

Virtopsy, does it become an essential necessity in Bahrain? (A review article)

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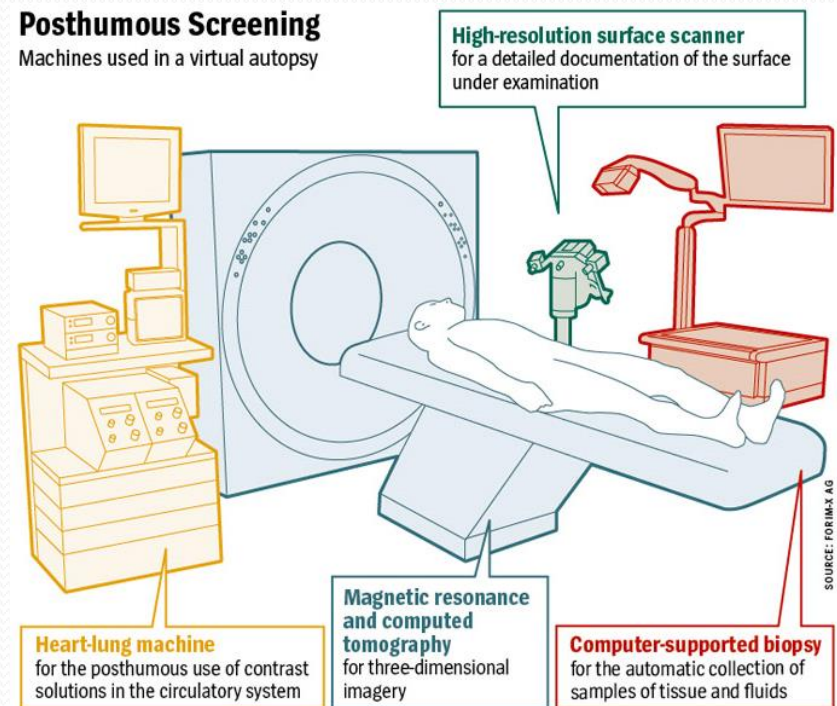
VIRTOPSY IS VIRTUAL AUTOPSY

- **VIRTUS** :useful ,
efficient and good
- **AUTOS** : self
- **OPSOMEI**: I will see

TO SEE WITH ONE'S
OWN EYES

THE IMAGING TECHNIQUES

- 3-D surface scan
- Multi-slice computed tomography (MSCT)
- Magnetic resonance imaging (MRI)
- Magnetic resonance imaging spectroscopy
- CT guided needle biopsy
- Post-mortem angiography(virtangio)



ADVANTAGES OF VIRTOPSY

- **Non- destructive**
- **Non- invasive**
- **Rapid**
- **Digitally storable**
- **Tele-forensics**
- **Observer-independent**
- **Acceptance by relatives and religious communities.**

DISADVANTAGES OF VIRTOPSY

- Virtopsy is a very costly procedure.
- Requires a special well equipped place with well trained radiologists and technicians.
- Cannot distinguish all the pathological conditions.
- Cannot give the infection status.
- Difficult to differentiate antemortem or the post-mortem wounds.
- Difficult to appreciate the post-mortem artefacts.
- The physiological senses of the pathologist are restricted.

Virtopsy in living subjects

- Matching inflicting weapon and injury.
- Strangulation and estimation of risk of death.
- Body packing.



EFFECTIVENESS OF VIRTOPSY

- Virtopsy has about 80% concordance with cause of death identified with conventional autopsy.



VIRTOPSY AND LEGAL ISSUES

- Clean bloodless forensic images give neutral fact-based verdict and are easy to appreciate.
- No juridical validity (yet).



CAN WE RELY ONLY ON THE EXTERNAL EXAMINATION OF CORPSES?

- In cases where there is extensive medical history or the circumstances around the death are well documented, an external autopsy may be all that is needed.
- (Carpenter and Tait)



Aim of The medico legal autopsy

- Identifying the deceased.
- Documenting the injuries.
- Ascertaining whether the injuries found were inflicted before or after death.
- Collecting samples and trace materials on the victim.
- confirming the cause of death.

DRAWBACKS OF MEDICOLEGAL AUTOPSY

- Subjective.
- Autopsy specimens are difficult to store indefinitely.
- Possible disturbed mutilation of the corpse.
- Possible delayed transfer of the body to the funeral home.

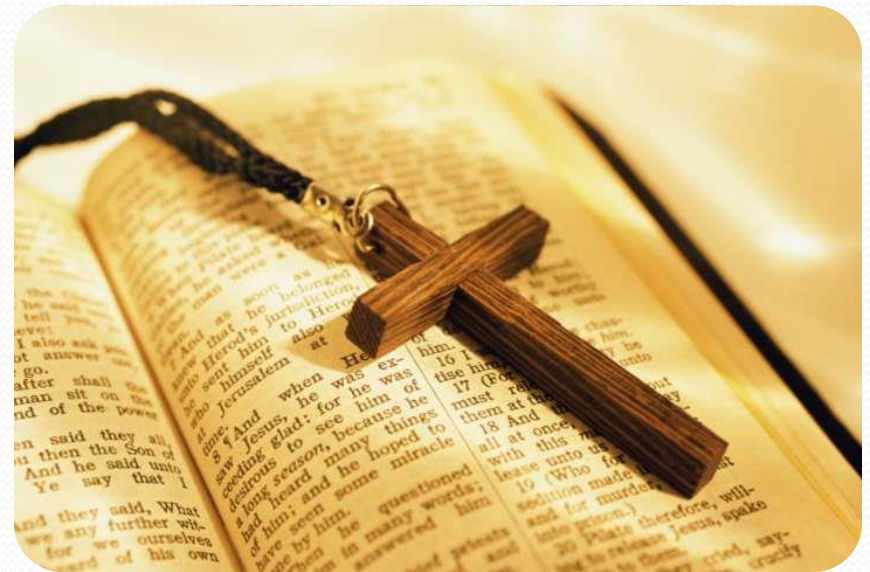


AUTOPSY AND RELIGIONS

- **Islam:**
- Koran does not literally prohibit autopsy.
- Muslims have rigid rituals after death and do not encourage autopsies as the procedure could harm the body and delay burial.



- **Christianity:**
- Catholics accept the value of an autopsy and often see it as an act of charity in order to help others.



- **Judaism:**
- Prohibit autopsy.
- Great care should be taken to perform the post-mortem examination so only necessary body parts are removed and all fluids and organs should be returned to body cavity.



- **Hinduism:**
- Hindus believe in reincarnation.
- Autopsy may disturb the soul.



- **Buddhism:**
- In general, they see autopsy as a form of compassion that helps to preserve life.



VIRTOPSY VS AUTOPSY

- MSCT is superior to autopsy in trauma cases.
- MSCT is superior in pneumothorax, air embolism, and subcutaneous emphysema.
- CT sensitivity for osseous findings is higher than that of conventional autopsy.
- MSCT is inferior to those caused by organic diseases.
- MSCT is inferior to autopsy in hemorrhage and fat embolism.
- CT is poorer for the soft tissues.

VIRTOPSY CAN BE OF GREAT HELP IN THE FOLLOWING CASES:

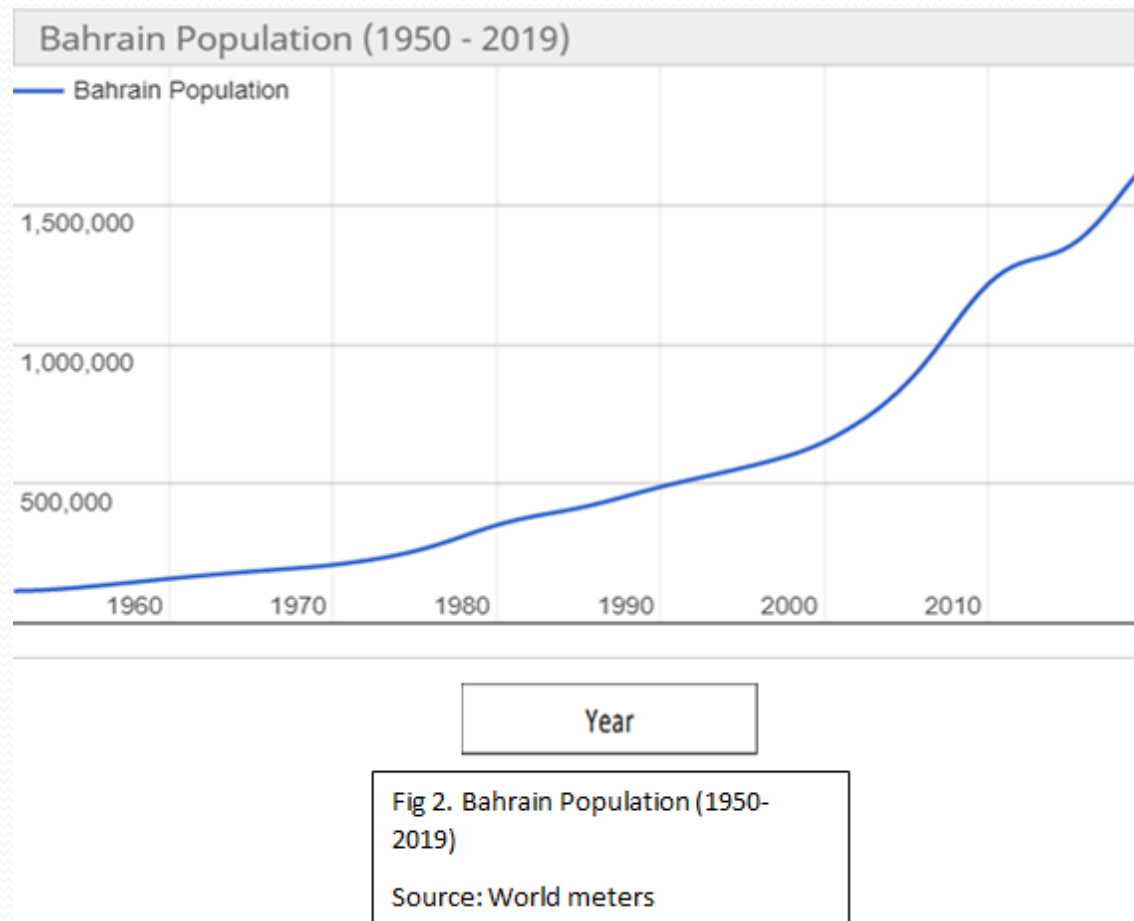
- **Traumatic Events and Ballistic Trauma.**
- **Violent Mechanic Asphyxia.**
- **Mass Disasters.**
- **Decomposed, Carbonized, and Badly Damaged Bodies**

THE FUTURE OF VIRTOPSY

- **Virtobot:**
- Reduce the risk of infection.
- Allow precise and automatic placement of injection tools or biopsy needles.
- **Virtomobile:**
- A version mounted on a trailer.



BAHRAIN DEMOGRAPHY





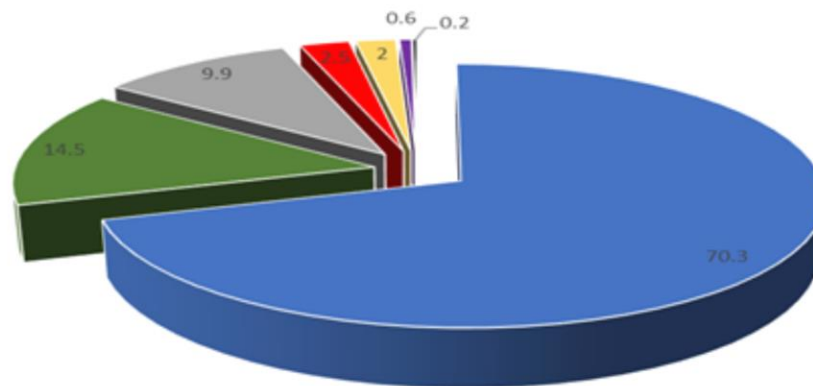


Fig.3 Religions in Bahrain
Source: Pew Research center. The Global Religious Landscape
Number of followers estimated by Countrymeters
(Thursday, March 28 2019)

THE MEDICOLEGAL SYSTEM IN BAHRAIN

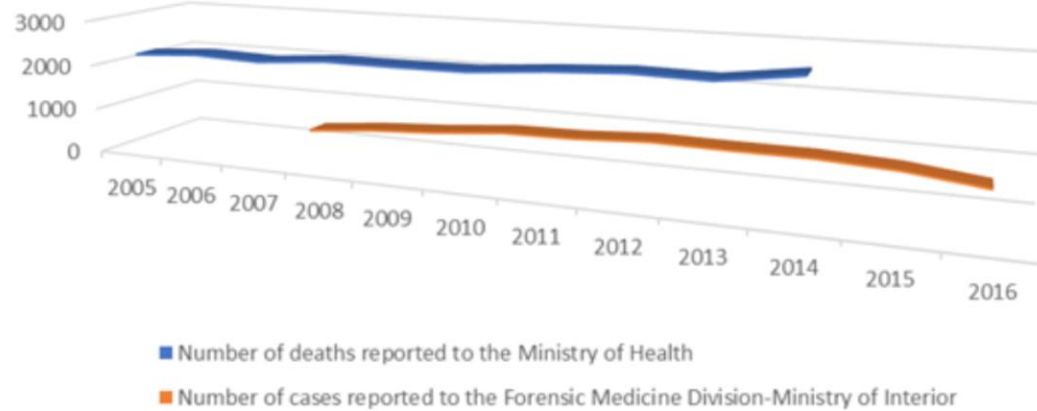
Directorate of Forensic Science (Ministry of Interior)

- The Forensic Medicine division of Forensic Science is concerned mainly with the examination of the scene of death together with Crime Scene team in all cases of deaths outside the hospitals and the health centres (unattended deaths).

Directorate of Forensic Evidence (Public Prosecution-Ministry of Justice and Islamic Affairs)

- The Forensic Medicine division of Forensic Evidence is concerned with the examination of corpses at the mortuaries.
- If the circumstances are criminal or suspicious, then the medical examiner has to perform autopsy.

Fig.4 Total reported deaths to the Ministry of Health and the Forensic Medicine Division-Ministry of Interior



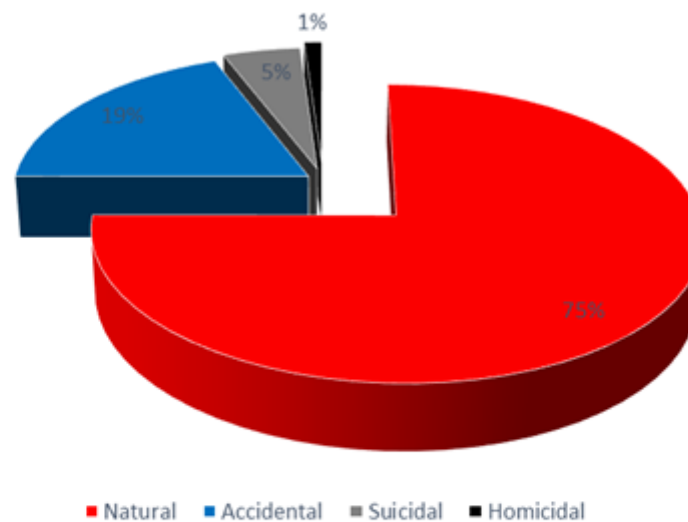
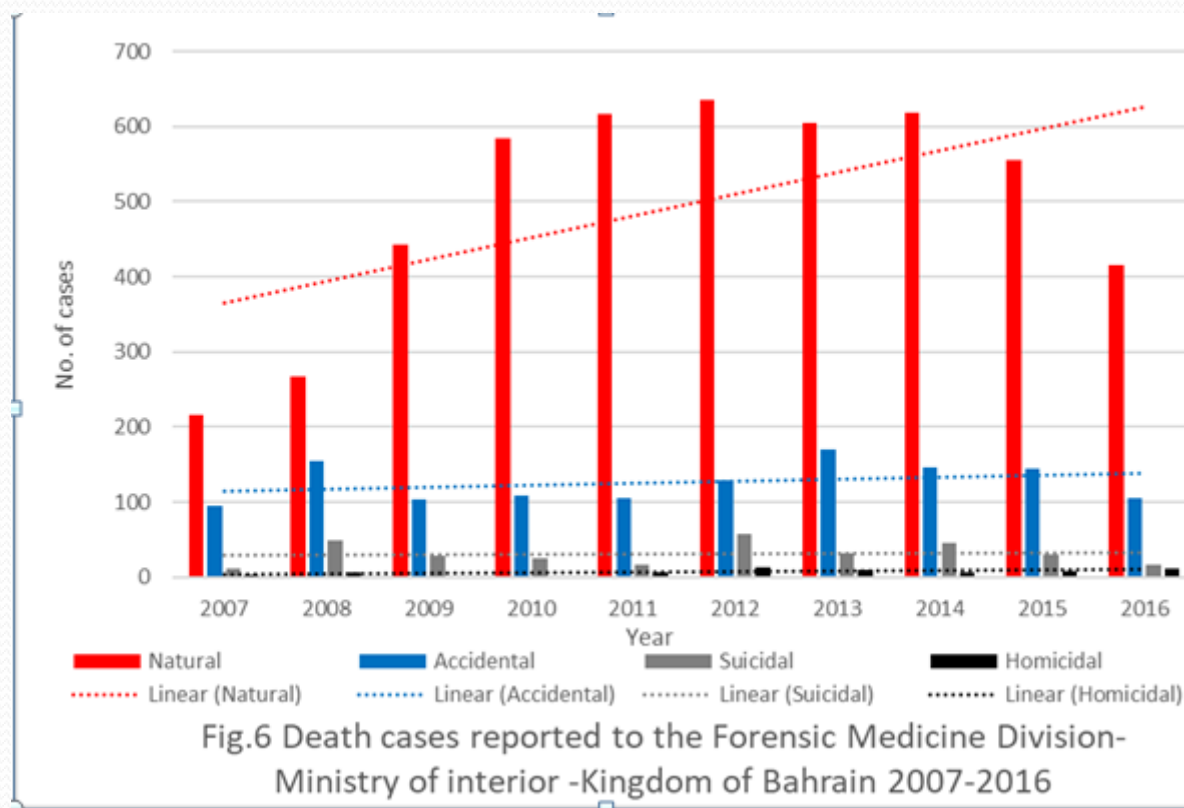


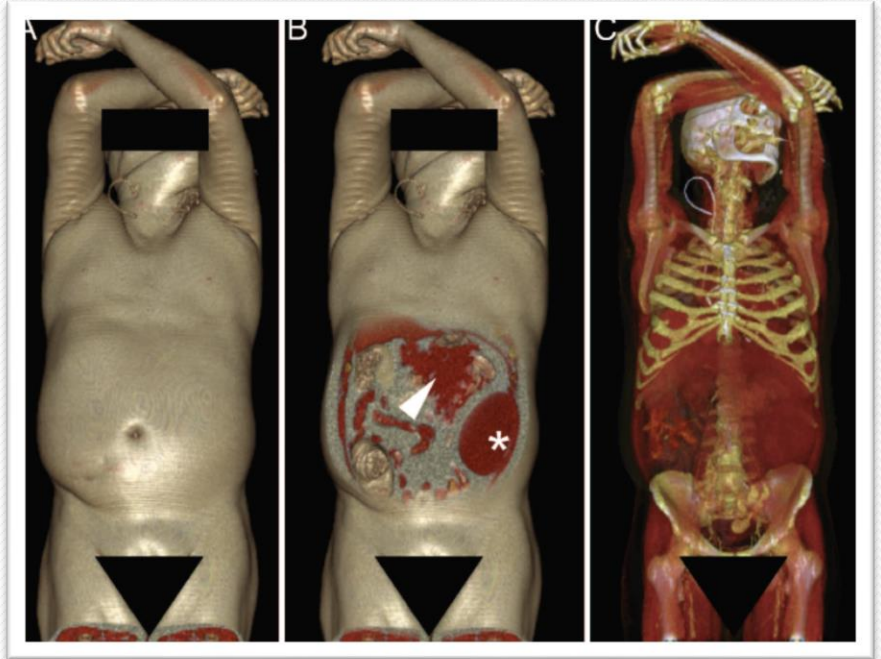
Fig.5 Death cases reported to the Forensic Medicine Division- Ministry of Interior - Kingdom of Bahrain (2007-2016)



CONCLUSION

- **IS IT THE TIME OF VIRTOPSY IN BAHRAIN?**
- External examination of corpses no longer becomes acceptable with the presence of this diagnostic radiological imaging revolution, and the need of an alternative way(s) arises.

- Virtopsy seems to be the solution in the horizon. But one should weigh the benefits and the drawbacks.



- Virtopsy is a very costly procedure and requires a special well equipped place with well trained radiologists and technicians for postmortem imaging.



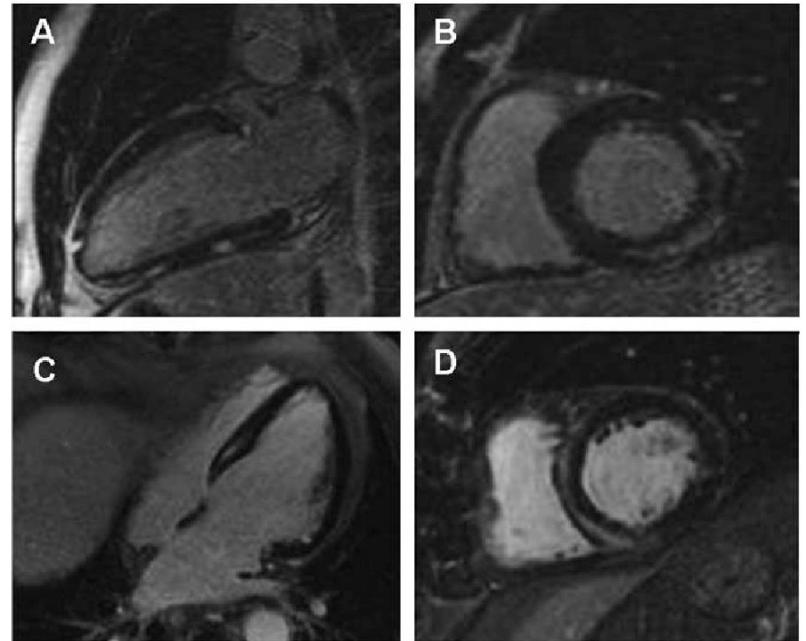
- Most death cases referred to the Forensic Medicine Division- Ministry of Interior are due to natural circumstances.
- The leading cause of natural death is cardiac insufficiency.



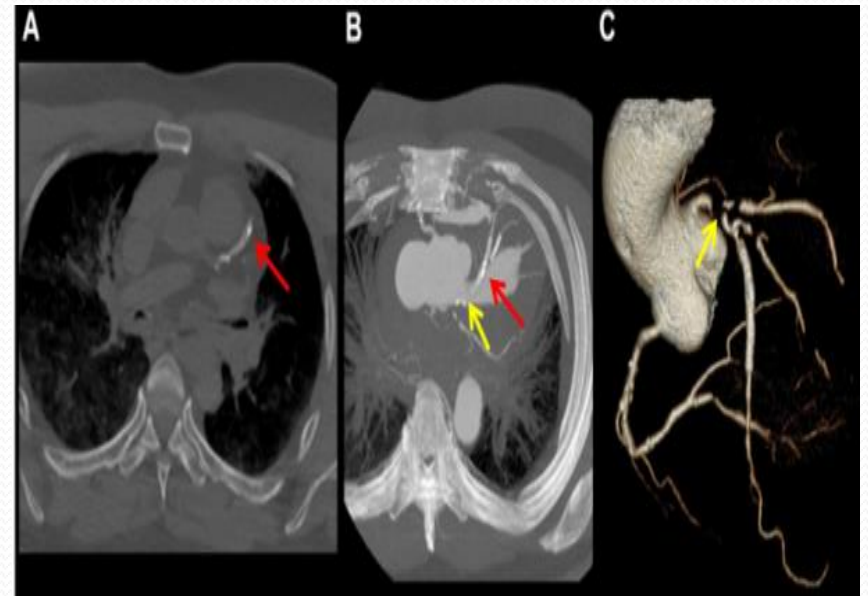
- MSCT is unable to verify the early stages of myocardial infraction.
- Acute cases of MI may not appear at the time of imaging.



- T2-weighted MRI can visualize the area of infarction if the deceased survived at least 30–60 minutes after the onset of infarction.



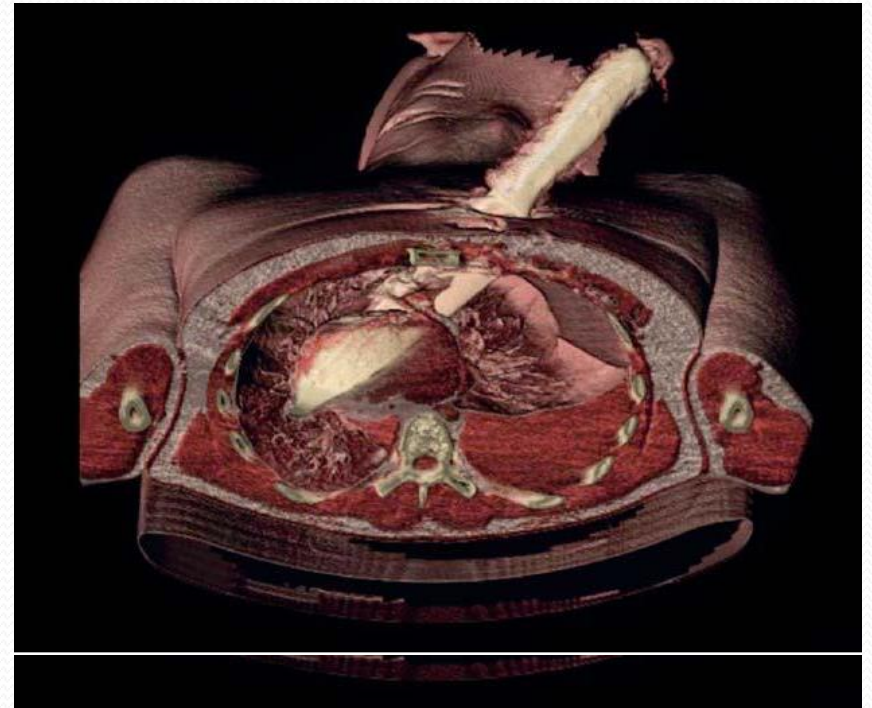
- **PMCTA** can be used to visualize the vascular system as a screening method for unusual causes of death.



- Virtopsy seems to be feasible in trauma cases of accidental and suicidal circumstances that not rendered to conventional autopsy.



- For homicidal cases, one should consider virtopsy as a preliminary evaluation to conventional autopsy which is routinely carried out in Bahrain upon the instruction of the Public Prosecution regardless the family opinion.



Thank You!

