TRANSDIAPHRAGMATIC METHOD OF EXTERIORIZING LEADS FROM SENSORS IMPLANTED ON THE DOG'S HEART

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A transdiaphragmatic method of exteriorizing leads from sensors on the heart of animals, with advantages over the method of exteriorization through the intercostal spaces, as usually employed, is described.

KEY WORDS: implanted sensors; leads; method of exteriorization.

To investigate various aspects of cardiac activity under chronic experimental conditions implanted sensors and electrodes are extensively used. The reliability of the subsequent use of the implanted device is determined, not only by the nature of its construction [1], but also by the character of the leads and the method of their exteriorization from the thoracic cavity.

Thin multicore leads of the M-312-3 type, with a core consisting of K-40 NKhM alloy (7 × 0.05), in polyethylene insulation (external diameter 0.5 mm), possessing high flexible strength, lightness, and elasticity simultaneously, will function reliably in the body for 1.5-2 years. If necessary (if polyfunctional devices are constructed, or if several devices are implanted simultaneously), up to eight leads can be used in one cable. Other types of leads (with a copper core, and vinyl chloride or PTFE insulation) cannot always be recommended for prolonged implantation, either because of their inadequate strength, or because of the thickness and coarseness of the leads, which produce mechanical obstruction to the normal contractile activity of the heart.

To exteriorize the leads from the chest a transdiaphragmatic method was used, as follows: 1) laparotomy along the linea alba; 2) puncture of the diaphragm with a long pneumothorax needle, passed from the abdomen along the inner surface of the sternum; 3) passage of a guide ligature through the needle; 4) fixation of the leads to the end of the needle by means of the ligature; 5) exteriorization of the leads with the needle into the peritoneal cavity. After some experience this procedure can be carried out easily and quickly; there is no need to suture the diaphragm. The leads brought out from the chest are passed through a short length of silicone-treated tube fixed to the base of a removable fistula (Fig. 1), and sealed hermetically to it by means of tightly packed crude silicone rubber, with a coating of quick-hardening organosilicon compound of the KLT-30 type applied above. The fistula is sutured to the edges of the abdominal incision and the ends of the leads are connected to the terminals of a subminiature joint of the RS-10 or RS-19 type fixed in the outer end of the fistula tube. Rotation of the fistula around its long axis, which would be very undesirable, is prevented not so much by the suture as by the special shape of its buried part, which ensures reliable fixation by the omentum wrapped around it. The Dural lid screwed on the fistula protects it from removal and possible damage by the animal's teeth.

The method of exteriorization of the leads described above, which has been tested for several years on dogs with sensors implanted onto the coronary artery and heart muscle, has several advantages over the method of exteriorization in the intercostal space usually used. The main advantages are as follows: 1) The leads do not create any obstruction to movements of the lungs and diaphragm; 2) the length of the lead from sensor to joint is the shortest

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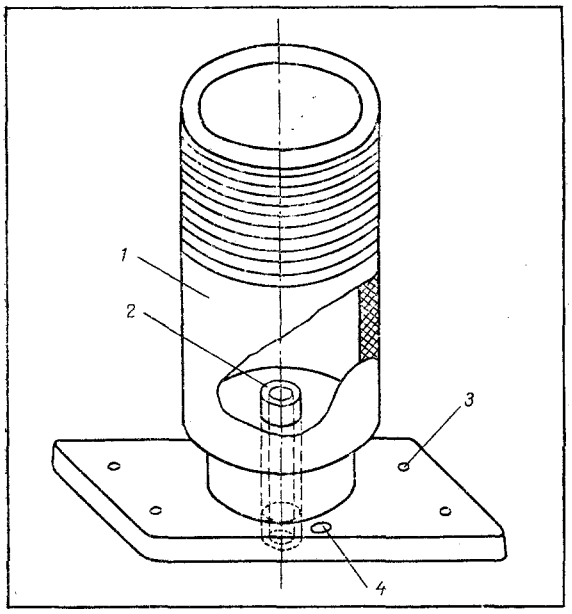

Fig. 1. Design of the removable fistula: 1) outer part of fistula with thread for lid; 2) length of silicone tube through which the leads are taken; 3) holes for suturing fistula to abdominal wall; holes into which omentum can grow (reduced in size).

possible; 3) nowhere are there any rigid fixation points, which is where the leads usually break; 4) exteriorization of the leads through the abdominal wall creates a barrier (the omentum) to the spread of infection and excludes the development of inflammation in the chest almost entirely; 5) the method of making airtight the place where the leads are brought out in the fistula means that they can be used many times; 6) if necessary, leads from sensors implanted on the abdominal organs can be brought out through the same fistula.

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TECHNIQUES FOR LONG-TERM STORAGE OF HUMAN LYMPHOCYTES

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When lymphocytes stored in the frozen state are used in the lymphocytotoxic test the fraction of cells dying after thawing must not exceed 10-20%. The effect of various concentrations of dimethyl sulfoxide (DMSO), the composition of the medium, and other parameters accordingly was investigated in order to work out optimal conditions for freezing human lymphocytes. The best results were obtained by freezing the cells in autologous serum with 12.5% DMSO. However, sufficiently good results also were obtained by the use of AB serum and 20% bovine serum in Eagle's medium.

KEY WORDS: human lymphocytes; freezing.

When human leukocytes are studied in order to type them with respect to the various antigen systems, in the blast-transformation reaction, and for other purposes the need often arises for a repeated or more detailed investigation. However, it is not always possible to obtain

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