

AH-01

Is There Macroscopic Different appearance in using formalin with Low and High Concentration in technic of cadaver embalming?

Ria Margiana*

Department of Anatomy, Faculty of Medicine, University of Indonesia,
Jl. Salemba Raya no. 6 Jakarta Pusat, Indonesia
*Corresponding author: *riamargiana@yahoo.com*

Keywords: macroscopic appearance, formalin, embalming technic

INTRODUCTION

Formaldehyde is a well-known carcinogenic and genotoxic agent, but it is still being used as principal agent in embalming cadaver. Using lower formalin concentration in embalming technic has been suggested by many anatomists in the world. But, in Indonesia, formalin with high concentration is still widely use as the first choice in embalming cadaver, which is caused by the high humidity of environmental condition. The change into usage of lower formalin concentration must be tested before applying this formula to human cadaver. The purpose of this study is to analyze the macroscopic appearance of using low and high formalin concentration in technic of cadaver embalming. If the result of the research using low formalin concentration is same as or better than the standard formula, we suggest performing a research of the use of low formalin concentration in human cadaver embalming fluid.

MATERIALS AND METHODS

We use 10 mice strain mus musculus to observe the macroscopic tissue appearance after using two different embalming fluids. The first embalming fluid is standard embalming fluid in human cadaver. The second embalming fluid is new embalming fluid with lower formalin concentration. After applying embalming fluid, the mice is preserved for two months, the observation is done routinely in every once a week. We observe whether the mice body is floating or drowning or not, the consistency of tissue, the integrity of the organ and the fungal growth. The result of observation is classified into positive and negative for observation of floating or drowning of the mice body and fungal growth. The result of tissue palpation to analyze the consistency of tissue is classified into soft, medium or hard. The result of observation on integrity of the organ is classified into whether it is intact or changed.

DISCUSSION

Indeed, the objects that are in the liquid, the weight of objects is not reduced. However, when the objects were in fluid, it would get upward force from the fluid which occupied by objects, so that the weight of the object was seemed to be relatively reduced. The upward force acting on an object in fluid is described by an expert named Archimedes (287-212 BC). An object is said to sink if the object is located at the base of a liquid substance. An object will sink if the weight of the object (w) is greater than the upward force (FA). In other words, an object will be immersed in a liquid if the density of the object is greater than the density of the liquid and the volume of the object is equal to the volume of the displaced fluid ($V_A = V_t$).

Some rats were not drowned because embalming fluid could not enter the rat body entirely. After a few days of observation, it was found that all rats drowned. Body rat drowning seemed to be depended on the embalming fluid injection technique.

Change the color and consistency of the organ indicate that there was an irreversible chemical changes, it was caused by the reaction of embalming fluid used and protein in the organs of rats.

RESULTS

Four of five mice from group one started to drown at the second week after embalming. The second group starts to drown in the first week. The tissue mice of the second group were softer in palpation than another group. No fungal growth was found in both groups. Both groups were showing their organs were still intact.

CONCLUSION

There are two important advantage of using low concentration of formalin in embalming, that were proved in this research. the first one is that the tissue penetration is faster in group with low concentration of formalin. Not only the faster penetration, but also the softer tissues in palpation are found in the second group comparing with another group. This result can be a first trigger to search the safer embalming fluid, so that, the carcinogenic and genotoxic risk caused by using formalin will be decreasing.

REFERENCES

1. Nie CL, Wei Y, Chen X, Liu YY, Dui W, et al. (2007) Formaldehyde at Low Concentration Induces Protein Tau into Globular Amyloid-Like Aggregates *In Vitro* and *In Vivo*. PLoS ONE 2(7): e629.
2. Kurose T, Koder H, Aoyama H, Kawamata S. Formaldehyde concentration in the air and in cadavers at the gross anatomy laboratory in Hiroshima University. Hiroshima J Med Sci. 2004 Dec; 53(3-4):33-7.
3. Committee on Toxicology. Formaldehyde--an assessment of its health effects. Washington, D.C.: National Academy of Sciences, March 1980.
4. Archimedes's principle gets updated, R. Mark Wilson, *Physics Today* 65(9), 15 (2012)