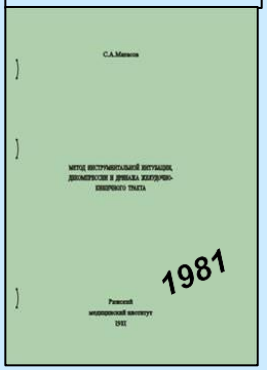
10. Clinical estimation of Antiseptic method

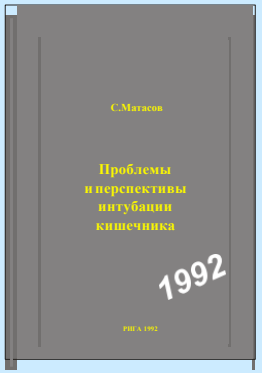
By the request of prof. E.A.Babayan, chairman of the Committee on New Technologies of the USSR Ministry of Health, the Department of Hospital Surgery of 2nd MMI realized the clinical estimation of the Method. On February 23, 1983, docent A.A.Grinberg has given the following report: *"This method has given a good clinical effect and could be recommended for the treatment of patients suffering from acute intestinal obstruction, peritonitis, to protect anastomosis during operations on colon tumors"*.

USSR Author certificates, 1974-1986



Countries of patenting; 2002-2012.





11. Conclusion

1. 1-moment resection requires a clean large intestine, all other resections comprise actions, aimed at post-operative removal of intestinal contents, but today both primary and secondary anastomoses, as well as unloading stomas are leaking.

2. The leak of intestinal sutures is a consequence of violation of the basic rules of surgery: aseptics, antiseptics, atraumatic manipulations. The proposed Method by means of atraumatic measures: intraoperative intubation and intensive lavage of the resected colon, its irrigation and aspiration after operation, prevents the leak of anastomosis.

3. Taking into account the high mortality from large intestine cancer, the quality of life of patients with colostomy, the number and price of performed operations, there is no alternative to the Method, so it can count on a broad clinical implementation.

Ideal partnership
Author interpetation of I.Surovtsev sketch

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