

Structural and optical coherence tomography angiography in laparoscopic operations on the abdominal organs

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The aim of the study was to establish the diagnostic value of multimodal optical coherence tomography (MM OCT) as a possible component of laparoscopic diagnosis of typical pathological processes in the hollow abdominal organs.

It is well known, that the transserous application of OCT technology for mobile organs (stomach, intestines) is very limited due to numerous motion artifacts causes the resulting images not informative. To overcome this limitation we suggested using a special cap to be put on the OCT probe with the subsequent creation of negative pressure in its cavity using a medical aspirator. This allowed providing temporary immobility of tissues at the area of their contact with the surface of the OCT probe and to obtain artifact-free images in 75% of cases.

The MM OCT system with vacuum tissue fixation was tested in experimental (rabbits) and clinical conditions. It was found that the structural and angiographic modalities of OCT help in the detection of pathological formations (calculi in the bile ducts), inflammatory lesions of the wall of a hollow organs (appendix), acute circulatory disorders (for example, damage to the intestine).

The advantages of using a vacuum tissue fixator in a wide range of diseases are: a significant (up to 96%) improvement of the data quality, including the ability to build artifact-free angiographic images in real time; the possibility of using it in laparoscopy; applicability to various abdominal organs.

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