

**The readiness of Forensic Specialist Doctor in using Multi-Slice Computed Tomography (MSCT), Magnetic Resonance Imaging (MRI) and Multi-Phase Post Mortem Computed Tomography Angiography (MPMCTA) to handle the forensic case in Indonesia**

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**Abstract**

An autopsy is an action that performs slicing on the corpse to search for the cause of death, the time of death, and may be related to death way. Family autopsy rejection increases from year to year around the world. In Indonesia, the main issue of rejection by the family includes religious or belief reasons and humanitarian reason. Virtual Autopsy is a breath of fresh air for the forensic doctor, radiology doctor, community and hospital to deal with conventional autopsy rejection. The minimally invasive method offered by this technology has the potential to increase the prevalence of autopsy, especially in Indonesia.

The purpose of this study, the writer wants to know how the readiness of forensic specialist doctor if this method is applied in Indonesia to handle the forensic case by using PMCT.

This research is qualitative descriptive research. The data collected by giving the questionnaire to 75 respondents, namely Forensic specialist doctor from 24 provinces in Indonesia at the National Congress and the Annual Scientific Meeting of Indonesian Forensic Doctors Association, held in Bandung on May 16-18, 2016. The data processed by using Ms. Excel 2013. The variables studied are the opinion of forensic specialist doctors when a virtual autopsy is applied in Indonesia to handle the forensic case and their knowledge of virtual autopsy

The results of the study indicate that 83% of respondents are not ready when virtual autopsy is applied in Indonesia to handle forensic case with the most reason that conventional autopsy is more superior than virtual otopsy, 12% state ready if virtual autopsy is applied in Indonesia to handle forensic case on the most reason that virtual autopsy is more accurate and fast, and 5% do not argue. For the average knowledge already knows the existence of this method, but still, do not know how to use the tool of virtual autopsy.

**Keywords:** Multi-Slice Computed Tomography (MSCT); Magnetic Resonance Imaging (MRI); Multi-Phase Post Mortem Computed Tomography Angiography (MPMCTA).

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## Introduction

Autopsy or post-mortem examination classically is an action by performing some slicing and some specific techniques on the corpse, with the aim of finding the cause of death, the time of death, which may be related to the death way. Corpse investigation can also be used to look for identification such as in mass disaster. Classical technique in some situations cause problems in religion and culture in the community. Most societies consider the idea of the autopsy is uncomfortable, even some religious groups forbid autopsy beyond the legal requirement (1).

Because of the inconvenience of a classical autopsy, there has been a great deal of resistance in some countries. The rate of autopsy in the United States was 41.1% in 1964, 34.9% in 1972, and 21.7% in 1975. In 1981 the autopsy rate was 15.7% and in 2003 it decreases to 11%, in England and Wales, the rate of autopsy decreases from 8.9% in 1966 to 1.7% in 1991, a similar decline has been reported in Canada, France, China and Zambia (2).

In Indonesia, the refusal reason by the family, in general, is the reason for religion or belief, humanitarian reason, organ or tissue of organ taken and sold, or the organ and body used practically by a student of medicine. In addition to the above reasons, the investigation cost and intricate administrative matter is also the reason for the autopsy rejection (3).

Virtual Autopsy Technique developed by the Forensic Health Institute in Bern, Switzerland, more than 15 years ago with the aim of replacing or adding conventional forensic autopsy. Virtual Autopsy (Virtopsy) or forensic imaging combines survey technology, pathology, radiology, image processing, computer sciences, telematics, physics, and biomechanics. Virtopsy is a combination of post-mortem Computed Tomography (PMCT), Post-mortem Magnetic Resonance Imaging (PMMRI), CT-guide post-mortem Angiography (PM CT angio) and CT-guided post-mortem Biopsy (PM biopsy) (4).

This study focuses on the Virtual Autopsy technology that has been used by medical experts in various countries in recent years, namely using CT-Scan and MRI as the main tool. In Indonesia, CT scan and MRI have been used frequently, but only to assist patient diagnosis, not for autopsy purposes in a forensic case.

Virtual Autopsy is a breath of fresh air for the forensic doctor, radiology doctor, community and hospital to cope with conventional autopsy rejection. The minimally invasive method offered by this technology has the potential to increase the prevalence of autopsy in Indonesia.

## Material and Method

The research type is qualitative descriptive with the population of 150 forensic doctors who are in the National Congress and Annual Scientific Meeting of Indonesian Forensic Doctors Association, held in Bandung on May 16-18, 2016. The sample of this research is the informant namely 75 forensic specialist doctors from 24 provinces in Indonesia. The sample determination is determined by slovin formula.

This research started by arranging questionnaire. This questionnaire contains a free and closed question. The data that has been collected will be checked to check its completeness. Then the data will be analyzed by using MS Excel 2013 and then viewed the opinion of ready or not ready of a forensic specialist doctor in Indonesia and the reason.

## Results

From the research, I conducted at the National Congress and the Annual Scientific Meeting of Indonesian Forensic Doctors Association, held in Bandung on May 16-18, 2016, with a total of 75 participants, with the research subject of a forensic specialist doctor from 24 provinces in Indonesia.



**Fig 1.** Personal reason about readiness of Forensic doctor for accepting Virtual Autopsy method for handling forensic Case in Indonesia

**Table 1:** Reason not ready for forensic specialist doctor towards virtual autopsy in Indonesia

| No.   | Reason not ready   | Total           |
|-------|--|-----------------|
| 1     | Price of <i>virtual autopsy</i> (CT-Scan and MRI) is quite expensive.                    | 4               |
| 2     | A conventional autopsy is still more superior than virtual autopsy                       | 12              |
| 3     | A virtual autopsy can only be used as a tool   | 11              |
| 4     | A conventional autopsy of the Gold standard  | 3               |
| 5     | the virtual autopsy does not comply with the applicable law in Indonesia                 | 3               |
| 6     | A virtual autopsy can only be applied in some cases                                      | 5               |
| 7     | The result of the virtual autopsy has not been accurate and can not be accounted for     | 6               |
| 8     | According to the meaning of <i>visum et repertum</i>                                     | 2               |
| 9     | There is no clinical trial stage to know its equivalent or not with conventional autopsy | 1               |
| 10    | A virtual autopsy cannot distinguish trauma of post-mortem and antemortem                | 1               |
| 11    | Not taught on forensic PPDS so must learn radiology science                              | 4               |
| 12    | Availability of CT-Scan and MRI is still uneven in every hospital                        | 1               |
| 13    | No multi-department policy   | 1               |
| 14    | All parties are not ready  | 1               |
| 15    | No reason  | 7               |
| Total |  | 62 participants |

Table 1 shows the most reason is not readiness of Indonesian forensic specialist doctor for using the virtual autopsy method. According to them, a conventional autopsy is still more superior than

virtual autopsy, followed by the opinion that virtual autopsy is used only as a supplemental investigation not for conventional autopsy replacement method.

**Table 2:** Reason for ready the forensic specialist doctor towards virtual autopsy in Indonesia

| No.   | Reason for ready  | Total |
|-------|---|-------|
| 1     | A conventional autopsy is an incompatible with the culture in Indonesia and especially Islamic religion | 1     |
| 2     | A virtual autopsy is more accurate and fast   | 5     |
| 3     | A virtual autopsy is more modern  | 2     |
| 4     | No reason   | 1     |
| TOTAL |   | 9     |

From the data above we can know that the most reason for readiness of forensic specialist doctor is because a virtual autopsy is more accurate and fast in doing forensic cases.

humanity, so the experts are required to find a new method in the settlement of forensic autopsy case so that the dead cause can be known without dissection to the corpse so that justice can be kept steady but still honor corpse.

#### Knowledge of Forensic Specialist Doctor Towards Virtual Autopsy Method

In this study, I also investigate how the level of knowledge of forensic specialist doctors and the result is from 75 participants only 10 people do not know virtual autopsy but the data for the procedure of using virtual autopsy that all participants claim not understand the procedure of using virtual autopsy.

Virtual Autopsy as we know it already answers the challenge, that is with the minimally invasive method. In addition to the method that does not require a lot of virtual autopsy surgery also provides many benefits in solving forensic cases such as:

1. The time required for autopsy will be faster
2. 3D illustration and actual size documentation to facilitate communication, for example between attorney and forensic expert.

#### Discussion

As we know that the current rejection of autopsy is so high that the main reason is religion and

3. Data is stored digitally (3D image) on the computer and can be accessed at any time. This allows digital re-examination of the body and possible crimes such as in the case of retest/retrial.
4. Digital storage of the discovery of Virtopsy facilitates second-opinion by other forensic expert or institutes located anywhere in the world

In addition to the weaknesses above the obstacles of the virtual autopsy method that is almost all forensic specialist doctors are not ready to apply the virtual autopsy method, then still struck by the regulation of forensic doctor's policy system, radiology doctor. There is a debate on how this tool will be used by whom, then who is eligible for the writing of visum et repertum for forensic autopsy case, and how the collegium manages the curriculum in virtual autopsy learning.

From the analysis of the study we can conclude that almost all forensic doctors are not ready for virtual autopsy with various reasons that have been explained, this is because there is still no test of this tool, especially in Indonesia to prove that the use of virtual autopsy method can compete with conventional autopsy in terms of result and diagnosis.

So it takes a container such as a seminar or a workshop for the forensic doctor, and radiology doctor to be able to dissect how the benefits side, add insight about virtual autopsy method as a whole and consider how if the virtual autopsy method applied in Indonesia. And also to discuss how the regulation of the use of virtual autopsy method will be whether to cooperate between two disciplines or virtual autopsy method only for the forensic specialist doctor.

So it can be determined how to apply the virtual autopsy method to substitute the conventional autopsy or just as a means of autopsy investigation tool, no other purpose of virtual autopsy method is to answer the reason for rejection of autopsy and give comfort especially the Islamic religion in honor of the corpse.

### Conclusion

Forensic Specialist Doctor in Indonesia is still not ready in the procedure of using virtual autopsy if the virtual autopsy method is applied to forensic case resolution, with the most reason is still being the superior of conventional autopsy compared to the virtual autopsy method.

Although many benefits, a tool must have some weaknesses which cause obstacles to the application of virtual autopsies, such as:

1. Cost is quite expensive
2. In Indonesia, the tools such as CT-Scan and MRI are not evenly distributed in all places
3. Especially in Indonesia, there is no forensic radiologist

Knowledge of Forensic Specialist Doctor about the virtual autopsy method is good enough they already know the method, but still, do not know how to use tools from the virtual autopsy.

### Conflict of Interest

None

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