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Electrical Stimulation as an Alternative Treatment in Gastroesophageal Reflux Disease - Clinical Study

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Abstract

Background: Recently, there was described the possibility to increase the lower esophageal sphincter (LES) tone by means of implantable electrical stimulator. Although, this method has already been used in clinical practice, however, the optimal parameters of LES electrical stimulation are still unknown.

Aims: The goals of this study were to get clinical data regarding the effects of different types of electrical stimulation on LES and to elaborate and test the prototype on laboratory animals.

Material and Methods: In the Department of Surgery no 4, during 4 years (2015-2018), there has been achieved one clinical-experimental study of LES electrical stimulation. During the first stage, the electrical stimulation of the LES, using an external pulse generator, was assessed in 15 patients. These patients underwent an antireflux intervention, with an additional insertion of 2 temporary electrodes on the LES. During the second stage, there was created an experimental device which consisted of a re-insertable microstimulator using wireless energy transfer. During the third stage, it was tested in the experimental surgery center "Pius Brânzeu", Timişoara, on laboratory animals (pigs).

Results: Values of the LES resting pressure and integrated relaxation pressure (IRP) were significantly different during the prestimulation and poststimulation periods.

Conclusions: There was successfully demonstrated the possibility to increase the LES tone. Modifications in the LES functionality and tone, during the electrical stimulation and in the period immediately after the stimulation, depend upon the pulse frequency and length. Also, the additional change of the Bluetooth transmitter antenna is necessary to offset the screening effect of the biological tissues.

Key words: lower esophageal sphincter (LES), electrical stimulation, gastroesophageal reflux disease