

Pathology Practical III

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THROMBO-EMBOLIC Disorders

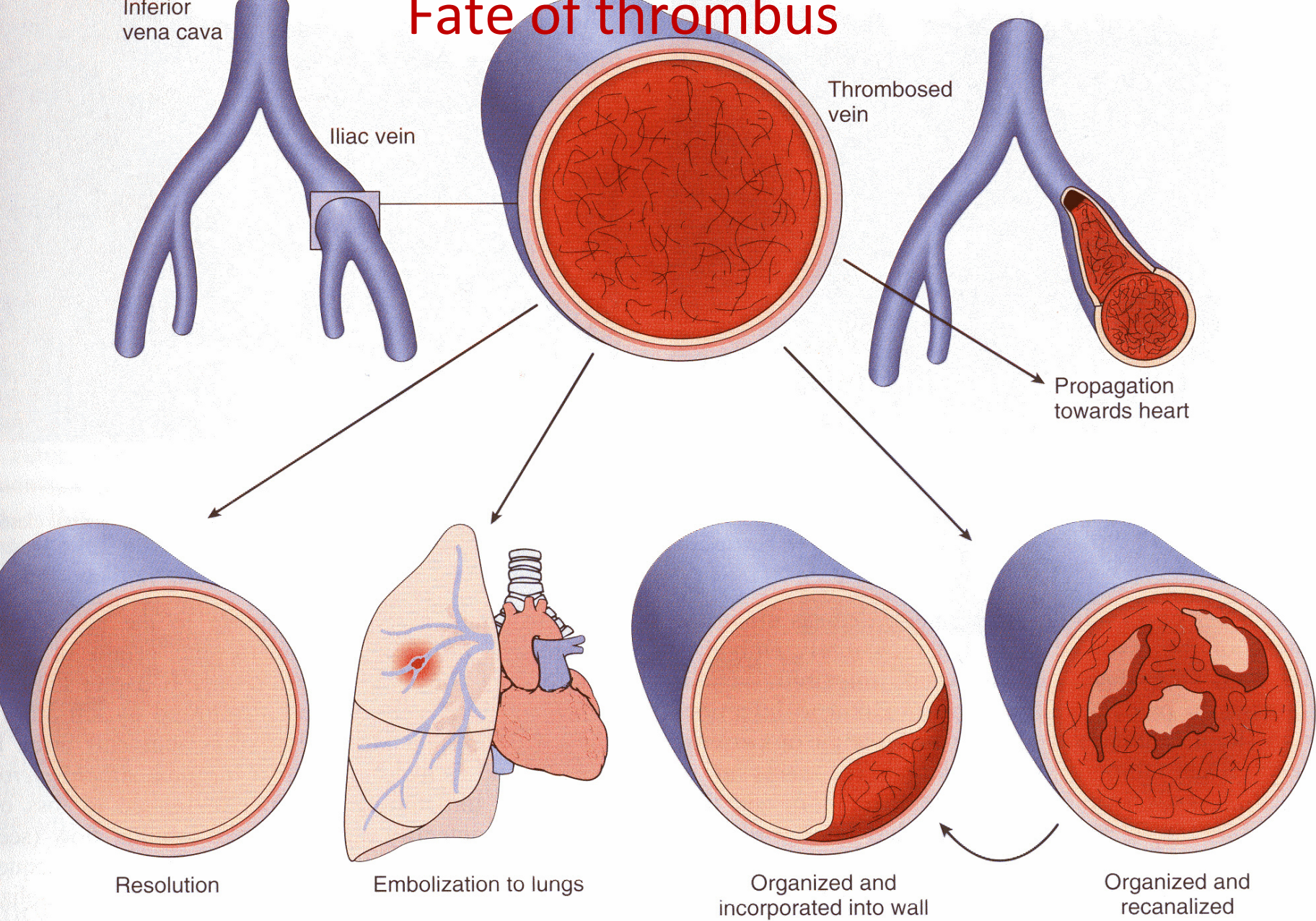
Hemostasis & Thrombosis

- Normal hemostasis maintain blood in fluid, clot free state in normal vessel and induce localized hemostatic plug at site of vascular injury.
- Thrombosis is inappropriate activation of normal hemostatic process (eg formation of thrombus/blood clot) in **un-injured vasculature** or thrombotic occlusion of vessel after minor injury.

- **Normal fluid homeostasis** means *maintaining blood as a liquid until such time as injury necessitates clot formation.*

- Clotting at inappropriate sites (*thrombosis*) or migration of clots (*embolism*) obstructs blood flow to tissues & leads to cell death (*infarction*).

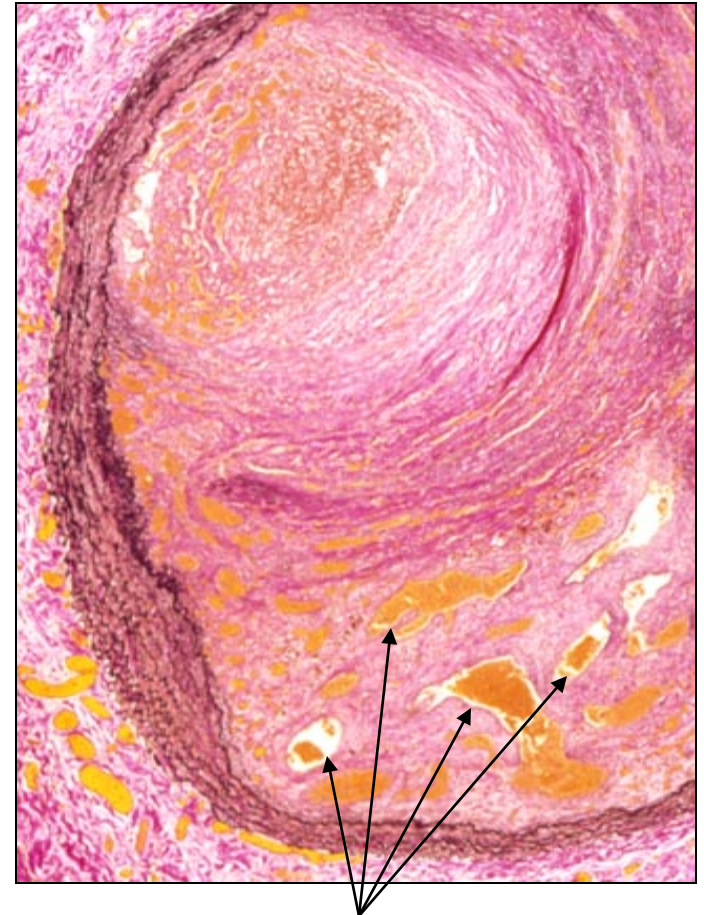
Fate of thrombus



1- Organizing Thrombus

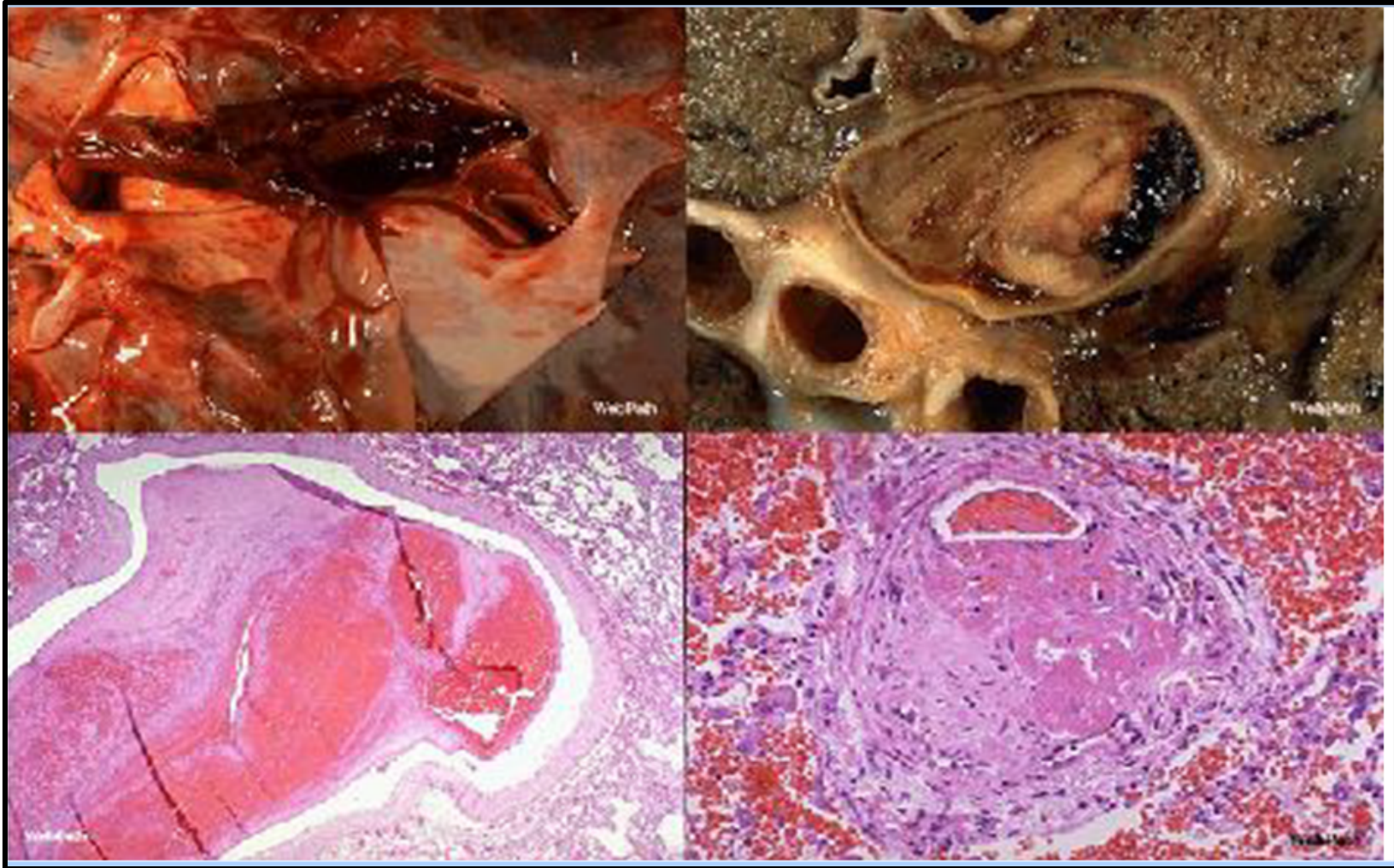
Organising thrombus:

- reparative process
- ingrowth of fibroblasts and capillaries (similar to granulation tissue)
- lumen remains obstructed may eventually **recanalize**



Organization & Recanalization
(multiple capillary channels)

Organizing Thrombus



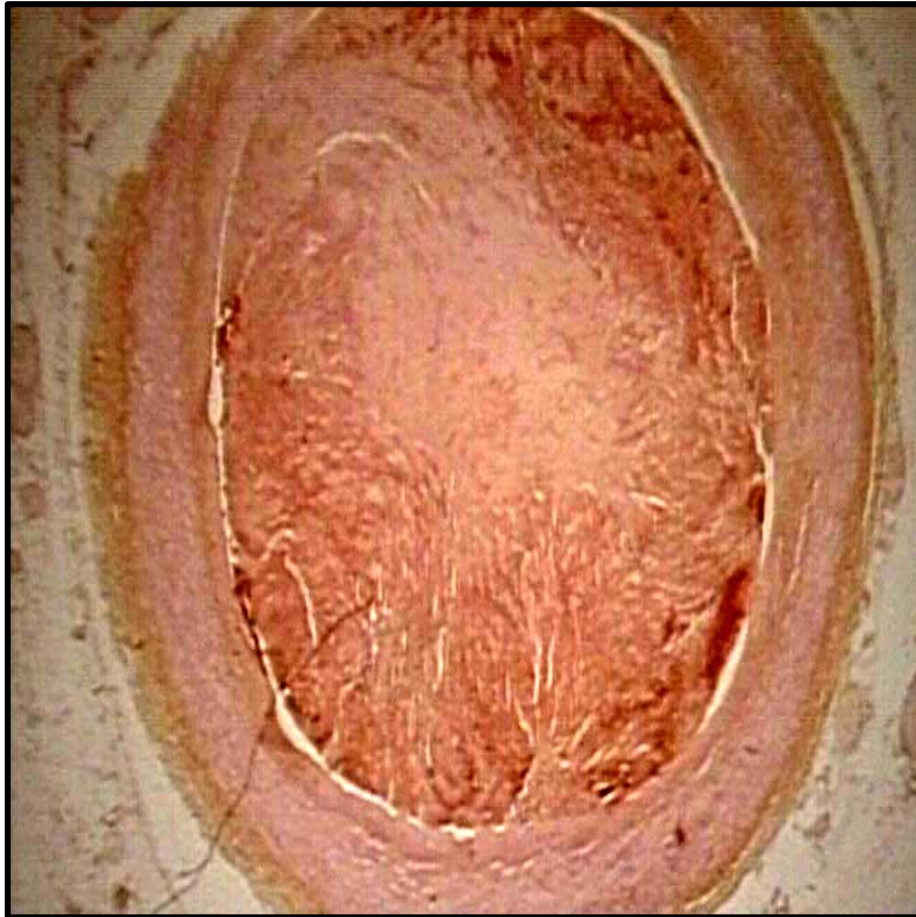
Organizing thrombus in a case of pulmonary embolism

Organizing Thrombus with Lines of Zahn



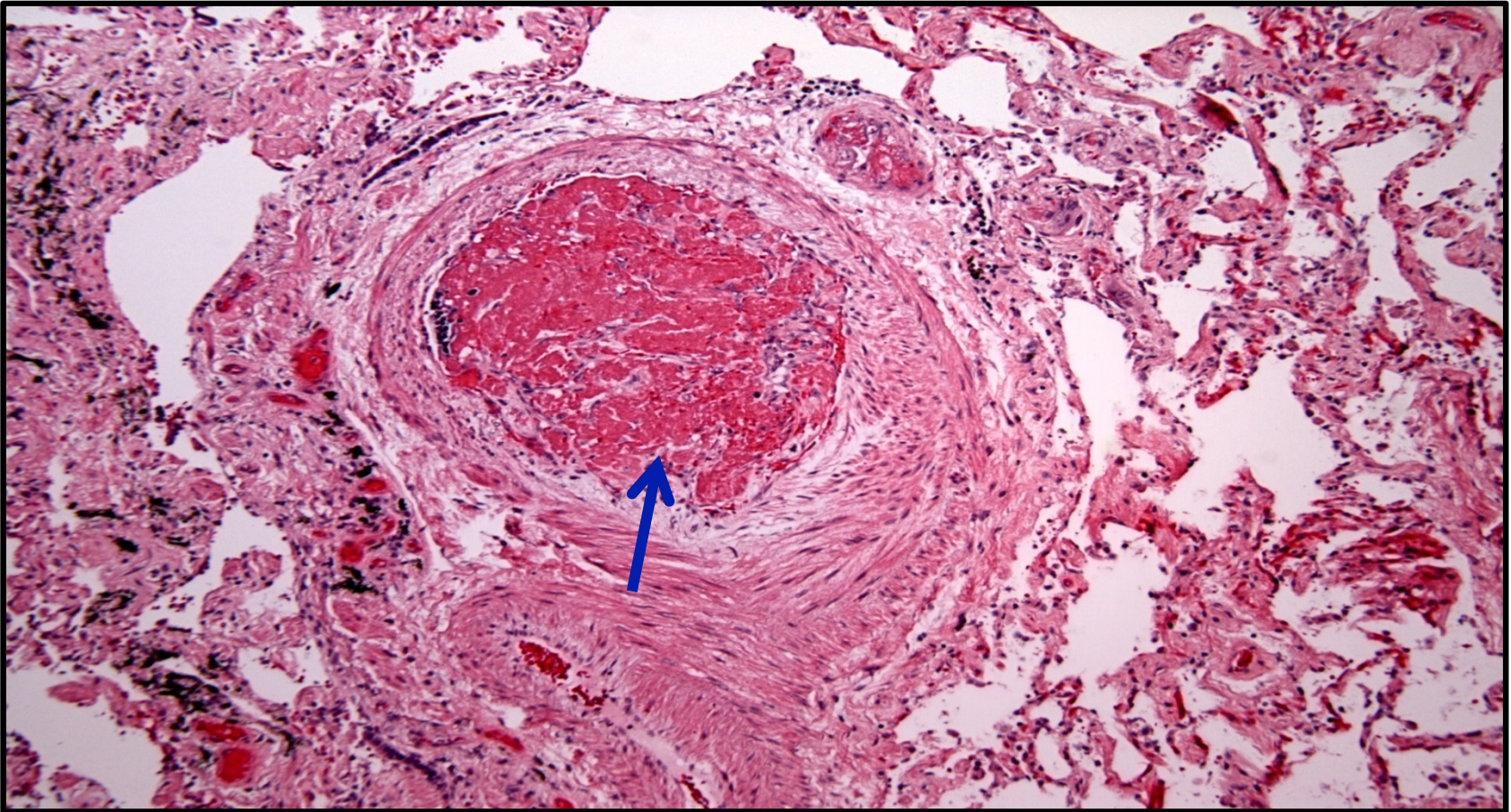
This is the microscopic appearance of a pulmonary thromboembolus in a large pulmonary artery. There are interdigitating areas of pale pink and red that form the "lines of Zahn" characteristic for a thrombus. These lines represent layers of red cells, platelets, and fibrin which are laid down in the vessel as the thrombus forms.

Lines of Zahn



Lines of Zahn, gross and microscopic, is evidence to prove a clot is pre-mortem (which is different from the clots appearing like current jelly or chicken fat which are said to be Post-mortem). These lines represent layers of red cells, platelets, and fibrin

Thromboembolus in Pulmonary Artery



Pulmonary thromboembolus in a small pulmonary artery. The interdigitating areas of pale pink and red within the organizing embolus form the “lines of Zahn” (arrow) characteristic of a thrombus. These lines represent layers of red cells, platelets, and fibrin that are laid down in the vessel as the thrombus forms

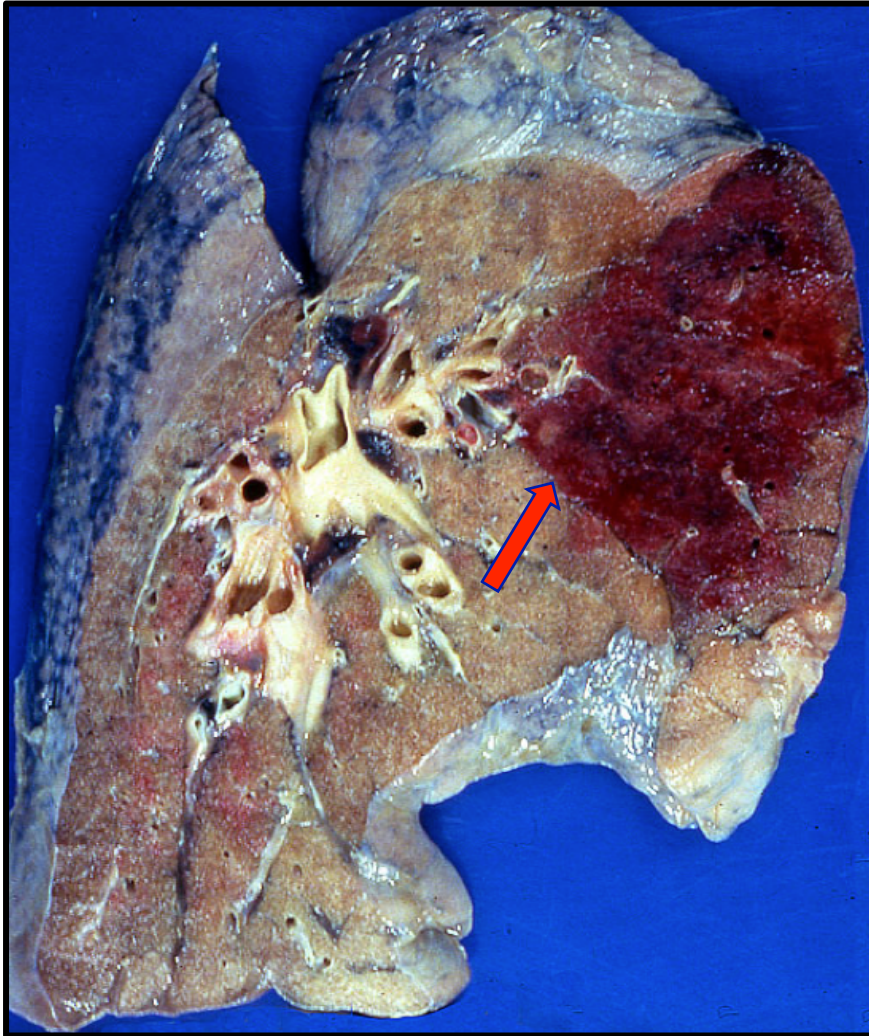
Organizing thrombus:

Cross section of blood vessel shows:

- ✚ The lumen is occluded by thrombus which consists of alternate layers of platelets with fibrin thread and clotted blood (line of Zahn).
- ✚ Organization can be seen at the periphery of thrombus which includes formation of small capillaries & fibroblasts with chronic inflammatory cells.
- ✚ Recanalization can be seen at one side.

2- Pulmonary Embolus with Infarction

Pulmonary Embolus with Infarction



This specimen shows an area of dead lung tissue ("infarction") due to blockage of one of the major arteries to the lung by an embolus ("blood clot") originating from the deep veins of the leg.

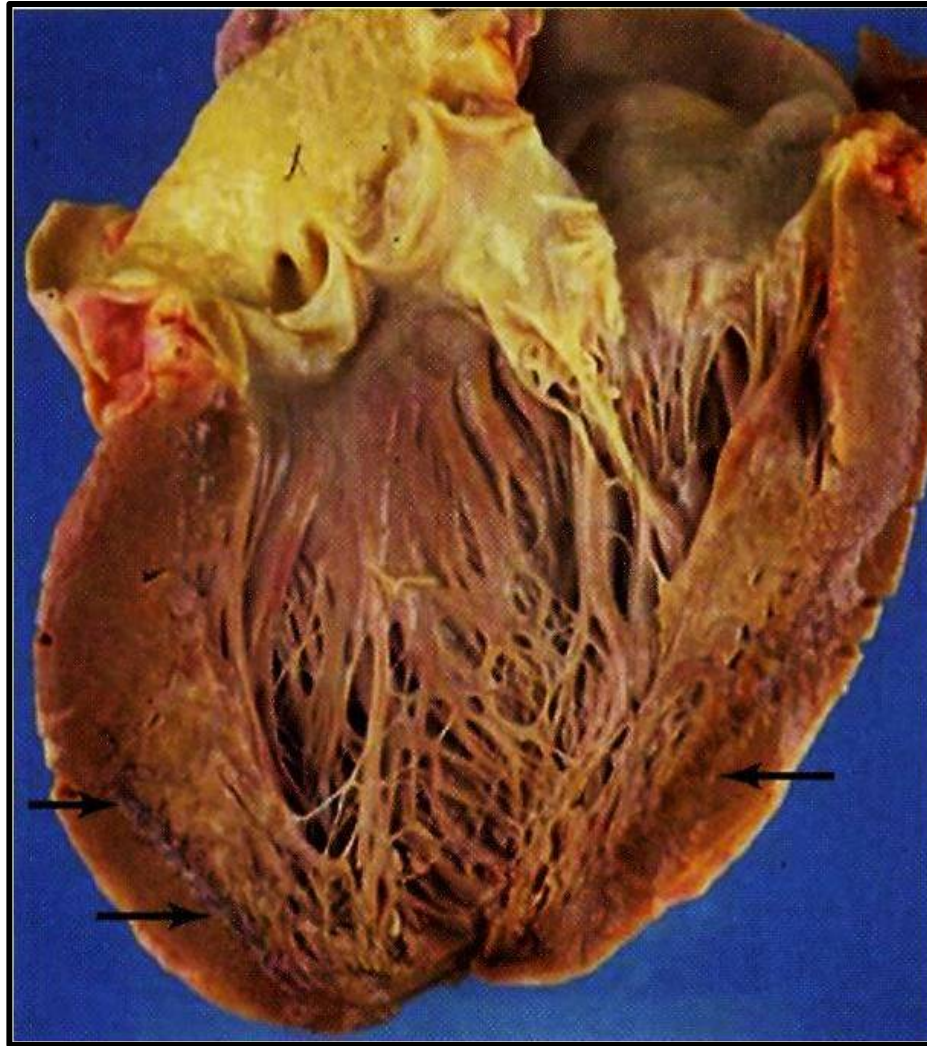
Pulmonary Embolus with Infarction



A large pulmonary thromboembolus is seen in the pulmonary artery of the left lung. Such thromboemboli typically originate in the leg veins or pelvic veins of persons who are immobilized

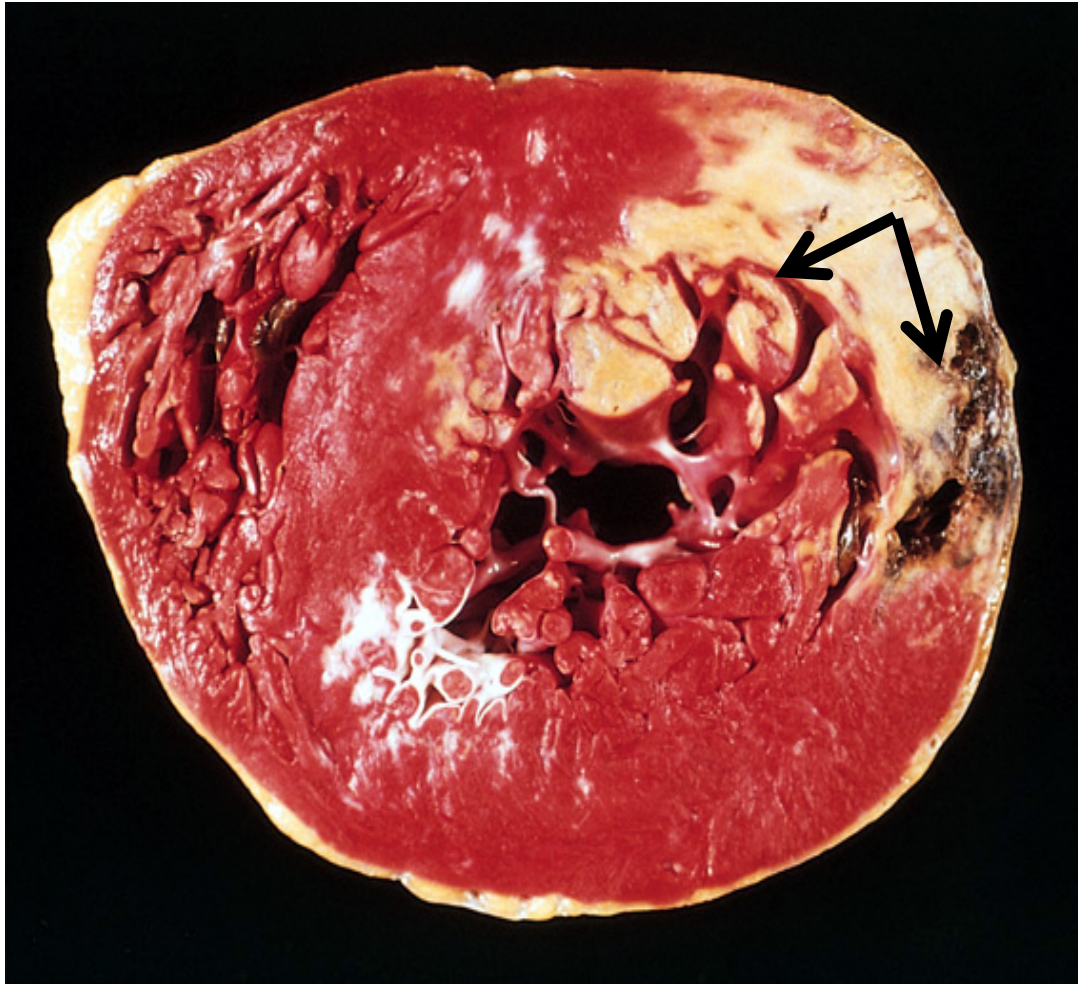
3- Myocardial Infarction

Myocardial Infarction



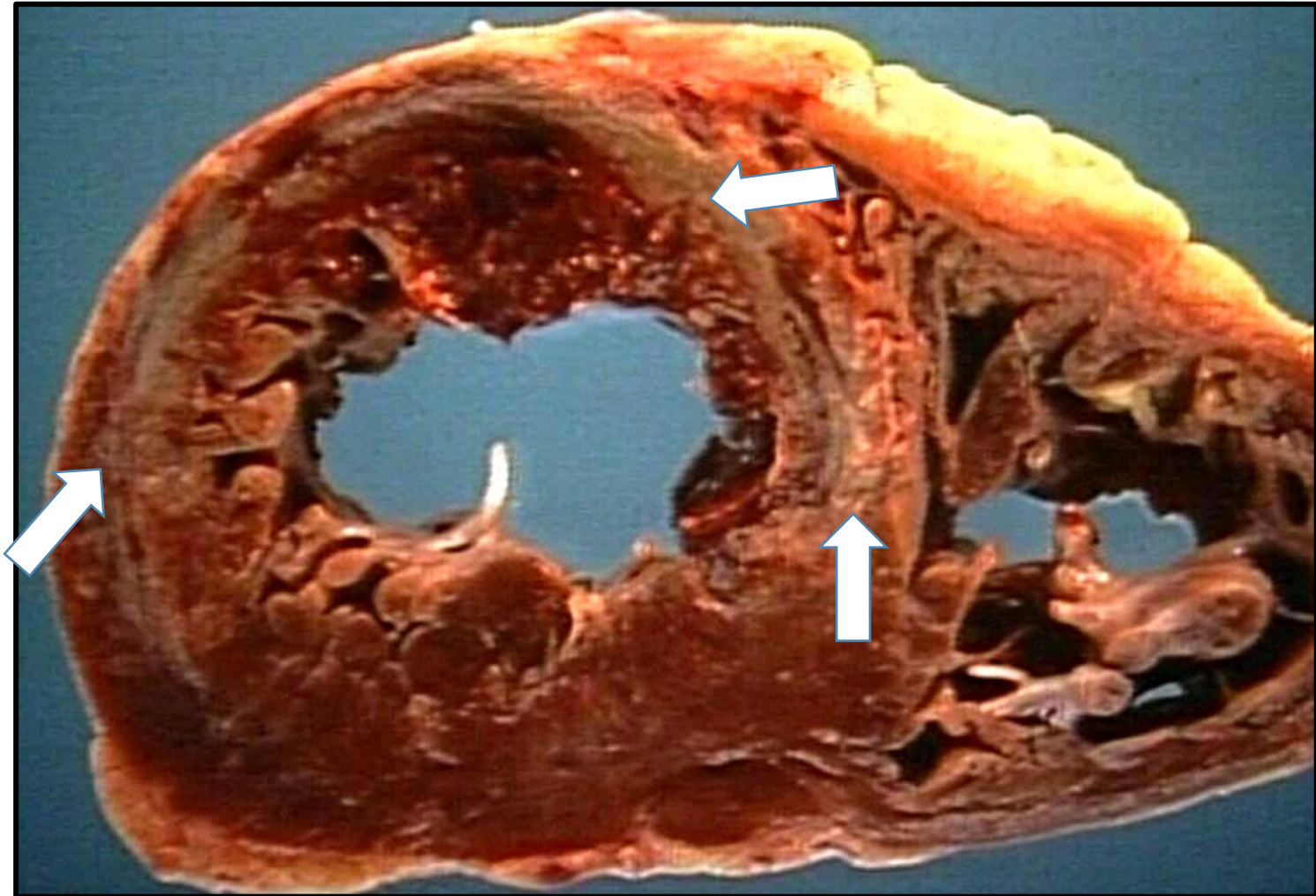
Complications that might occur : arrhythmias , ventricular aneurysm, rupture of myocardium, cardiac tamponade and others .

Myocardial Infarction



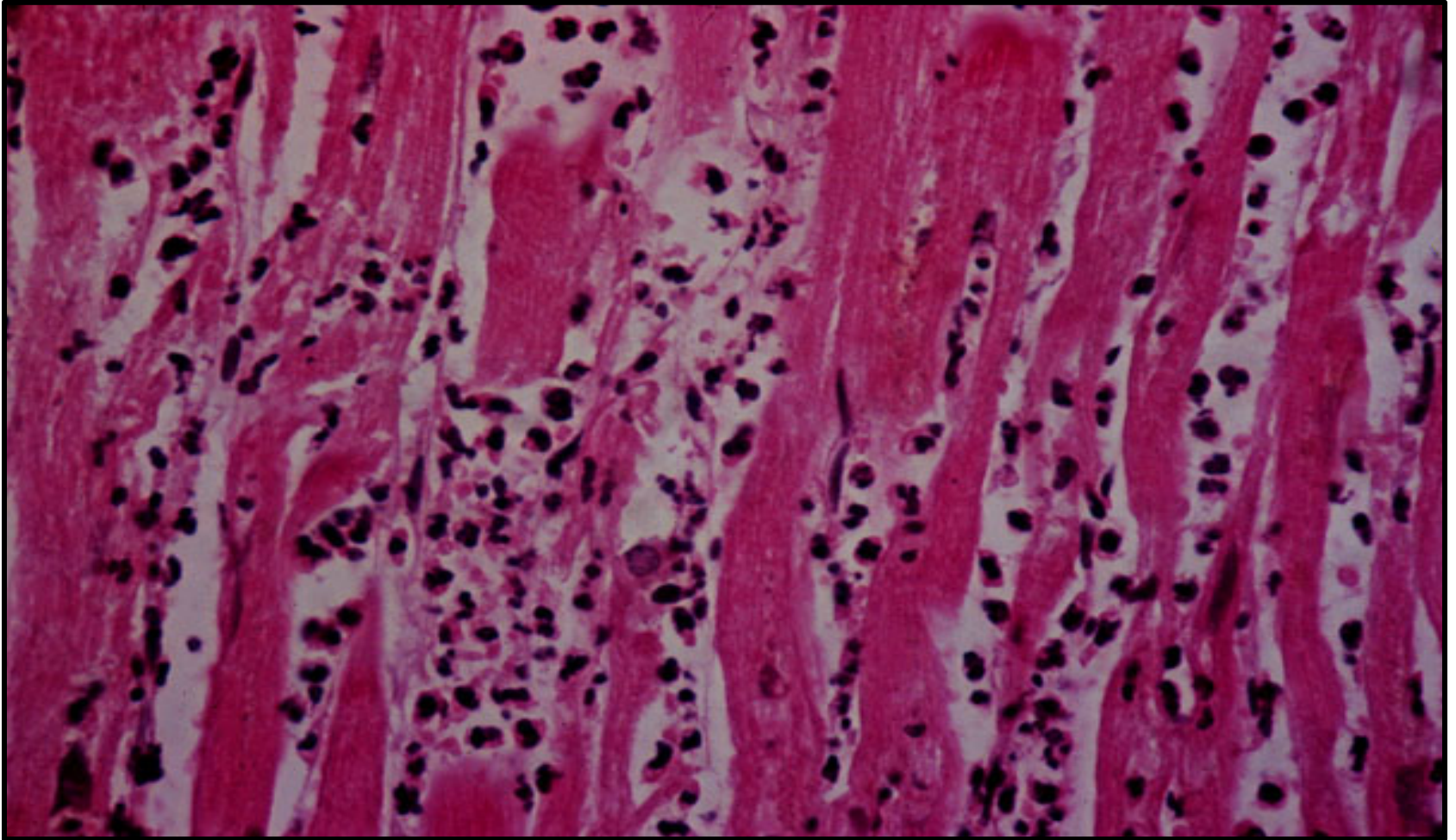
Cross section of the left and right ventricles shows a pale and irregular focal fibrosis in the left ventricular wall with increased thickness .

Myocardial Infarction



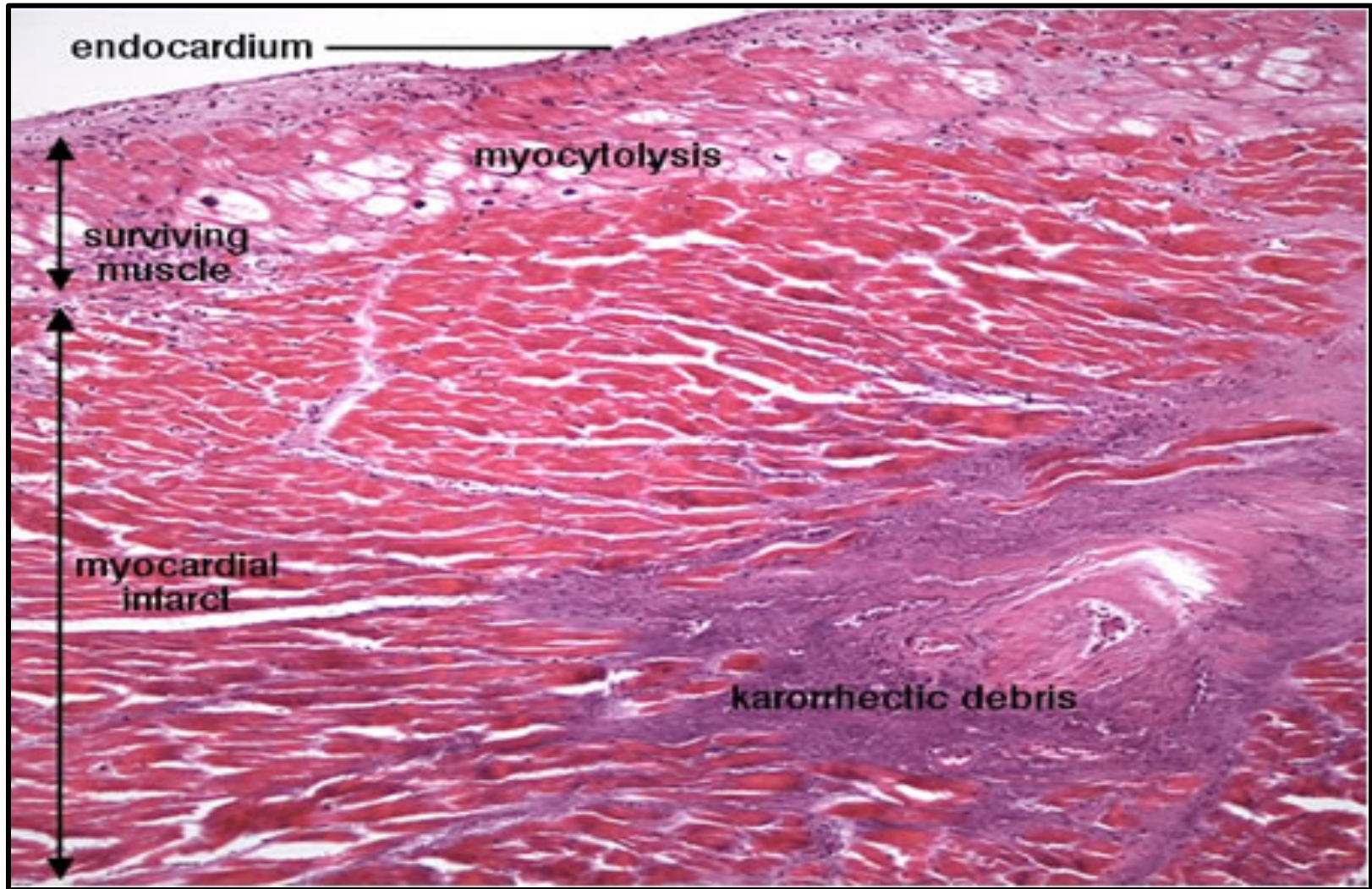
Cross section of the left and right ventricles shows a pale and irregular focal fibrosis in the left ventricular wall with increased thickness .

Myocardial Infarction



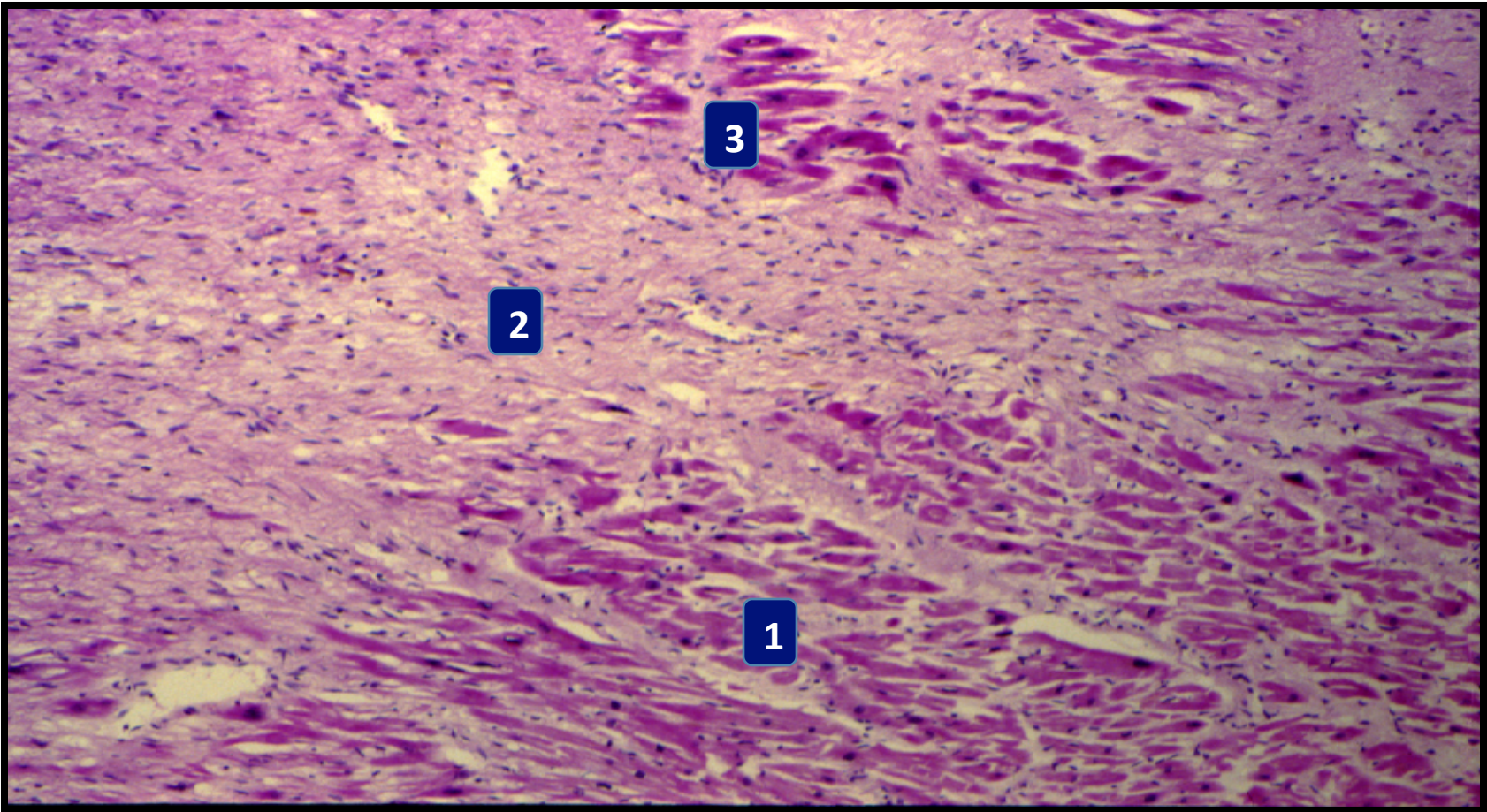
Acute myocardial infarct, histology. This 3-4 day old infarct shows necrosis of myocardial cells and is infiltrated with polymorphnuclear leukocytes.

Myocardial Infarction



Transmurular myocardial infarct at 2 weeks

Myocardial Infarction



- 1- Patchy coagulative necrosis of myocardial fibers. The dead muscle fibers are structureless and hyaline with loss of nuclei & striations.**
- 2- Chronic ischemic fibrous scar replacing dead myocardial fibers .**
- 3- The remaining myocardial fibers show enlarged nuclei due to ventricular hypertrophy .**

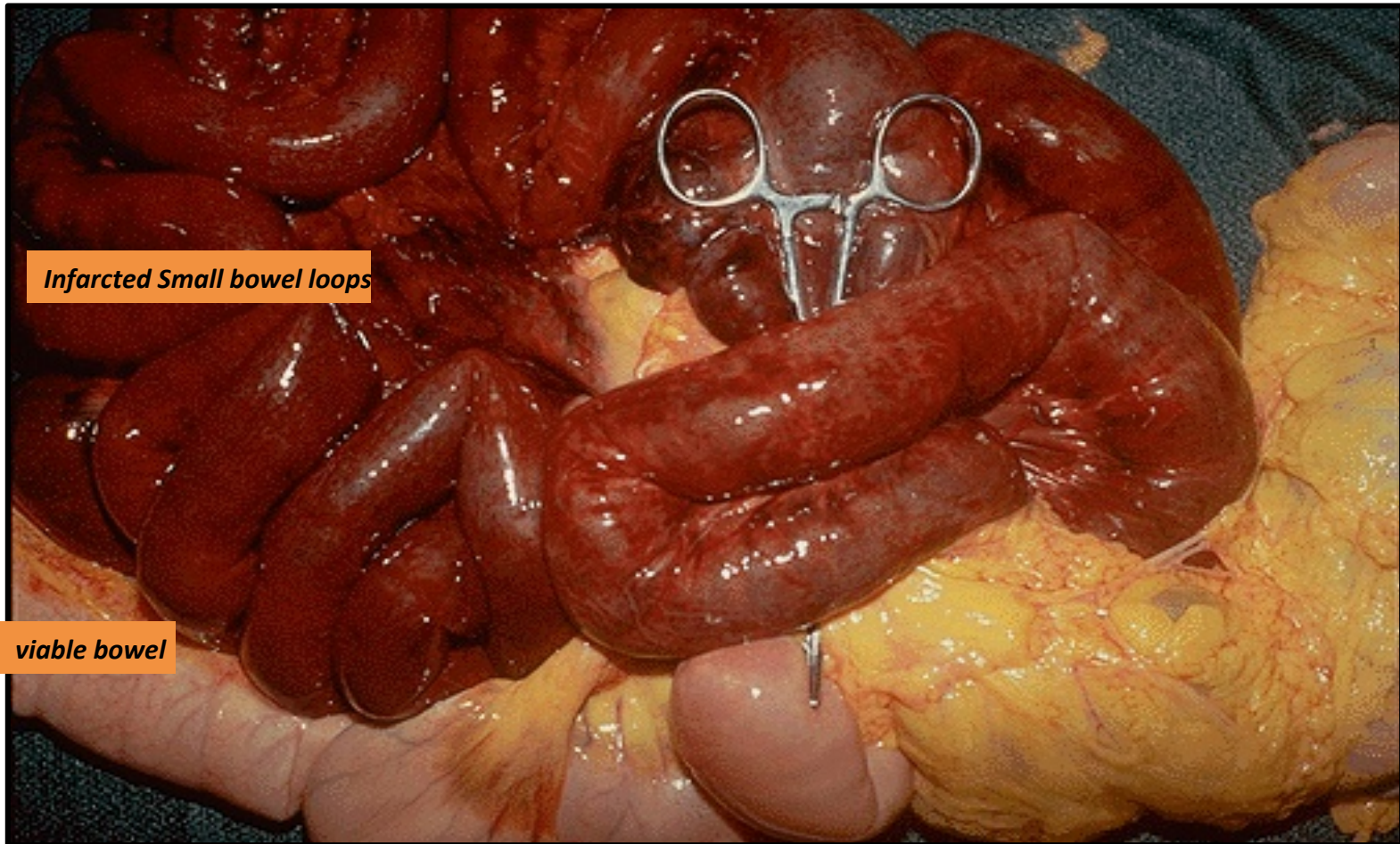
Myocardial infarction:

Section of myocardial shows:

- ✚ Patchy coagulative necrosis of myocardial fibres. The dead muscle fibres are structure less and hyaline.
- ✚ The necrotic muscle fibres are pale with loss of nuclei and striations. Infiltration of neutrophils in recent stage is seen .
- ✚ Later granulation tissue formation and fibrosis.

4- Infarction of the Small Intestine

Infarction of the Small Intestine



Infarcted Small bowel loops

viable bowel

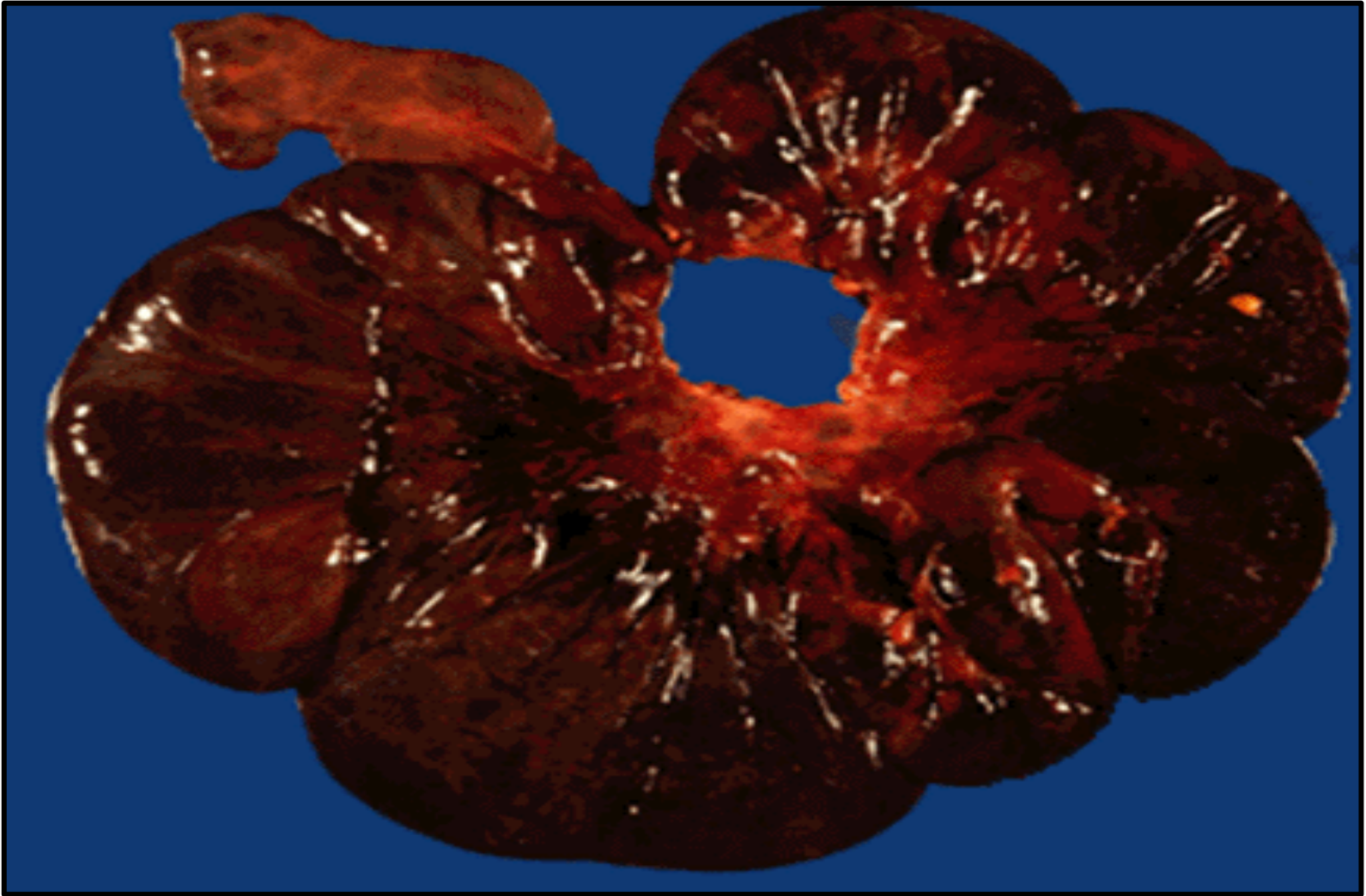
The dark red infarcted small intestine contrasts with the light pink viable bowel.

This is one complication of adhesions from previous surgery.

The trapped bowel has lost its blood supply.

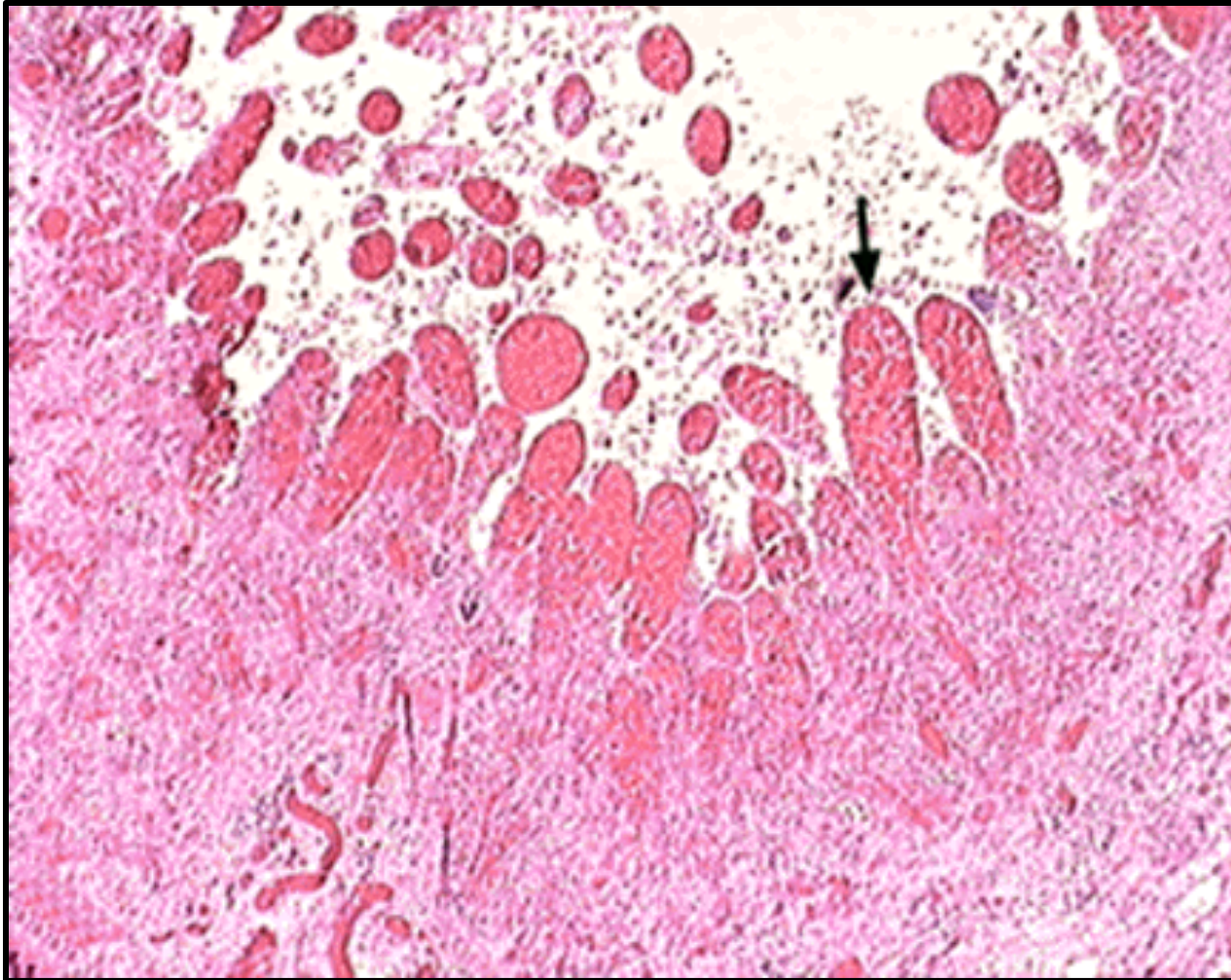
likely cause is ischemia secondary to mesenteric venous thrombosis

Infarction of the Small Intestine



Diffuse violaceous red appearance is characteristic of transmural hemorrhagic intestinal infarction

Infarction of the Small Intestine



- *Mucosal erosions/ ulcerations*
- *Areas of haemorrhagic necrosis*
- *Inflammatory infiltration*

Intestinal infarction typically begins in the villi, which are end vasculature without anastomoses. There is complete loss of the mucosal epithelium. Broad areas of hemorrhage with moderate inflammatory infiltrate is present