

DETERMINING OF THE PERIPHERAL BLOOD CIRCULATION OF AN ABDOMINAL WALL USING PHOTOPLETHYSMOGRAPHIC DEVICE

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Abstract

In the article was determined the blood filling of the abdominal wall in postoperative patients with different body mass using photoplethysmographic device that was developed on the base of department of general physics.

Key words: peripheral blood circulation, photoplethysmography, obesity, surgery.

Introduction. The human health directly depends on the state of peripheral blood circulation. Blood filling disturbance causes various types of disorders of our body. For example it causes the bad healing of postoperative wounds. Therefore, for timely and qualitative diagnosis of such disorders the modern medicine uses non-invasive methods. These methods allow providing painless and non-destructive control of affected areas. The most perspective among them are optical methods for recording and transforming of biomedical information [1, 2].

Obesity is one of the actual problems of modern world medicine and it's one of the reasons of the bad healing of postoperative wounds. It is caused by the difference in the blood filling of tissues in patients with different body mass.

The aim of our studying is determining the blood filling of the anterior abdominal wall before surgery and at 1st, 3rd, 5th and 7th days after surgery in patients with different body mass using the photoplethysmographic device.

Method. Determination of the blood filling of the abdominal wall was providing by using the developed photoplethysmographic device (Fig. 1).



Figure 1 – Photoplethysmographic device [1]

An analysis of the blood filling of the anterior abdominal wall was provided on the basis of the Department of General Surgery VNMU named after M. I. Pirogov and on the basis of the surgical department of the city clinical hospital №1 in Vinnitsia. Were examined 40 patients with inguinal groin hernias (20 men and 20 women) with different body mass, aged 27-75 years. All patients were divided by body mass index (BMI) and by the degree of obesity into 4 groups. The first (control) group included 15 patients with normal body weight (BMI 18.5-24.9). The second group included 9 patients with overweight and the degree of obese – I (BMI 25.0-29.9 and 30.0-34.9 respectively). The third group included 10 patients with degree of obese – II (BMI was 35.0-39.9). And the fourth group included 6 patients with obesity of the III and IV degrees (BMI \geq 40.0).

The blood filling of the anterior abdominal wall was measured at 3 points: 1 (control) point - in the middle between the bladder and navel, 2 point - the lateral edge of the wound, 3 point - the medial edge of the wound.

Conclusion. On the base of the researches we can confirm about effectiveness of using of optoelectronic plethysmograph for study of the microcirculation of the anterior abdominal wall. It allows with high reliability to diagnose possible deviations in the process of healing postoperative wounds. It is very important for surgery, because helps to stimulate microcirculation in a timely manner [3, 4].

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