

ORIGINAL ARTICLE

EXPERIMENTAL STUDIES OF THE EFFECT OF ELECTROSURGICAL AND STANDARD TECHNIQUES ON PANCREATIC RESTORATION

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ABSTRACT

The aim: There have been investigated the specific features of pancreatic resection with the use of electrosurgical methods on experimental models of clinical operations. Pancreatic tissue regeneration at the surgical site have been studied when employing monopolar, bipolar, electric welding methods as compared with standard surgical technique.

Materials and methods: The study was performed on 40 white laboratory rats. Pancreatic resection was conducted by standard surgical technique or by welding with electrocoagulation device "Patonmed EWD-300", high-energy electrosurgical device in bipolar mode and in monopolar mode. The pancreatic tissue was examined immediately after the surgery and at 3, 7 and 21 days postoperatively.

Results: In early terms following standard surgery there was seen more severe inflammation and the volume of newly formed connective tissue got increased faster than after the electrosurgical technique. Pancreatic ducts developed in newly formed tissue after the use of each type of electroresection, whereas that event was not observed following standard surgery. When using electrosurgery in monopolar mode, the area of coagulative necrosis was found to be less dense than after resection performed in bipolar mode.

Conclusions: Based on the findings, we can conclude that each of the above types of electroresection reduces surgery time, lowers bleeding risks, contributes to formation of the more adequate sealing on the resection surface with no complications of the recovery process.

KEY WORDS: regeneration, pancreas; electric welding of tissues; electrosurgery; monopolar welding; bipolar welding

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INTRODUCTION

Surgical interventions on the pancreas have always been a challenge due to the features of the anatomical structure. Despite the latest developments in modern surgery, some issues still need addressing. High-frequency electrosurgical instruments are widely used in various branches of medicine. They are employed in gynecology and abdominal surgery, in proctology and thoracic surgery, in ophthalmology and urology [1, 2, 3, 4].

High frequency electric welding technology reduces the time of surgical intervention, does not require suture materials, not only minimizes the duration of bleeding, but also disinfects the wound surface [5, 6]. The use of electrosurgical instruments significantly reduces the time of surgical intervention and wound pain in the postoperative period [7]. However, there is limited data on changes that occur in the pancreatic tissue resulting from the use of electrosurgical instruments during resection interventions.

THE AIM

The aim was to investigate the features of changes in the tissues of the pancreas after resections performed with the use of standard surgical techniques and electrosurgical methods: electric welding, bipolar welding and monopolar

welding, to analyze the possibilities and feasibility of their use.

MATERIALS AND METHODS

The study was performed on 40 six-month old rats of the genus *Rattus*, (family Muridae), weighing 240-280 g. Before the research, a veterinary examination was conducted, and the animals had a group health passport with the necessary preventive measures. The animals were treated and anesthetized as *required* by the Law of Ukraine "On Protection of Animals from Cruel Handling" No. 1759-IV dated December 15, 2009, the Ordinance of the Cabinet of Ministers of Ukraine dated July 28, 2010 No. 1585 "On Approval of the List of Regulatory and Legal Acts Protecting Animals from Ill-treatment", and Scientific and Practical Guidance for Housing and Care. of Laboratory Animals and Their Use issued by the National Pharmacological Centre, Ministry of Health of Ukraine (Protocol No. 8 dated June 22, 2012). According to the Ethics Committee of Shupyk National Academy of Postgraduate Education during the bioethical examination of the experimental study on compliance with the principles and norms of bioethics established its full compliance with the current norms and standards (23.10.2017, Protocol No. 8).