
7 Preparing the CAS Case Book, 50 case studies

The CAS for Forensic Imaging and Virtopsy requires you to prepare a casebook containing 50 case studies.

Based on both our own case based experience and scientific studies into the effect of written and depicted reporting (see page 25 for details), we are convinced that PMCT evidence needs to be prepared with attention and care to details, to the attorneys or authorities that authorize you to perform a forensic PMCT on a body.

Preparing the CAS Forensic Imaging and Virtopsy casebook should allow you to practice the preparation of PMCT evidence in a way that also authorities and courts can follow your descriptions.

Formal expectations

At the same time, an academic requirement for this course is to avoid what is called fraudulent actions:

1. Do not bring and use unauthorized aids
2. Do not communicate during assessments without permission
3. Using incomplete or false information during registration for this program
4. Plagiarism

In terms of the case book, we detail the task to complete a coursebook to be as follows:

- The language of the casebook is English or German.
- The course participant is expected to use axial PMCT image data sets and work from there *by themselves*. The participant needs to demonstrate they are able to visually document a case by themselves, given only some background information and axial PMCT image sets and no further help. With that, the own intellectual task, that the participant presents as their personal achievement, in form of the case book are:
 1. Use of series of axial PMCT data (or exceptionally, PMMR data) but no reconstructed images.
 2. Axial image selection that the course participant performed or performs themselves, without copying these from someone else that already documented or solved that case.

3. 3D (VRT) or oblique slice (MPR) or other reconstructions and views that they performed entirely on their own without copying these from someone else that already documented or solved that case.
 4. Use of own case reconstructions, also if performed already prior to putting together the casebook, just as well as use of newly created reconstructions, is fine.
- The case book should conform to the participants' local laws regarding anonymization.
 - The participant needs to keep a list of the cases that are used in their casebook, for possible later referral in case a double check is necessary, in case a third party alleges that reconstructions were not performed by the participant but by someone else.
 - If the participant works at the Institute of Forensic Medicine of the University of Zurich, the case book is to be performed containing case reference numbers. The case book will not be given out and only checked within the department of Forensic Imaging & Virtopsy.

Content expectations

We expect you to prepare findings covering a range of cases spanning the spectrum of forensic medicine, preferably from your own case work. As that may not be possible, participants may use our own case selection.

- In each of these 50 cases, one or several images of a post mortem computed tomography (PMCT) scan is/are expected to be present. Ideally, it is/they are accompanied by one or more autopsy photographs of the macroscopic finding to supplement if not confirm the observation.
- We do not want you to fill a PMCT casebook entirely with natural deaths where cause of death is myocardial infarction, and neither would a casebook showing only cases of firearm injuries to extremities constitute a satisfying choice of cases. And yet, this spectrum of cases will be different, depending on your specific case load. Forensic medicine is a field that usually focuses on "the forensic question" in each and every case. Obviously, we would want to see you embracing this "forensic question" approach in your case studies as well.
- Was it suicide/accident or homicide? – A pistol (firearm) shot to the head can be a typical cause of death. And yet, penal law makes a big difference between self inflicted (accidental, suicidal) shots and those inflicted by another person (homicidal). Now, for a self inflicted head shot, however, a close range or contact shot (and not a shot from distance) is the typical finding. So we would want to know how you differentiate

between a distant or close range / contact shot to identify a suicide rather than a homicide

- What are the reconstructive aspects? – In a number of fatal traffic accidents, the post mortem investigation has to elucidate findings that are indicative of a particular sequence or location of injuries. With these, the sequence of events leading up to the fatal injuries can be reconstructed. "Reconstruction" here designates a sequence space spanning uncertainties and certain aspects, typical for forensic medicine. Usually, investigative authorities spend extra money only if they have a considerable chance that they can expand their insight into relevant reconstructive aspects. While PMCT has that potential, showing that potential in each and every case is the challenge at hand.
- If you read a lot of image catalogs that other people created, you will see that arrows and labels are a requirement for fast and efficient image catalog reading. If you label all findings numerically (1,2,3,..) or alphabetically (A, B, C, ..) and refer to the labels in your image caption, the reader will be fast in understanding what you meant.
- For many trauma cases, it will be relevant to document associated vital reactions. Vital reactions are pathological changes that indicate the trauma was survived. This can be blood aspiration into the lungs in case of a head shot. It can be swallowed air in case of a drowning case. Vital reactions are typically cardiovascular events such as embolism or hemorrhages, but also may contain tension pneumothorax. In some cases such as train suicides, death is too early for vital reactions to even occur (or being detected); one of the first relevant examination steps in train collision cases therefore is the determination of body core temperature as early as possible to approximate answers to that question.
- The cases need to be interpreted correctly. To interpret what clearly is a road traffic fatality on a dry and open road (with extensive blunt trauma) as drowning, to suggest that lungs that have no findings exhibit a "mosaic pattern", may be marked as mistakes upon review of your case book.

Findings: zoom in / crop image, point out, describe well

It is often a good idea to provide at least two images, one with an overview to allow for better orientation, and one that focuses, zooms in, and exhibits the relevant small aspects.

The same is true for forensic photography: what makes a good photo often also makes a good PMCT reconstruction.

For one and the same finding you may use:

- one axial image
- a number of axial images
- one MPR (multiplanar reconstruction) image
- several MPR images
- one 3D (threedimensional) image
- several 3D images
- or a combination of the above
- always consider use of arrows and labels to refer to in the image caption

The ultimate question is probably, with how little effort and work you can achieve a maximal clarity, speed and ease in demonstrating the finding you try to demonstrate.

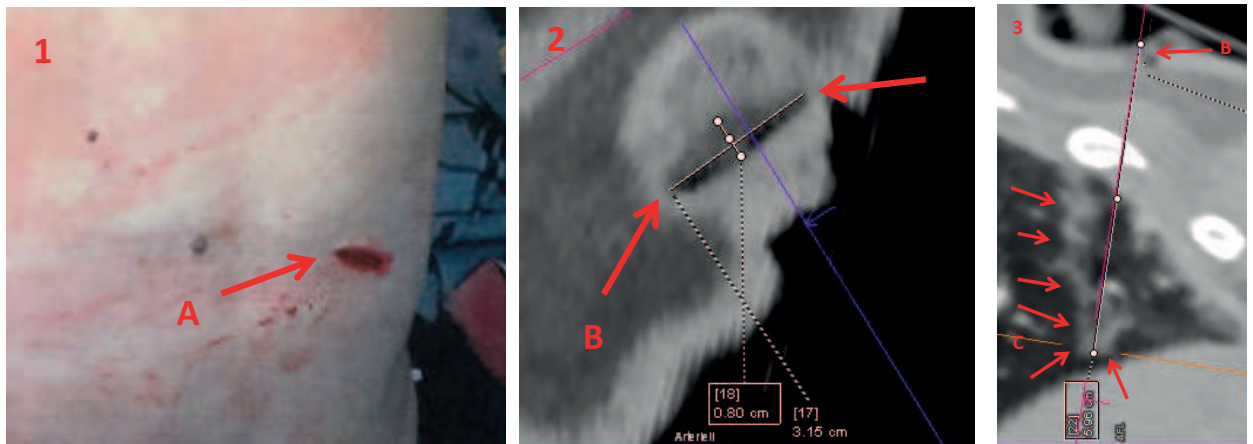
As always, we are living and working in a constrained world. While some more expensive or difficult reconstructions such as preparing subdural hemorrhages for 3D volume rendering may be impressive, axial images may suffice to demonstrate the relevant aspects in any given case.

Identities, personal data

- You are reminded of what probably is your official duty, that is, to protect the identity of the people whose PMCT and autopsy data you collect for this casebook. Unless all data and written evidence are public record (which is certainly not the case in Switzerland), anonymity may be required for all data that you export or transfer to your casebook.
- In all instances of doubt, such as cases that have not been to court yet, or cases where court decisions are not final as the case may be appealed, please check with your authorities whether it is at all acceptable for you to use a particular image or case data.
- To allow for possible later checks of your work regarding intellectual own contribution (if ever that necessity arises), you are requested to keep a full list of all case information and case numbers in your files, at least for 5 years after you have obtained the certificate.

Suggestions and examples

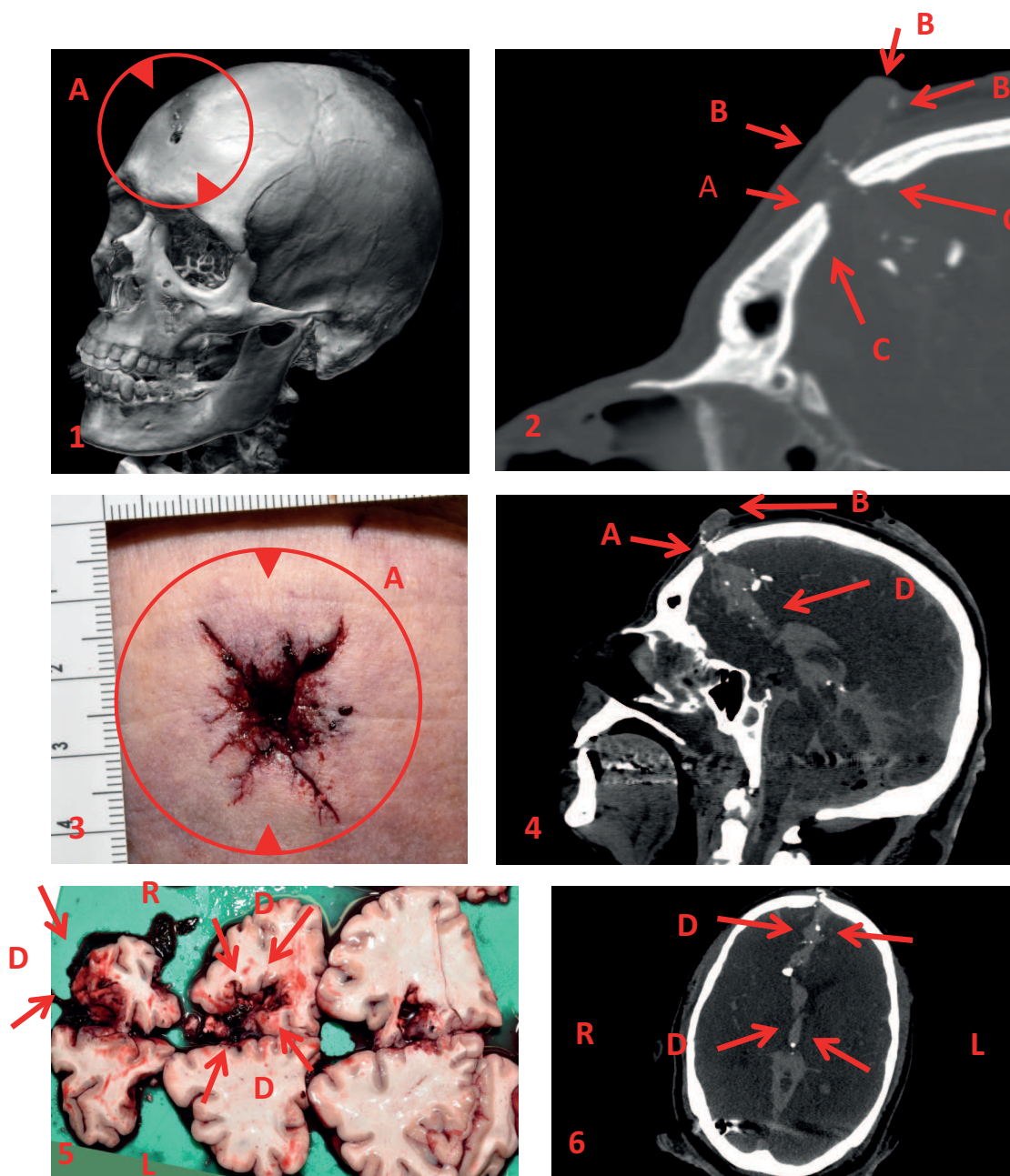
Example 1: stab wound



Example: stab wound image caption or description

Stab wound to the back, entry on the right side.

1. Photograph of first responders with a slit like sharp force entrance wound (A) at the right side of the back.
2. MPR (multiplanar reconstruction) of the stab wound skin entrance (B), at the skin level. Extent or size is 31,5mm x 8mm.
3. MPR perpendicular to the injury track, with skin entrance at B, and a sharp force lung penetration (C) containing acute hemorrhage, with a total length of almost 7 cm. Ribs without discernible injury to the bone. Minimal hemothorax. No evidence of liver injury.

Example 2: firearm injury

Example: stab wound image caption or description: Suicidal pistol contact shot to the forehead. Entrance defect to the skin of forehead and skull (A) (images 1-4) also contains blood that ran off to the back (B, images 2 and 4) that in addition contains CT-dense soot (B in image 2); together with star-shaped tears (A, image 3) the diagnosis of a contact shot was made. Bullet track (D in images 5 and 6; R right L left) with hemorrhage and bone fragments [reference: this is case 15 in the "Reading forensic PMCT" session].

Practically / technically preparing a casebook

- An easy way to prepare a casebook is by using Microsoft Powerpoint and by employing an A4 (or Letter) formatted template.
- Consider using letters to indicate findings, or orientation guides such as using L for left, R for right, A for anterior, P for posterior and make sure to word out your letters in the image caption.
- To avoid misunderstandings, use arrows for more precise indication what you mean.
- To make this a straightforward process, we usually use a file template that already contains pre-formatted arrows and letters so one can save time by just dragging these into position.
- Always consider that the reader does not know what body part, what zoomed in region, you want to show and consider including an overview – such as when demonstrating a calcified coronary artery with a stent, you could add a whole axial image with a rectangle to show where you zoomed in from.
- Every image requires a verbal description in form of a written image caption.

How to get good quality PMCT images into the casebook software (such as Microsoft Powerpoint)

There are a number of ways to export your images to your casebook. At any rate, we would ask you to not compress the image too much seeing as if all popular image formats (GIF, PNG, JPG) are compression formats, whereas the higher the degree of compression the higher the degree of compression artifacts.

- If ever possible you may therefore want to directly copy/paste image data from the DICOM or CT viewer to the software that you use to assemble your casebook, such as Microsoft Powerpoint.
- Alternatively, exporting to an uncompressed TIFF format is desirable.
- If nothing else, at least try to not compress JPG, GIF or PNG too much. Typical sequences to arrive at a successful image transfer could be:
- Viewer software > Clip/screenshot /snipping tool/grab tool> TIFF or JPG / GIF / PNG > import to casebook file.
- Viewer software > copy > paste into casebook file.

- By all means, CROP the image that you just pasted, as you do not want the margins, border text etc. of the whole screen content that you just copied and pasted.

Downloads:

- Casebook Powerpoint template,<http://virtopsy.com/wp-content/uploads/2017/02/CAS-Forensic-Imaging-and-Virtopsy-Casebook-template.zip>