

POST COVID-19 TISSUE QUANDARY



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Clinical History

The patient was a 52 year old male with Grave disease, myasthenia gravis (treated with azathioprine), and asymptomatic COVID-19 infection detected 7 weeks before his final hospitalization. He presented on admission with a 1 day history of headaches, fevers, and abnormal gate. COVID-19 RNA -SARS test was negative at the time. His hospital course was complicated by a diffuse pustular rash (pictures A, B).

Surgical Pathology

A shave biopsy of the skin was performed which revealed fibrin accumulation within vessels and marked associated acute inflammation (C) with the following comment:

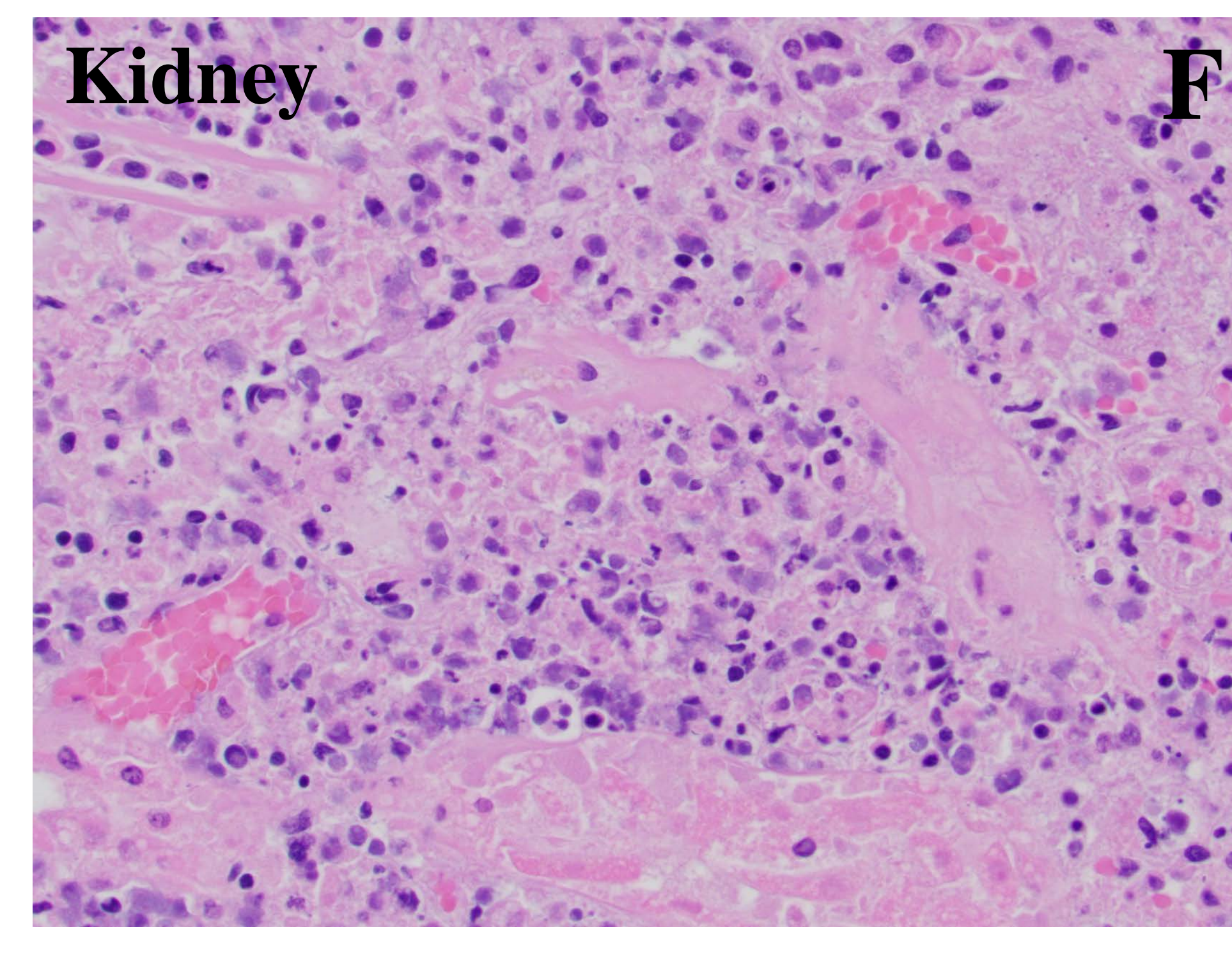
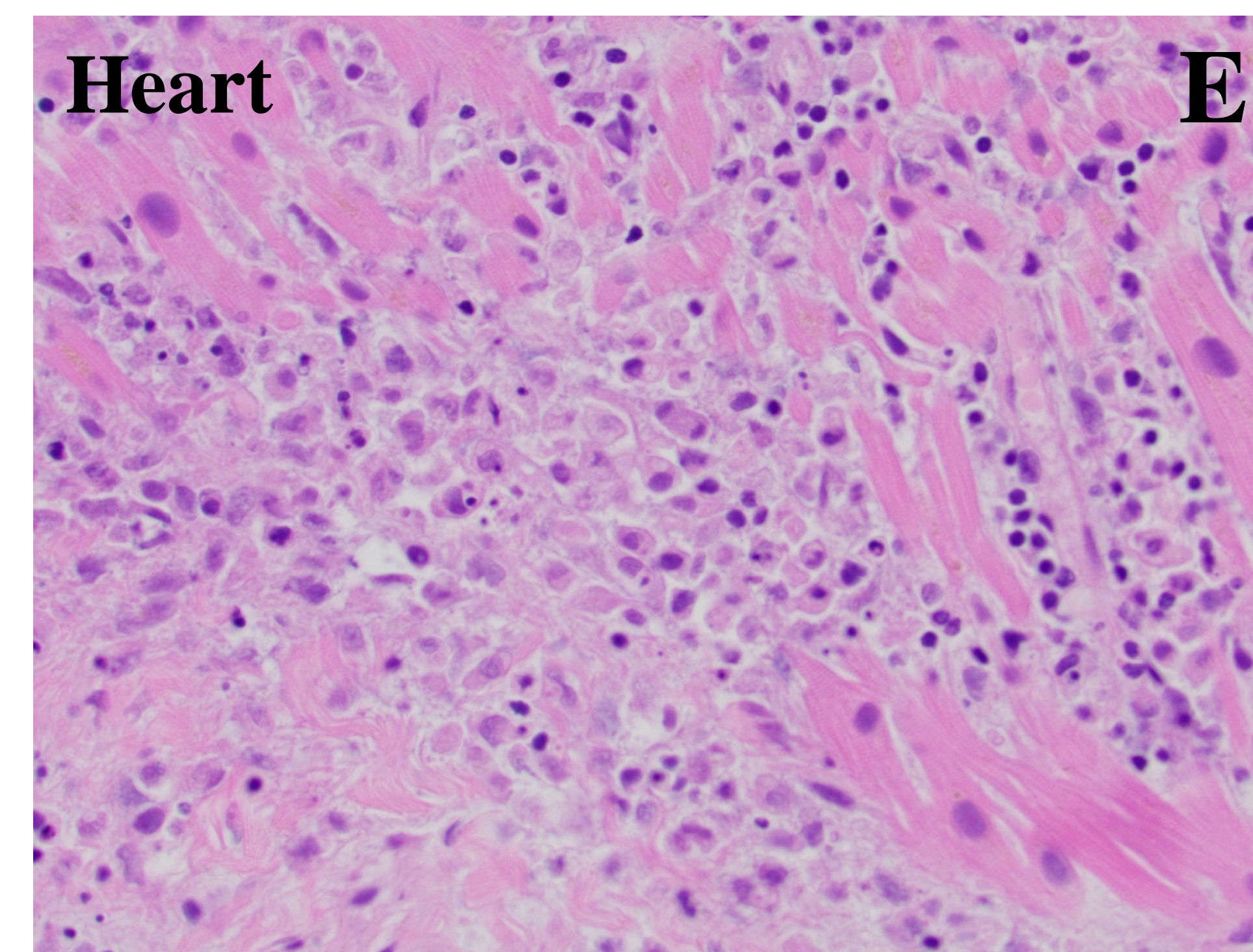
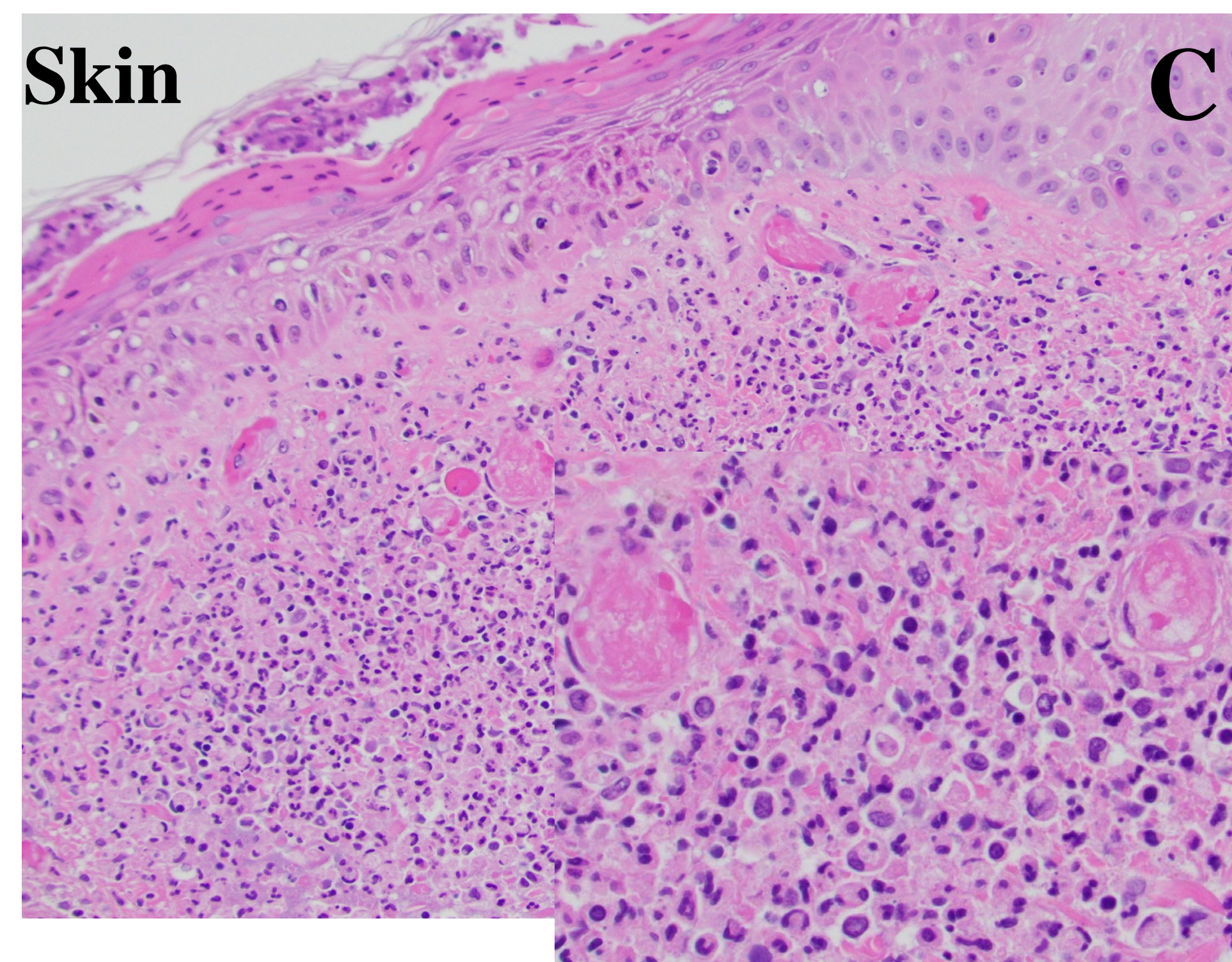
The presence of vascular occlusion by fibrinous material and overlying ischemic epidermal changes were concerning for a coagulopathic process. There was also significant inflammation to a degree not always seen in association with coagulopathies (such as disseminated intravascular coagulation, DIC). This raised the possibility of an infectious process occurring either in conjunction with coagulopathy or possibly promoting a coagulopathic process.

Special stains and immunohistochemical studies showed:

- Periodic acid-Schiff (PAS) – negative for fungal organisms
- Silver (GMS) – negative for fungal organisms
- AFB – negative for mycobacterial organisms
- Gram – negative for bacterial organisms
- HSV1, HSV2 and CMV – no labeling of any cells.

He was transferred to the medical ICU for worsening respiratory failure requiring intubation and DIC (D-dimer >66,000 FEU, platelets $18 \times 10^9/L$, INR 14.9). He died one week after admission and an autopsy was requested to exclude infection or malignancy. The autopsy was performed 8 weeks after the initial positive COVID-19 test.

Autopsy Findings Evidence of coagulopathy was seen in multiple other organs (i.e. mesentery in D). Microscopically, similar appearing inflammatory foci consisting of neutrophils, possibly with a left shift, and histiocytes were found associated with the coagulopathy in the microvasculature (E, F). The possibility that clotting had caused ischemia resulting in attraction of inflammation was a consideration. Although the inflammatory foci included immature myelocytes, no myeloblasts, such as in myeloid sarcoma were identified. The patient additionally had laboratory evidence of a myocardial infarction (high sensitivity troponin 10219 ng/L; reference ≤ 19.8 in males) in the setting of DIC. Despite further immunohistochemical studies on autopsy, no infectious organisms or malignancy were identified to account for the coagulopathy.



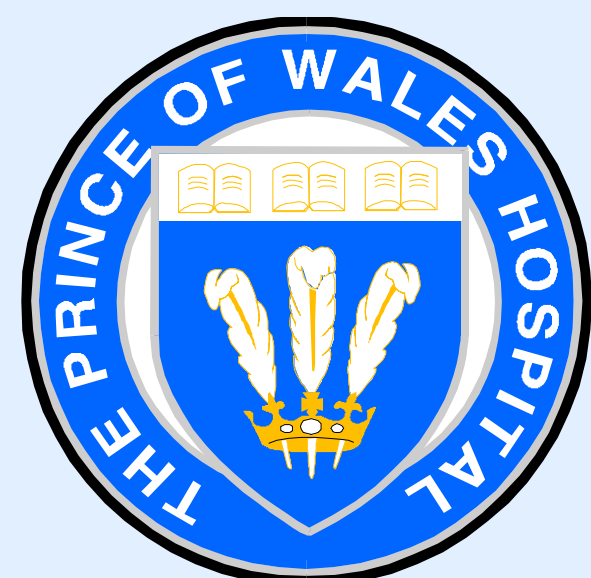
Examination of the lungs (G) additionally revealed marked congestion in the lower lobes bilaterally with focal giant cells and early acute bronchoalveolar pneumonia, suggestive of aspiration pneumonia. There was also severe cyanosis in the fingertips consistent with hypoxia.

Discussion

The possibility that the findings represented tissue manifestations of COVID-19 was a consideration. According to the literature, the virus attacks the endothelial cells which line the blood vessels, initiating the clotting cascade. This is particularly noticeable in the microvasculature. It may be why the virus has such widespread systemic effects, even causing neurological strokes. Although examination of the brain in this case did not reveal infarctions, there was severe cerebral edema and widespread metabolic gliosis that could be seen in a wide variety of metabolic perturbations including systemic infection, acidosis, renal or hepatic failure, among other conditions. In summary, though the patient had a positive COVID-19 test two months before his death, which is considered a remote infection by the CDC, immunosuppression for myasthenia gravis may have delayed his immune reaction, allowing coagulopathy to manifest in other organs even after the virus was no longer detectable by nasal swabbing.

Reference

Leitch C. COVID-19 Attacks Endothelial Cells. Labroots website. July 5, 2020. Accessed March 19, 2022. <https://www.labroots.com/trending/cell-and-molecular-biology/18043/covid-19-attacks-endothelial-cells>



Poster title goes here, containing strictly only the essential number of words...



Author's Name/s Goes Here, Author's Name/s Goes Here, Author's Name/s Goes Here

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Introduction

First...

Check with conference organisers on their specifications of size and orientation, before you start your poster eg. maximum poster size; landscape, portrait or square.

The page size of this poster template is A0 (84x119cm), landscape (horizontal) format. Do not change this page size, MIU can scale-to-fit a smaller or larger size, when printing. If you need a different shape start with either a portrait (vertical) or a square poster template.

Bear in mind you do not need to fill up the whole space allocated by some conference organisers (eg. 8ftx4ft in the USA). Do not make your poster bigger than necessary just to fill that given size.

Aim

How to use this poster template...

Simply highlight this text and replace it by typing in your own text, or copy and paste your text from a MS Word document or a PowerPoint slide presentation.

The body text / font size should be between 24 and 32 points. Arial, Helvetica or equivalent.

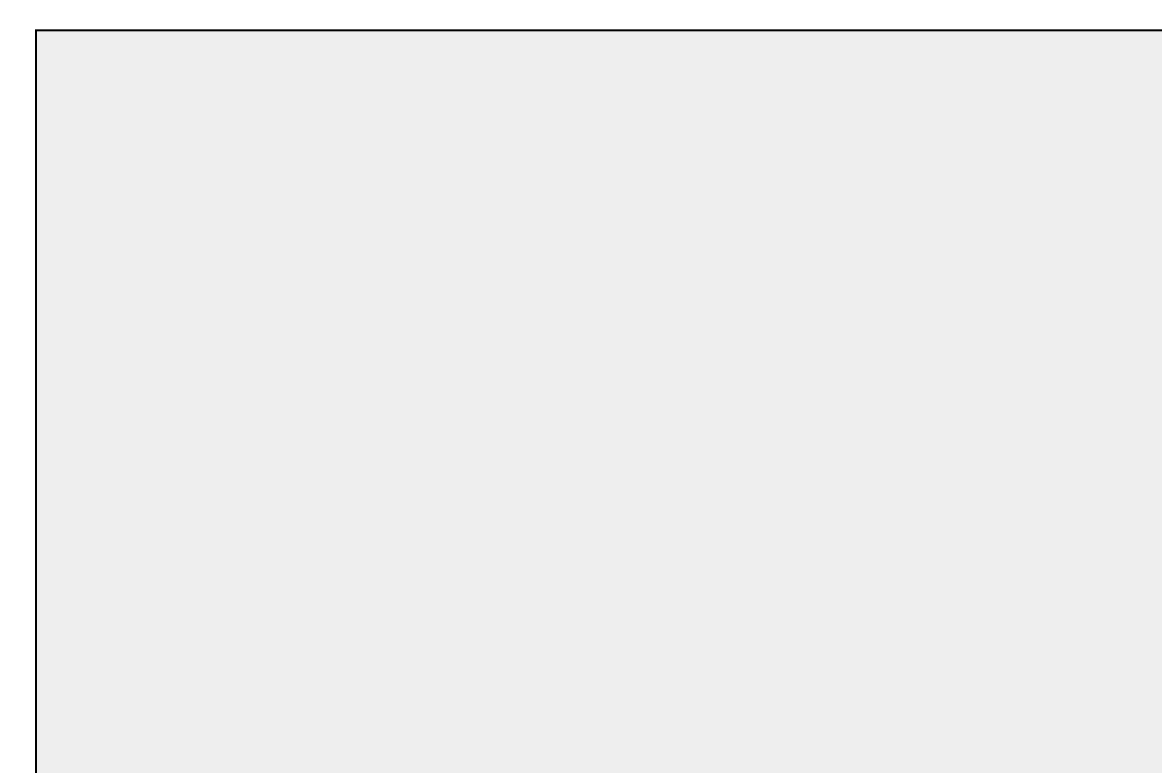
Keep body text left-aligned, do **not** justify text.

The colour of the text, title and poster background can be changed to the colour of your choice.

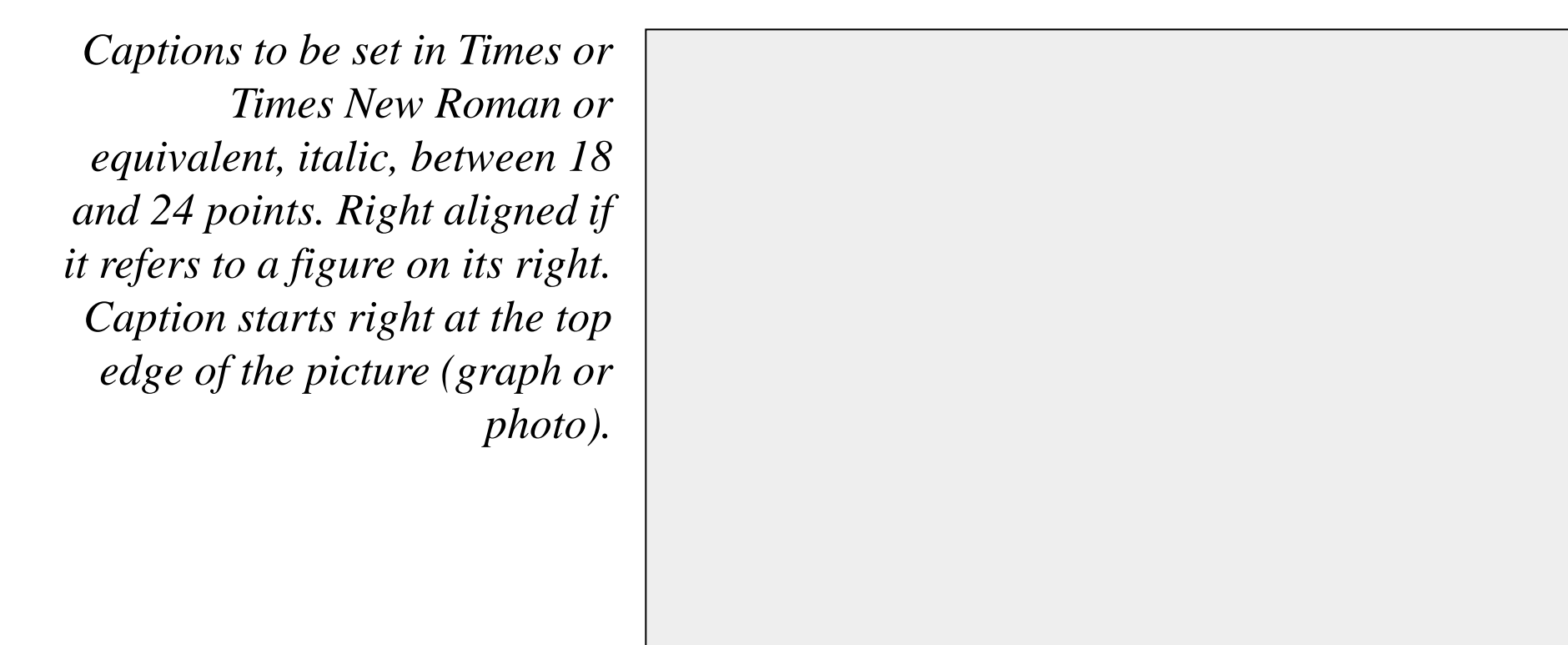
Method

Tips for making a successful poster...

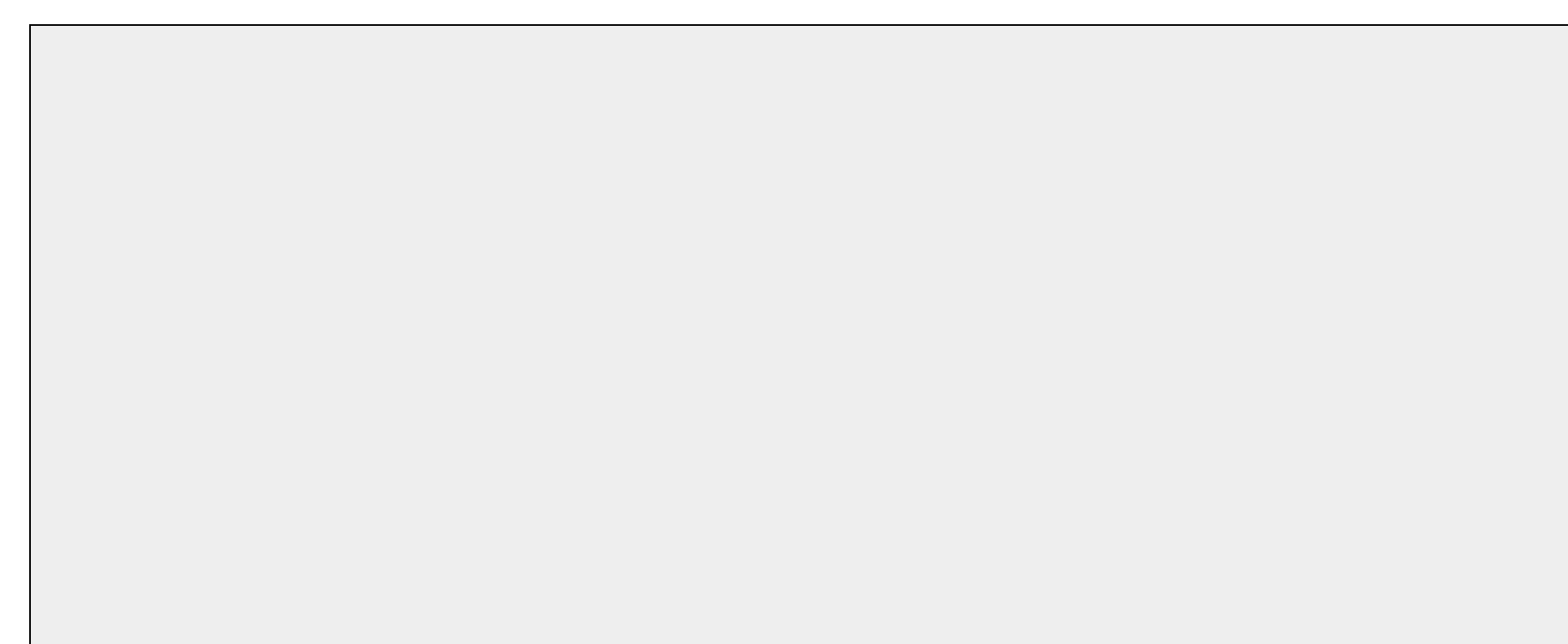
- Re-write your paper into poster format ie. Simplify everything, avoid data overkill.
- Headings of more than 6 words should be in upper and lower case, not all capitals.
- Never do whole sentences in capitals or underline to stress your point, use **bold** characters instead.
- When laying out your poster leave breathing space around you text. Don't overcrowd your poster.
- Try using photographs or coloured graphs. Avoid long numerical tables.
- Spell check and get someone else to proof-read.



Captions to be set in Times or Times New Roman or equivalent, italic, between 18 and 24 points. Left aligned if it refers to a figure on its left. Caption starts right at the top edge of the picture (graph or photo).



Captions to be set in Times or Times New Roman or equivalent, italic, between 18 and 24 points. Right aligned if it refers to a figure on its right. Caption starts right at the top edge of the picture (graph or photo).



Captions to be set in Times or Times New Roman or equivalent, italic, 18 to 24 points, to the length of the column in case a figure takes more than 2/3 of column width.

Results

Importing / inserting files...

Images such as photographs, graphs, diagrams, logos, etc, can be added to the poster.

To insert scanned images into your poster, go through the menus as follows: Insert / Picture / From File... then find the file on your computer, select it, and press OK.

The best type of image files to insert are JPEG or TIFF, JPEG is the preferred format.

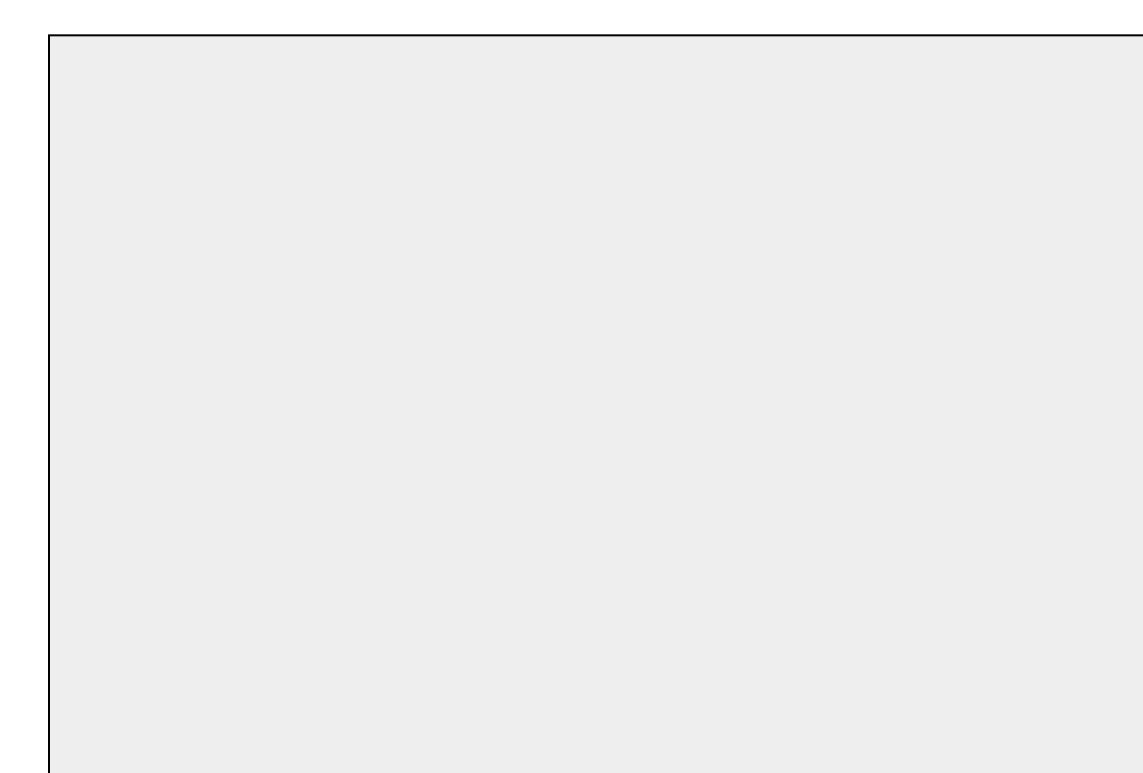
Be aware of the image size you are importing. The average colour photo (13 x 18cm at 180dpi) would be about 3Mb (1Mb for B/W greyscale). Call MIU if unsure.

Do **not** use images from the web.

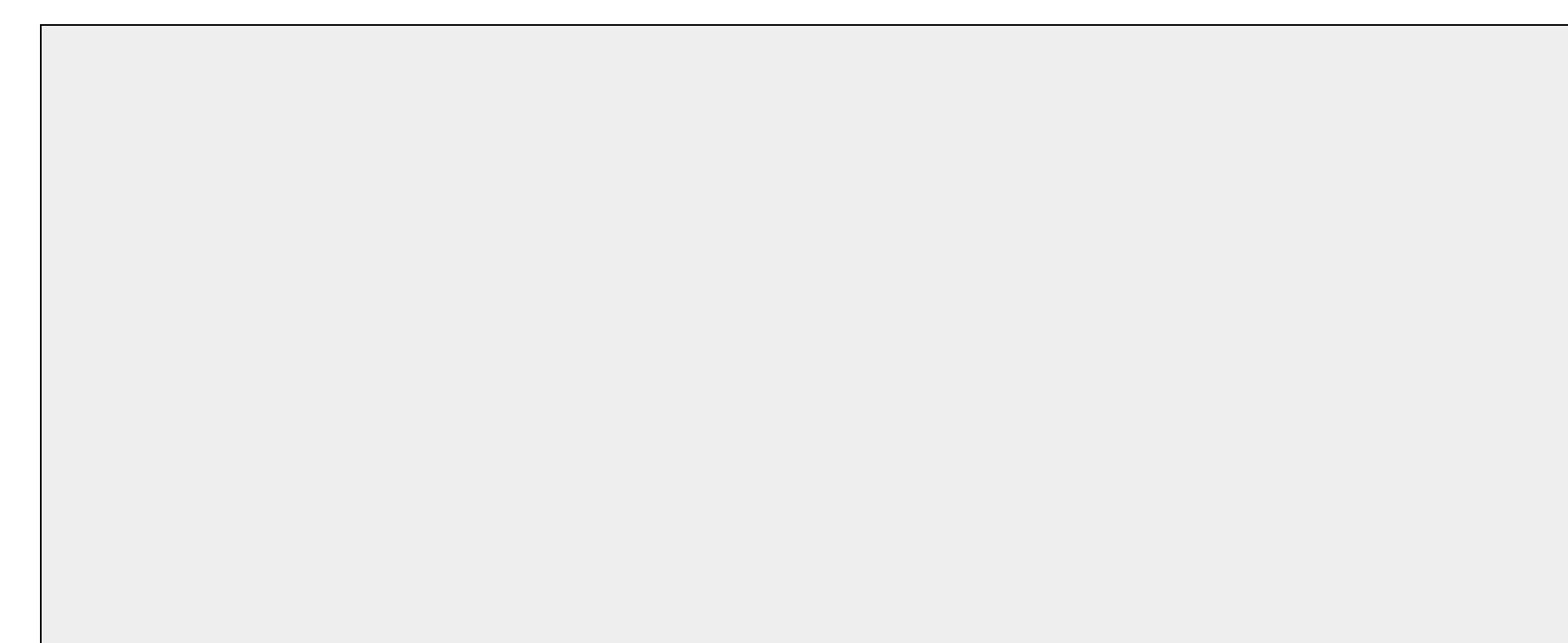
Notes about graphs...

For simple graphs use MS Excel, or do the graph directly in PowerPoint.

Graphs done in a scientific graphing programs (eg. Sigma Plot, Prism, SPSS, Statistica) should be saved as JPEG or TIFF if possible. For more information see MIU.



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Printing and Laminating...

Once you have completed your poster, bring it down to MIU for printing. We will produce a A3 size draft print for you to check and proof read. The final poster will then be printed and laminated.

Note: Do not leave your poster until the last minute. Allow at least 5 working days before you need to use it.

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Conclusion

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Medical Illustration Unit
Prince of Wales Hospital

Ph: 9382 2800

Email: miunsw@unsw.edu.au

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Acknowledgements

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