CQ21 What are the useful findings in postmortem images to determine intrinsic death?

Grades of recommendations:
C1 for evaluating the condition
C2 for determining the cause of death

Extravascular pooled blood findings (such as cerebral hemorrhage and hemopericardium (intrapericardial hematoma) due to aortic) dissection are useful in determining the presence of signs of an intrinsic disease that may be a cause of death, depending on the extent of the damage observed. Findings of diseases used for a clinical diagnosis may also be helpful.

All findings serve as an index for determining the presence of diseases, but in order to consider the cause of death, exclusion of external factors that may be the cause of death is essential and must be carefully considered.

Explanation----------
Background

Intrinsic death is used as an expression that is paired with "extrinsic death". Intrinsic death is what is commonly called disease death or natural death. This refers to death caused by an internal disease, excluding deaths caused by trauma or foreign substances or the environment. However, deaths caused by foreign pathogenic microorganisms such as bacteria and viruses are included among what is considered intrinsic death.

According to the annual mortality data for 2017 by the basic classification of ICD (Statistical Classification of Disease, Injury and Death), intrinsic deaths (code A-R) account for about 95% of the total number of deaths in Japan [1]. According to the annual statistics report of Hyogo Medical Examiner's Office, about 60% of the cases of abnormal corpses handled by medical examiners are due to intrinsic death [2].

Post-mortem CT findings useful for determining intrinsic death

In determining the cause of death, determining whether the death is intrinsic or extrinsic may affect the amount of life insurance payments later [3] and is very important in social medicine. Even with an autopsy, there are cases where it may be difficult to clearly identify whether the death is due to intrinsic or extrinsic causes, and a very carefully considered evaluation is required for postmortem CT interpretations.

In postmortem images, findings suggesting a natural disease are important. Among cardiovascular diseases, findings of hemopericardium associated with aortic dissection or myocardial infarction rupture are useful when considering the possibility of intrinsic death.

In particular, when the rupture site is identified by postmortem CT angiography, it can form the basis for the evaluation [4]. Compared with extrinsic death, intrinsic death may be more difficult to diagnose with postmortem CT [5].

For the different findings, please refer to the CQ sections listed below.

・Intracranial hemorrhage; subarachnoid hemorrhage (CQ24), intracerebral hemorrhage (CQ25)
・Ischemic heart disease (CQ27, 28)
・Pericardial hematoma (intrapericardial hematoma) (CQ29)
・Rupture of aortic aneurysm
・Aortic dissection (CQ30)
・Malignant tumor (CQ22)
・Pneumonia (CQ31)

In postmortem CT interpretation, it is necessary to carefully consider whether external factors that cause death can be excluded. In addition, when interpreting images with such as functional diseases or poisoning, it is necessary to carefully consider the possibility of undetermined external factors.

Literature search formula and literature selection (2019/8/30)

PubMed

#	Search formula	Number of documents
1	Search (((((("postmortem CT") OR "postmortem MRI") OR "postmortem imaging") OR "post-mortem CT") OR "post-mortem MRI") OR "postmortem imaging"	846
2	Search sudden death	58,559
3	Search (((((((("postmortem CT") OR "postmortem MRI") OR "postmortem imaging") OR "post-mortem CT") OR "post-mortem MRI") OR "postmortem imaging")) AND sudden death	56

From other than search formula

[1-3]

References

[1] Welfare and Labour Statistics Association: Annual mortality data by ICD (International Classification of Diseases, Injuries and Causes of Death) basic classification. 2017 (Japanese)

[2] Hyogo Prefecture Health and Welfare Department: Annual statistics report of cause of death by Hyogo Medical Examiner's Office, 2017 (Japanese)

[3] Nakao H et al: Statistical approaches for findings in inspections of cases of unknown causes of death. Journal of Japanese Association for Acute Medicine 2007; 18: 39-46 (Japanese)

[4] Filograna L et al: The role of post-mortem imaging in a case of sudden death due to ascending aorta aneurysm rupture. Forensic Sci Int 2013; 228: e76-80 (Level 5)

[5] Bedford PJ：Routine CT scan combined with preliminary examination as a new method in determining the need for autopsy. Forensic Sci Med Pathol 2012; 8: 390-394 (Level 4b)