

CQ14 Is image processing (3D reconstruction/MPR) in postmortem CT useful for determining the cause of death?

Grades of recommendations:

C1 for evaluating the condition

C1 for determining the cause of death

Some case reports have shown the usefulness of 3D reconstructed images for postmortem CT imaging, but there is no scientific proof of their usefulness at this time.

Explanation-----

Background

The following case reports showed the usefulness of 3D reconstruction images of postmortem CT. Evaluation of structures with high resorption by bone, metal, and similar, with fractures and bone abnormalities in stillborn infants with osteogenesis imperfecta [1], characterization of strangled cordage, hyoid bone and thyroid cartilage fractures [2], and multiple traumas caused by motorcycle accidents [3] have been reported.

It has also been reported that the spatial position of gunshot wounds [4, 5] and the identification of the device causing injury in trauma deaths [6] have been evaluated.

The observation of coronary artery calcification [7] and the evaluation of coronary arteries by postmortem angiography have been reported for the evaluation of coronary artery diseases, which are difficult to determine by non-contrast computed tomography (CT) [8].

There have been reports of deaths from air emboli [9] and hemorrhages due to tumor infiltration of the common carotid artery [10] involving evaluations of intravascular gas distribution.

Other reports include investigations of stillborn infants [11] and identification and quantification of subdural hematomas in highly decomposed cases [12].

Column-----

3D images created using image workstations are often used to help understanding when explaining the conditions to investigators and judges, and have already been used in practice. If you are in charge of image creation, it is important to keep an objective image presentation in mind, and care must be taken not to create (fabricate) new findings.

Literature search formula and literature selection (2019/ 6 /2)

PubMed

#	Search formula	Number of documents
1	Search (postmortem) AND ((computed tomography OR magnetic resonance))	10,449
2	Search (((postmortem) AND ((computed tomography OR magnetic resonance)))) AND volume rendering	19
3	Search ((((((postmortem) AND ((computed tomography OR magnetic resonance)))) AND volume rendering)) AND Humans	15

Ichushi (Medical Journal)

#	Search formula	Number of documents
1	(((死後/AL or 死亡時/AL) and (画像診断/TH or 画像診断/AL)) or ((死亡時画像診断/TH or オートプシーイメージング/AL) or ("死亡時画像診断"/TH or "Autopsy imaging"/AL)))	3,895
2	(((死後/AL or 死亡時/AL) and (画像診断/TH or 画像診断/AL)) or ((死亡時画像診断/TH or オートプシーイメージング/AL) or ("死亡時画像診断"/TH or "Autopsy imaging"/AL))) and ((容積表現法/TH or ポリウムレンダリング/AL)))	5
3	(((死後/AL or 死亡時/AL) and (画像診断/TH or 画像診断/AL)) or ((死亡時画像診断/TH or オートプシーイメージング/AL) or ("死亡時画像診断"/TH or "Autopsy imaging"/AL))) and ((容積表現法/TH or ポリウムレンダリング/AL)) and (AB=Y and PT=会議録除く))	4

References

- [1] Zou DH et al: Determination of a newborn with lethal type II osteogenesis imperfecta and other anomalies using autopsy and postmortem MSCT: a case report. *Fa Yi Xue Za Zhi* 2016; 32: 69-73 (Level 5)
- [2] Maiese A et al: When the hidden features become evident: the usefulness of PMCT in a strangulation-related death. *Leg Med* 2014; 16: 364-366 (Level 5)
- [3] Moskała A et al: The importance of post-mortem computed tomography (PMCT) in confrontation with conventional forensic autopsy of victims of motorcycle accidents. *Leg Med* 2016; 18: 25-30 (Level 5)
- [4] Maiese A et al: Post mortem computed tomography: useful or unnecessary in gunshot wounds deaths?: two case reports. *Leg Med* 2014; 16: 357-363 (Level 5)

- [5] Tartaglione T et al: Importance of 3D-CT imaging in single-bullet cranioencephalic gunshot wounds. *Radiol Med* 2012; 117: 461-470 (Level 5)
- [6] Aromatario M et al: Weapon identification using antemortem CT with 3D reconstruction, is it always possible?: a report in a case of facial blunt and sharp injuries using an ashtray. *Leg Med* 2016; 18: 1-6 (Level 5)
- [7] Wan L et al: Assessment of a sudden death case due to coronary artery disease based on the PMCT and forensic autopsy. *Fa Yi Xue Za Zhi* 2012; 28: 379-382 (Level 5)
- [8] Takahashi Y et al: Use of postmortem coronary computed tomography angiography with water-insoluble contrast medium to detect stenosis of the left anterior descending artery in a case of sudden death. *Leg Med* 2016; 19: 47-51 (Level 5)
- [9] Jackowski C et al: Visualization and quantification of air embolism structure by processing postmortem MSCT data. *J Forensic Sci* 2004; 49: 1339-1342 (Level 5)
- [10] Tajima S et al: Availability of postmortem CT for fatal bleeding attributed to common carotid artery rupture: a case report. *Japanese Journal of Diagnostic Imaging* 2013; 31: 124-128 (Level 5)
- [11] O'Donoghue K et al: Investigation of the role of computed tomography as an adjunct to autopsy in the evaluation of stillbirth. *Eur J Radiol* 2012; 81: 1667-1675 (Level 5)
- [12] Sano R et al: Use of postmortem computed tomography to reveal acute subdural hematoma in a severely decomposed body with advanced skeletonization. *Leg Med* 2013; 15: 32-34 (Level 5)