Technical Notes

Casting Method of Superficial Lymphatic Vessels of Cattle Heart

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ABSTRACT **Object:** To investigate the method of displaying superficial lymphatic vessels of cattle heart and provide molten specimen for experimental research and teaching anatomy. **Methods:** Twenty fresh cattle hearts were given acid corrosion[1] after the superficial lymphatic vessels were found in the heart surface and filled with perfusion with conventional syringe and special compound casting agents, and then fixed. **Results:** The casting method could show the space structure, distribution and trends of superficial lymphatic vessels of cattle heart.

Conclusion: The superficial lymphatic vessels perfusion of cattle heart gives a better display of lymphatic vessels and lymph nodes, meanwhile, contribute to the research of the lymphatic system and related diseases.

Key Words: Superficial lymphatic vessels; Corrosion cast; Acid corrosion; Lymph nodes; Cattle heart

The lymphatic vessels with small caliber, thin shell and colorless are not easily observed by general anatomical methods at present[2-3]. RanFa's silver perfusion, lymphangiogram and Carbon's ink injection etc[4] that had been used for showing lymphatic vessels can not give a good display of three-dimensional structure and distribution of lymphatic vessels. In addition, the specimens can't be kept for a long time. Few investigations about lymphatic casting had been reported. This investigation will provide a research to the casting method of surface lymphatic of cattle heart. The specimens can be made up for the deficiencies by above mentioned and the result is satisfactory.

MATERIAL AND METHODS

Materials

Fresh cattle heart were purchased from the north area of Henan province, weighted(1±0.5)kg.

Preparation of casting agents

Oil paints were put in a tapered bottle with glass balls and shook to make into the particles smaller. According to the following formula:

Chlorinated polyvinyl	15~25 g
Solvent (cyclohexanone)	100ml
Plasticizer (Phthalic acid ester)	3~5ml
Oil paints (green)	proper

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Above composition were mixed evenly and placed for a week for use.

Methods

Disposal before injection

After 24 hours freezing□the cattle hearts were defrosted by running water [5] until the surface of cattle heart becoming soft properly.

Perfusion

After the proper casting agents in the syringe were extracted, the structure with filaments, equal in degree and less branched at cardiac apex or near the surface artery of cattle heart can be found. The cant of needle tip was put upward with a syringe that was installed iron needle which model is 7 in right hand, then, we pricked the epicardium with proper force along with the trends of superficial lymphatic vessels. Kept the tip motionless when the tip was pushed into the lymphatic completely, then, we injected the casting agents slowly. When the lymphatic vessels were pricked by the needle in the right direction, it would be revealed on the surface of the cattle heart speedily. It showed failure when the injection point became protuberant or the force needed was large, then, we should find new injection point to prick. The casting agents were poured into the lymphatic vessels that were found in proper order around the heart sufficiently as the method above.

Corrosion and wash

Fig. 1 The superficial lymphatic vessels of the cattle heart after injection

The heart which had been finished perfusion was laid away for two hours. We gave cut-in to the myocardial about 1 cm around the lymphatic vessels when the casting agent was solidified, and then cut down the myocardial carefully which contained complete lymphatic vessels. Then, the myocardial which was put on a square plastic card with four thin ropes at its edge was put into the solution which consists of 2/3 HCl and 1/3 water for a week. After that, the myocardial which had been corrupted was washed away carefully with rubber hose, and repaired and fixed after being dried in the air.

RESULTS

The lymphatic vessels of the cattle heart which had been poured into casting agents presented clearly green as the cords and most of them were situated between the epicardial and myocardial. Seldom of the lymphatic vessels went deep into the adipose tissue near the coronary groove and muscularis near the cardiac apex. The lymphatic vessels were branchless and calibres uniform. Occasionally a small quantity of reticular structure could be found at the distributed place. Beaded lymph nodes could also be seen in where the lymphatic vessels were turned(Fig.1). After the acid corrosion, we got the three-dimensional corrosion cast of the lymphatic vessels. The lymphatic vessels were twists and had long less branch, the lumen of them were oblate mostly. The lymph nodes often bumped obviously. The space construction of lymphatic vessels and distribution of lymph nodes can easily be observe(Fig.2).

DICUSSION

Fig.2 The corrosion cast of the superficial lymphatic vessels.

Materials must be fresh

The casting agents should be injected in time after the cattle heart is defrosted, and then the epicardium should be kept wet when injected the casting agents in order to prevent the injection becoming hard for epicardium bursting or water loss.

Lymphatic recognition

The lymphatic vessels should be seen near the surface of cattle heart because most superficial lymphatic vessels go down along with the surface artery of the heart vessels. The lymphatic vessels present branchless, calibers uniform, but the vascular is branch and its pipe is uneven. So we should distinguish the lymphatic vessels with the vascular.

Injection experience

The tip should be tilted about 10°~20° when injection, the depth is about 1~2mm, the lymphatic vessels may be pierced and failed to Perfusion if the lymphatic vessels were stabbed too deep. We should inject the casting agents from the cardiac apex up to the coronary groove because it is hard to infuse the casting agents in reverse direction on account of valves in the lymphatic vessels[6-8]. We can massage the distal of lymphatic vessels gently with wet cotton swab before infusing the casting agents to make the casting agents move ahead more easily. If failed to perfusion, we should drop out the needle in time to prevent the epicardium from bursting which may lead to leakage at next perfusion. All the whole process of perfusion should be finished as soon as possible, otherwise the toughness of lymphatic vessels will become too bad for injecting the casting agents.

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