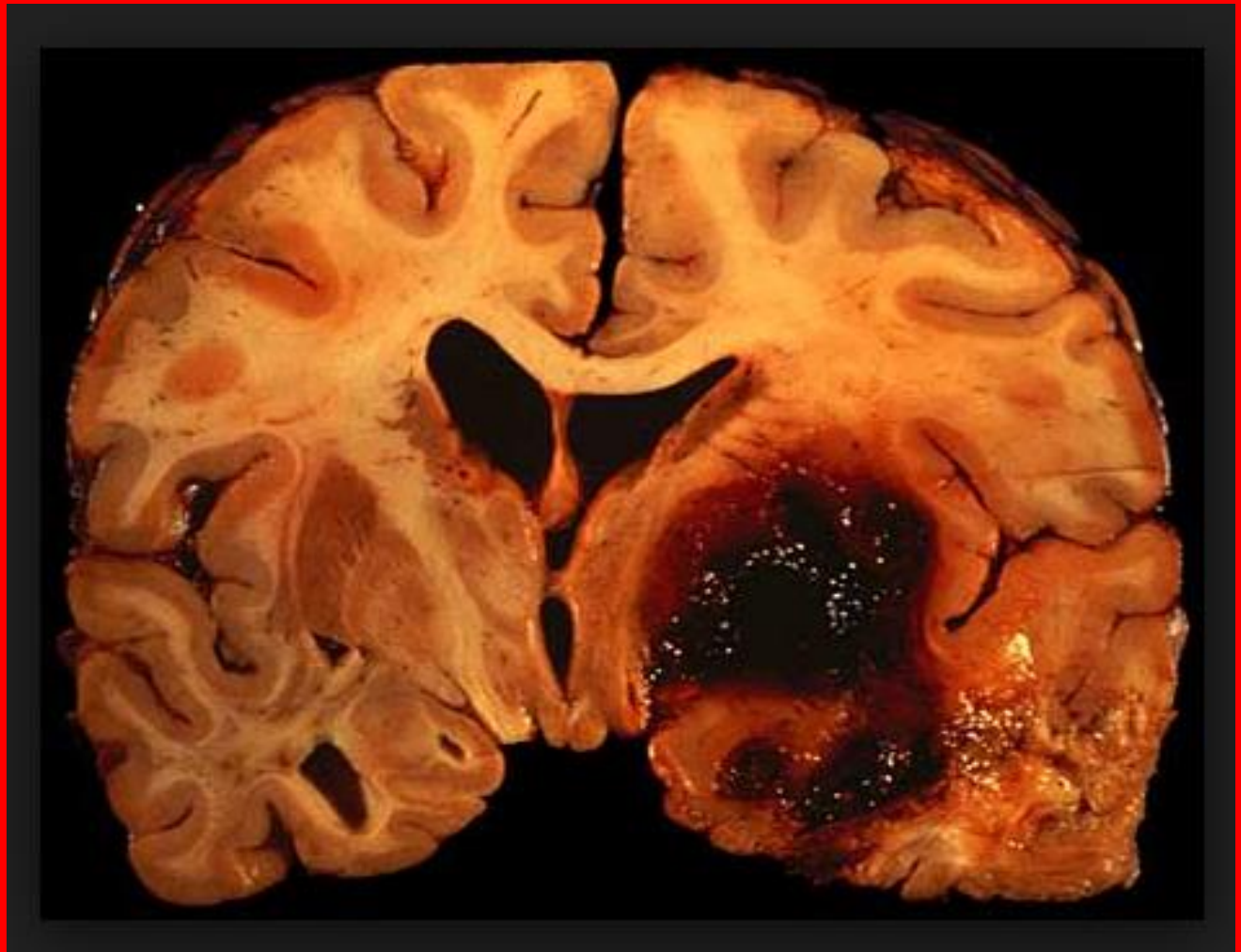
LECTURE 6

HEMORRHAGE

- **It is a blood escaping from the circulatory system**

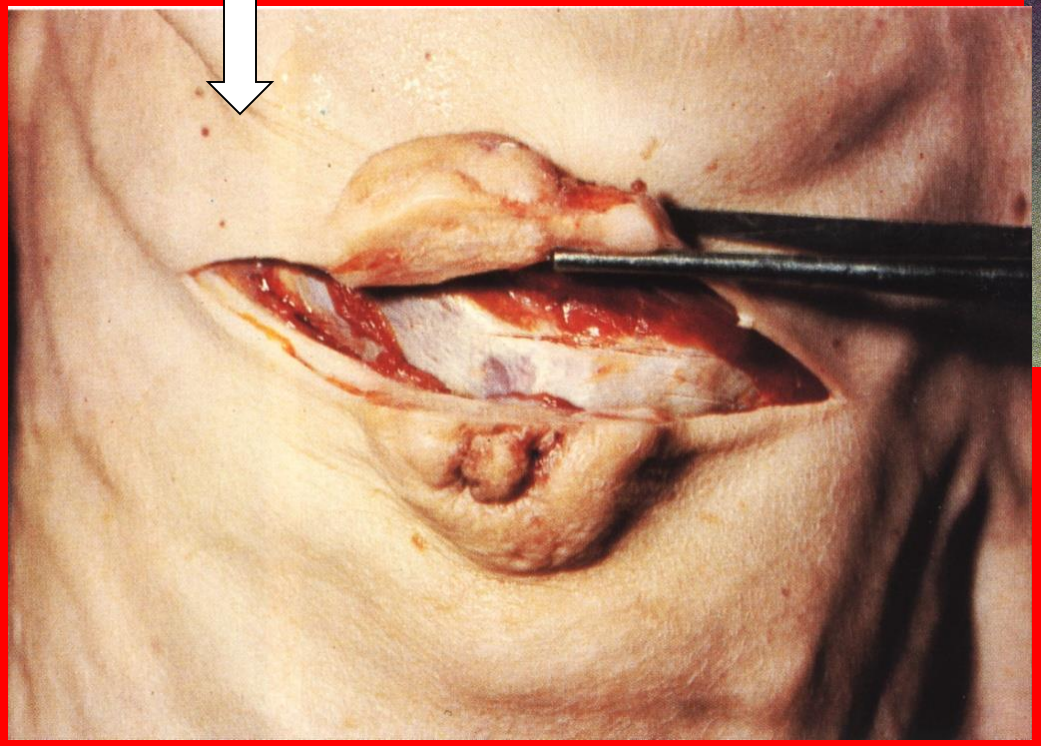


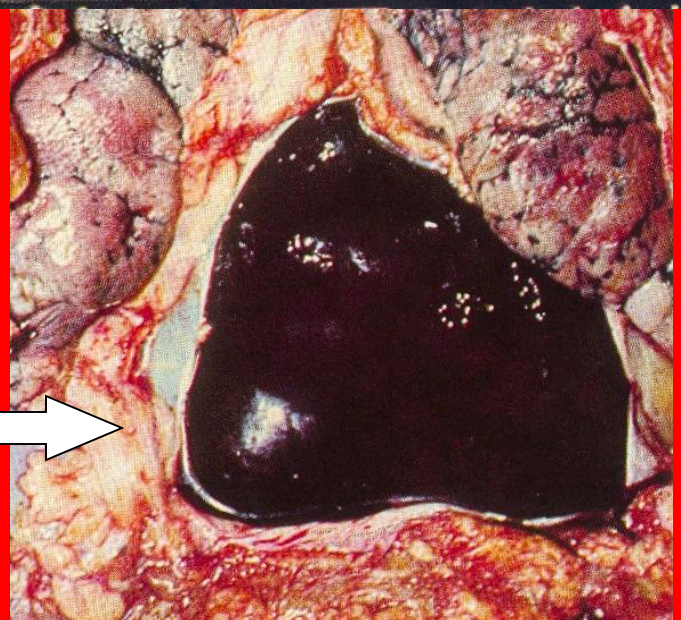
HEMORRHAGE

HAEMORRHAGIA EXTERNA

DIRECT (VULNUS)

INDIRECT (ESOPHAGEAL VARICES)





INTERNAL HEMORRHAGE (FROM HEART) - HEMOPERICARDIUM

VARICES

- **Dilated tortuous vessels, usually submucosal, that develop due to portal hypertension (prolonged or severe), which induces formation of collaterals between portal and caval systems**

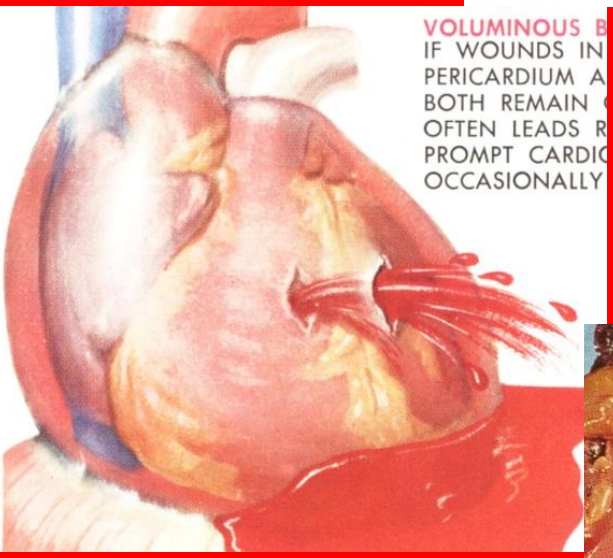
VARICES

- **Collaterals in lower esophagus divert flow from portal vein, through coronary veins of stomach, into esophageal veins, then azygous veins, then into vena cava**

VARICES

in the lower esophagus (which has been turned inside out at autopsy) are linear dark blue submucosal dilated veins known as varices: in patients with portal hypertension

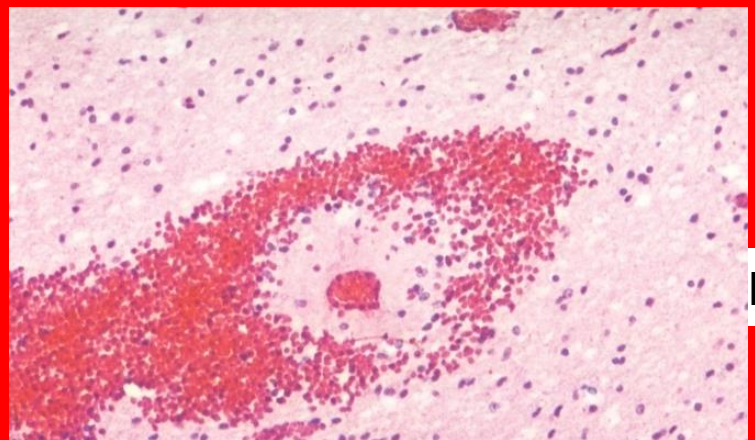
ORIGIN OF HEMORRHAGES



HEMORRHAGE FROM HEART

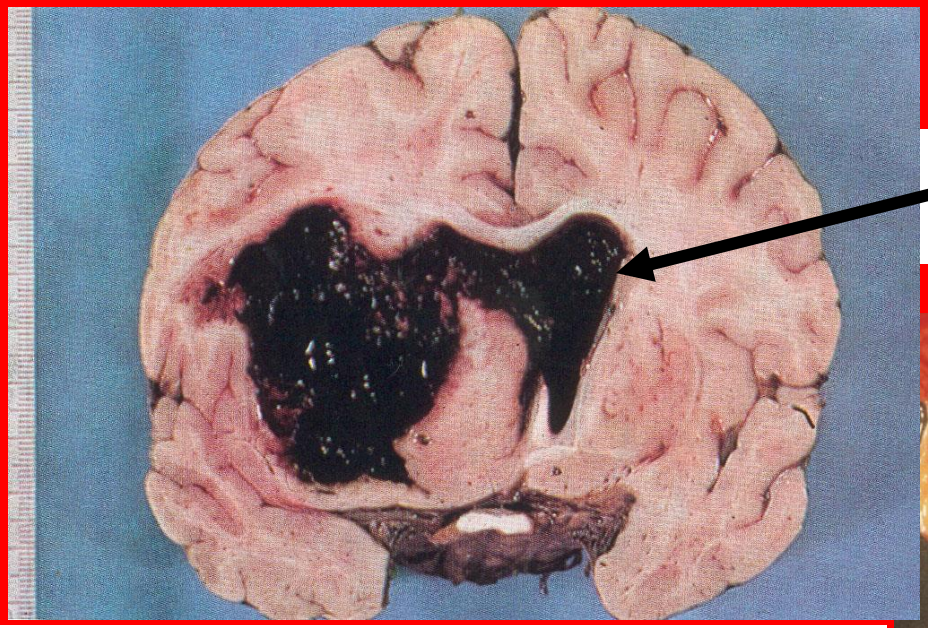
ARTERIAL HEMORRHAGE

VENOUS HEMORRHAGE-varices

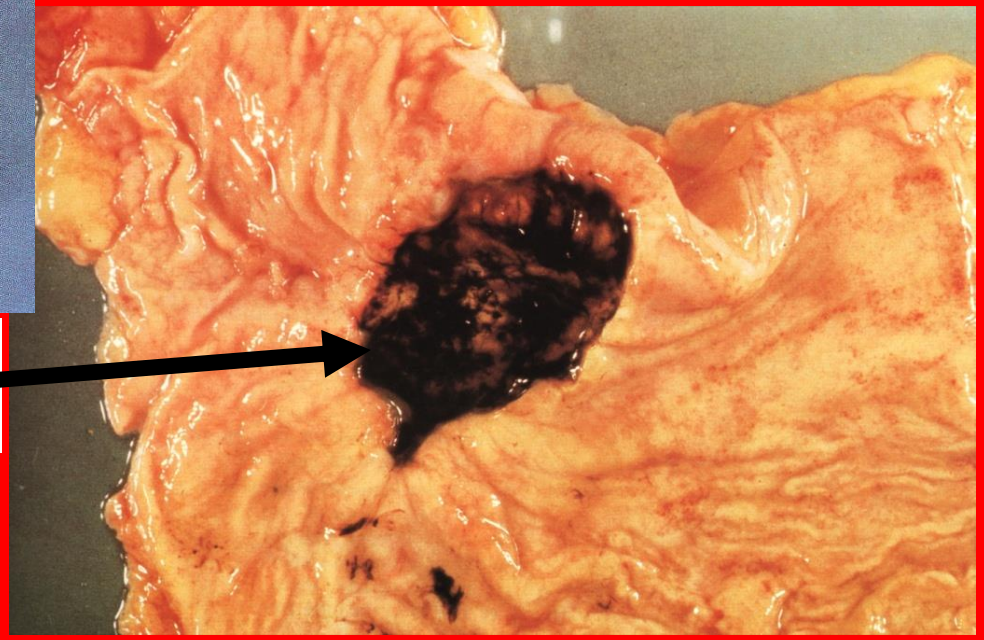


PARENCHYMATOUS HEMORRHAGE

MECHANISMS OF HEMORRHAGES



HEMORRHAGIA PER RHEXIN - RUPTURE



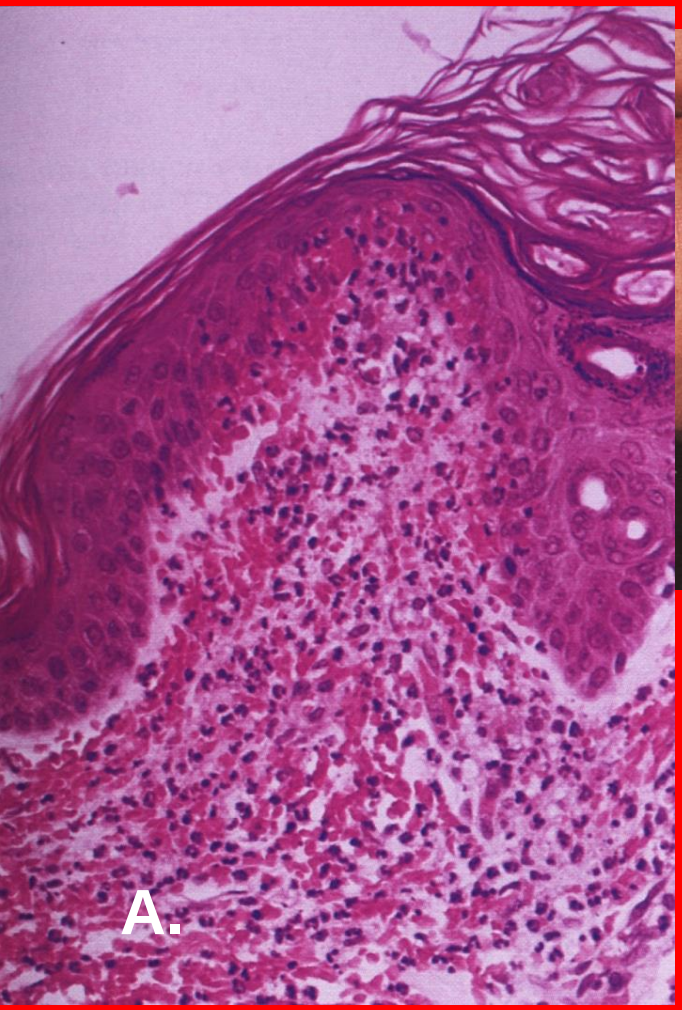
HEMORRHAGIA PER DIABROSIN - ARROSION

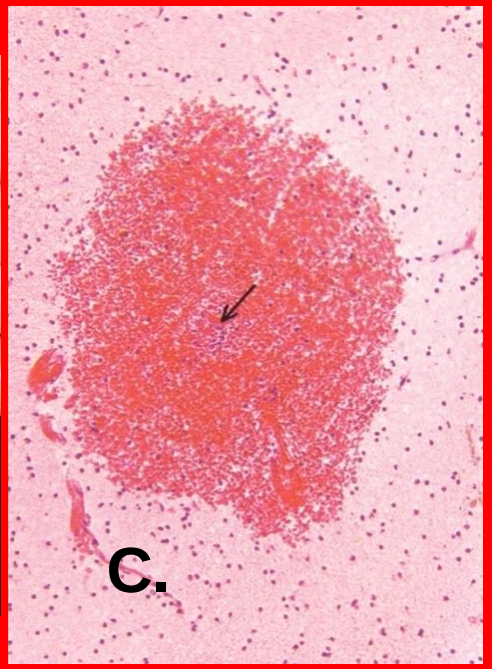
HEMORRHAGIA PER DIAPEDESIN - DIAPEDESIS

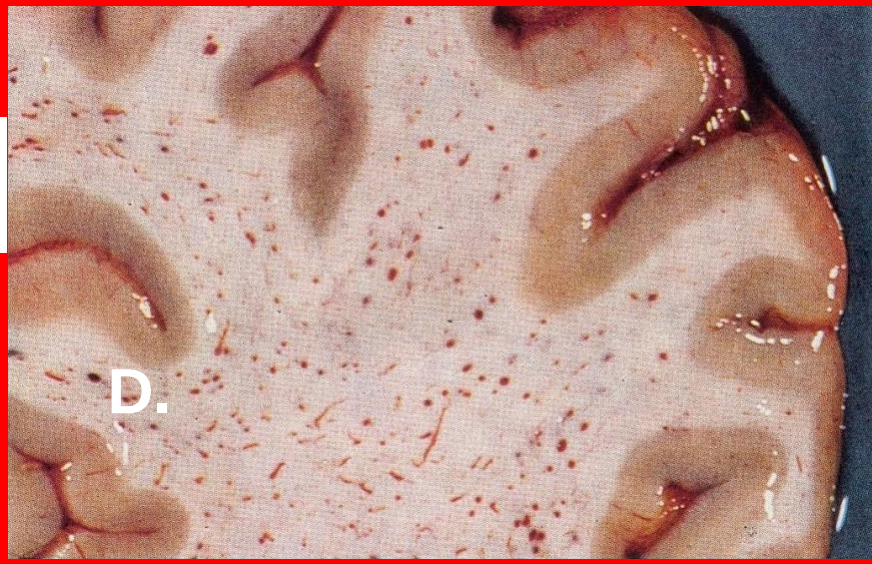
CLASSIFICATION OF HEMORRHAGES WITH REGARD TO THE MECHANISM

- 1. **TRAUMATIC HEMORRHAGES**
- 2. **SPONTANEOUS HEMORRHAGES**
- **A. PER RHEXIN (RUPTURE)**
- **B. PER DIABROSIN (ARROSION)**
- **C. PER DIAPEDESIN (DIAPEDESIS)**

TYPES OF HEMORRHAGIC CHANGES







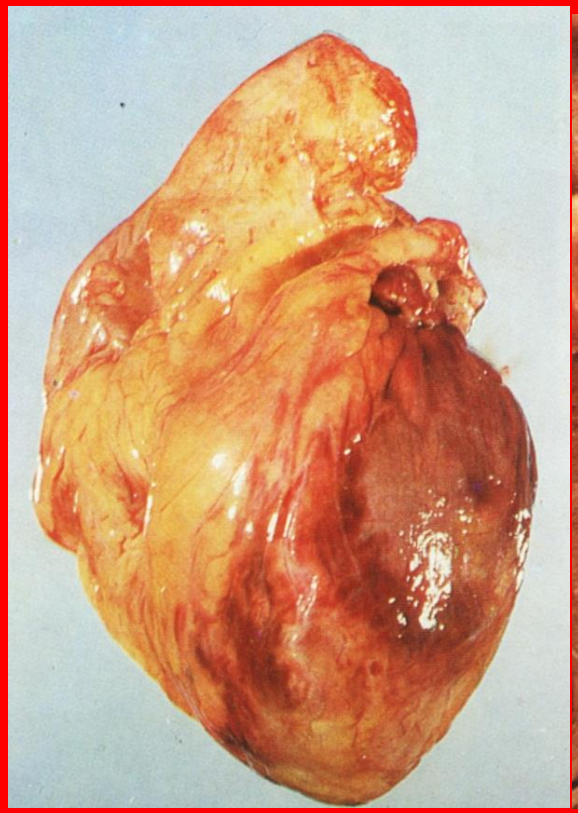
B. and D. PURPURA

SIZE
1-5 mm

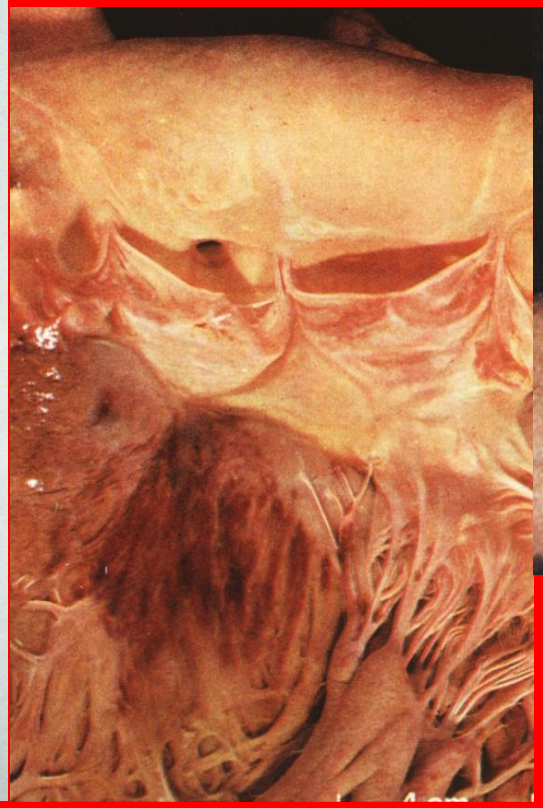
A. PETECHIA (SKIN)

C. PETECHIA (BRAIN)

HEMORRHAGIC SUGGILLATIONS



EPICARDIAL BRUISE



BRUISE UNDER EPICARDIUM – OFTEN AS A RESULT OF A DAMAGE OF BRAIN STEM

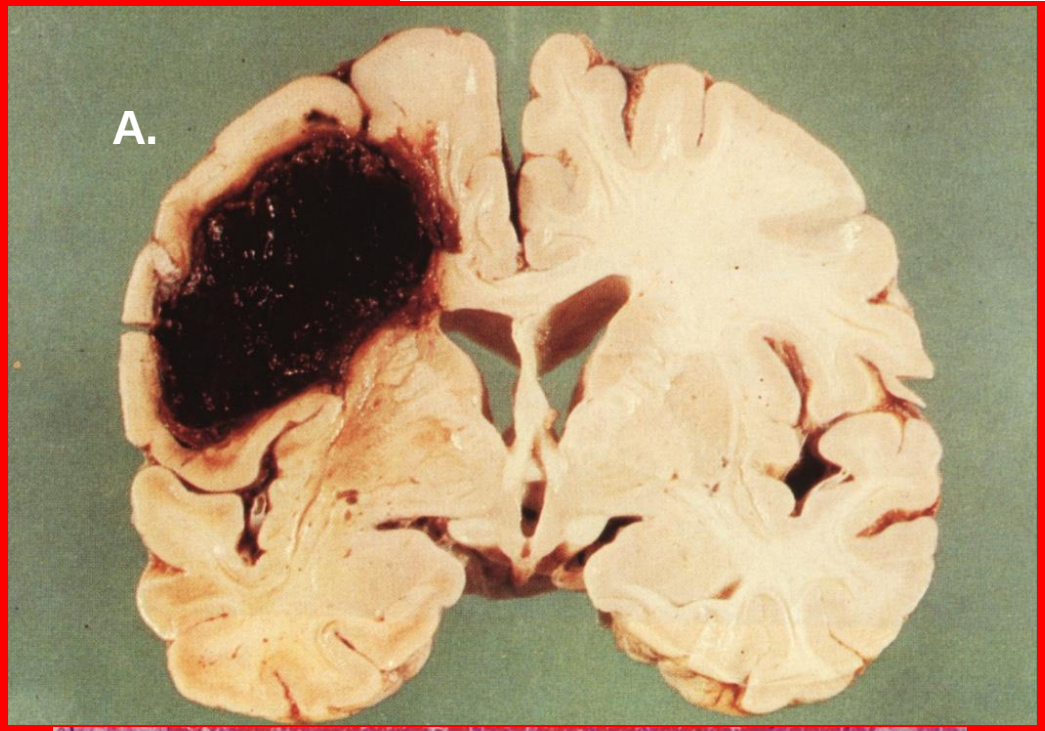
SKIN BRUISE

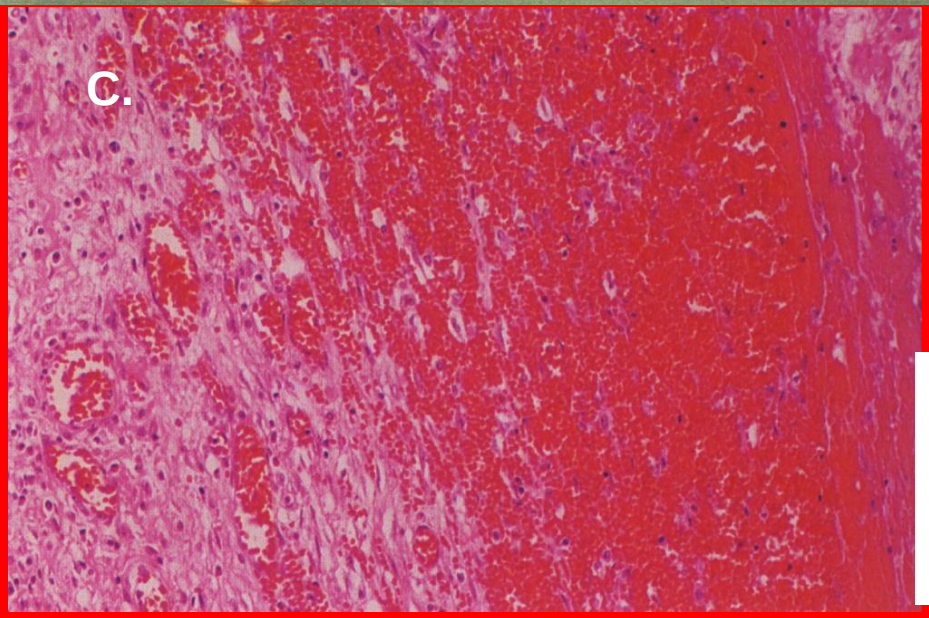
A BRUISE IS THE EXTRAVASATION OF BLOOD TO SURROUNDING INTACT TISSUES

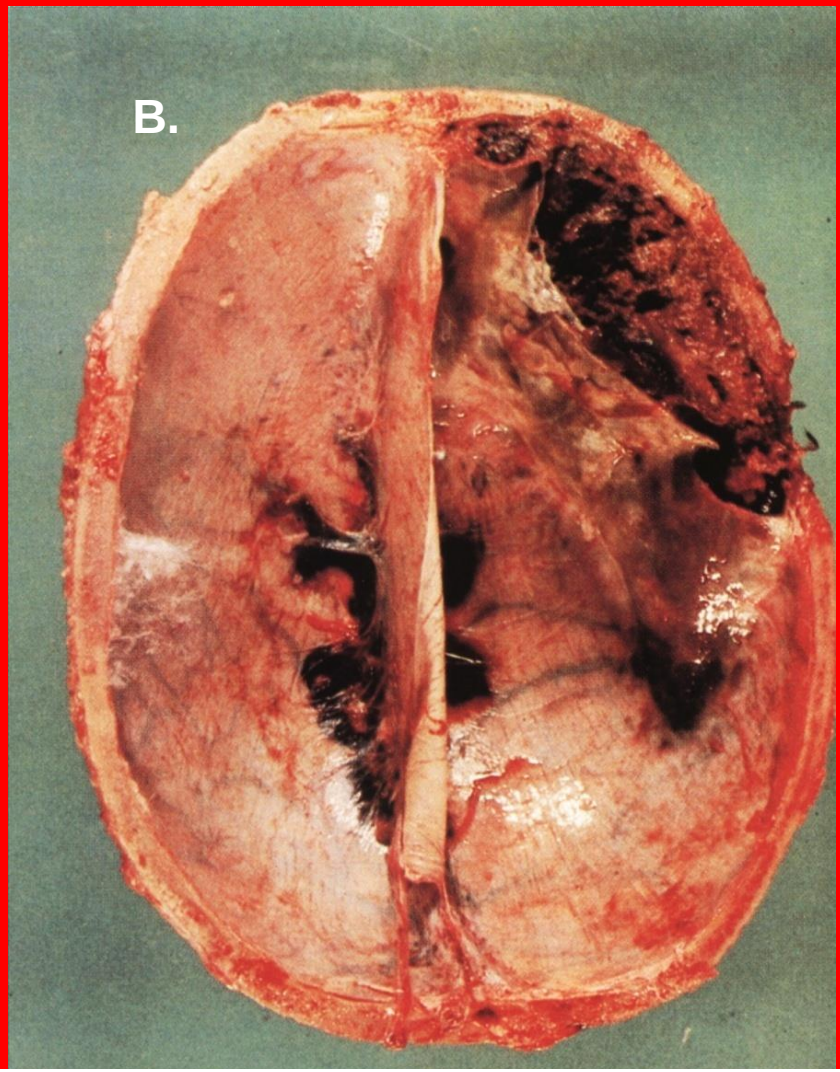
ECCHYMOSIS

Ecchymosis is the medical term for a bruise that measures over one centimeter in diameter

HEMATOMA





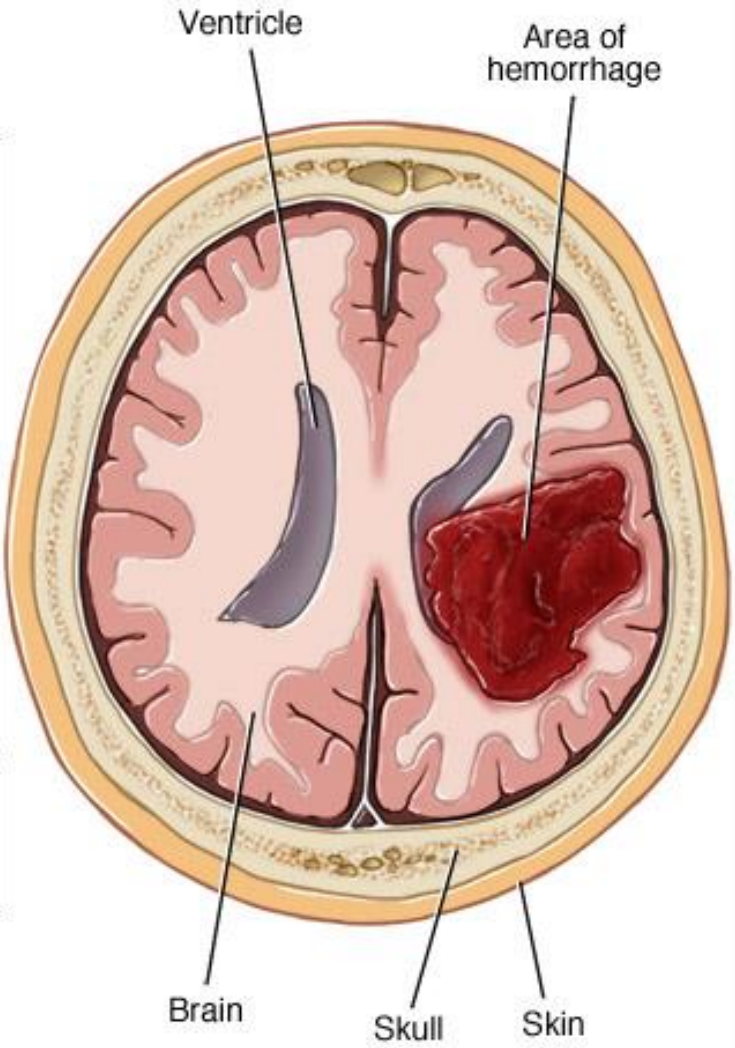


A. CEREBRAL HEMATOMA

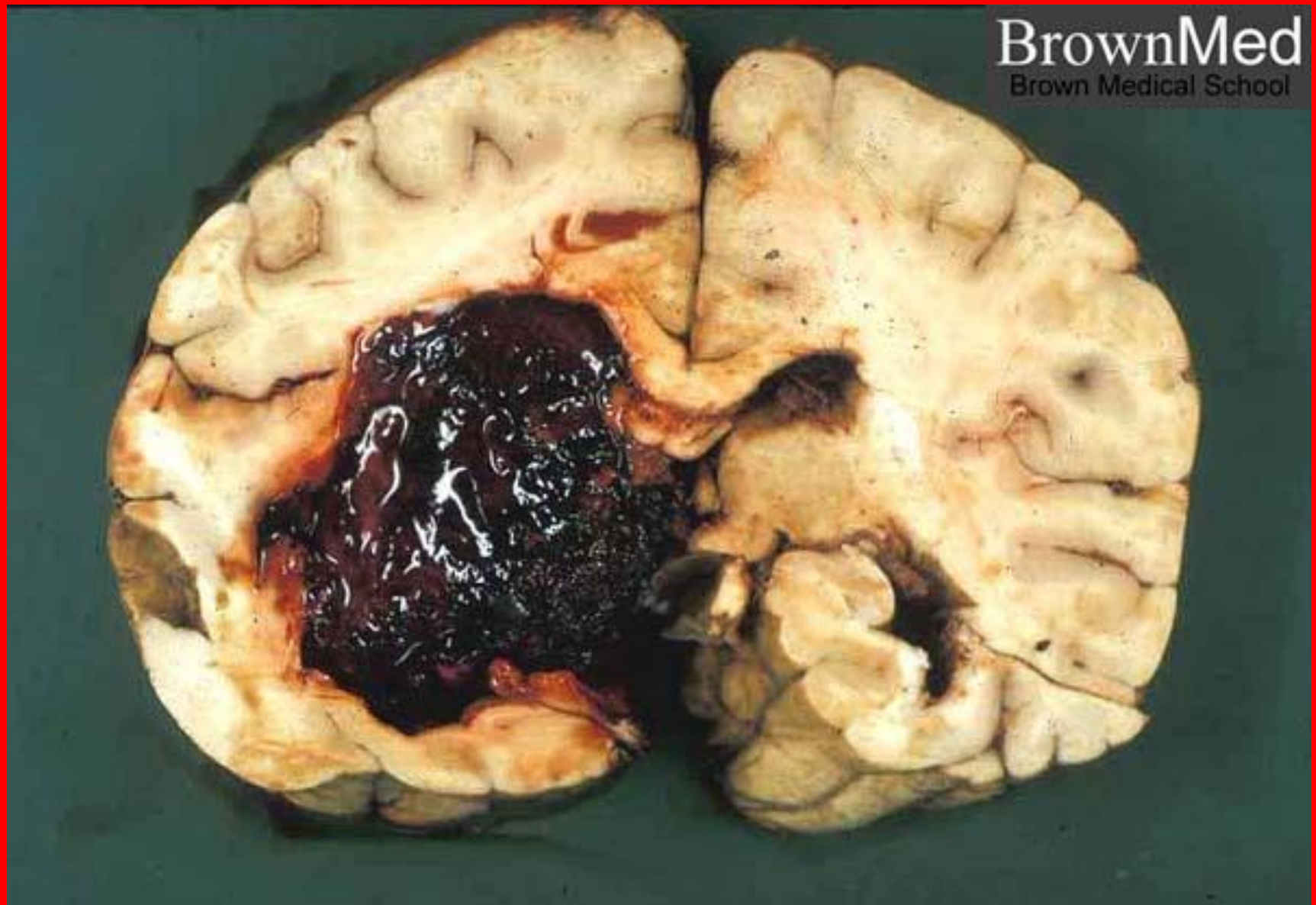
B. EPIDURAL HEMATOMA

C. HEMATOMA (MICROSCOPY)

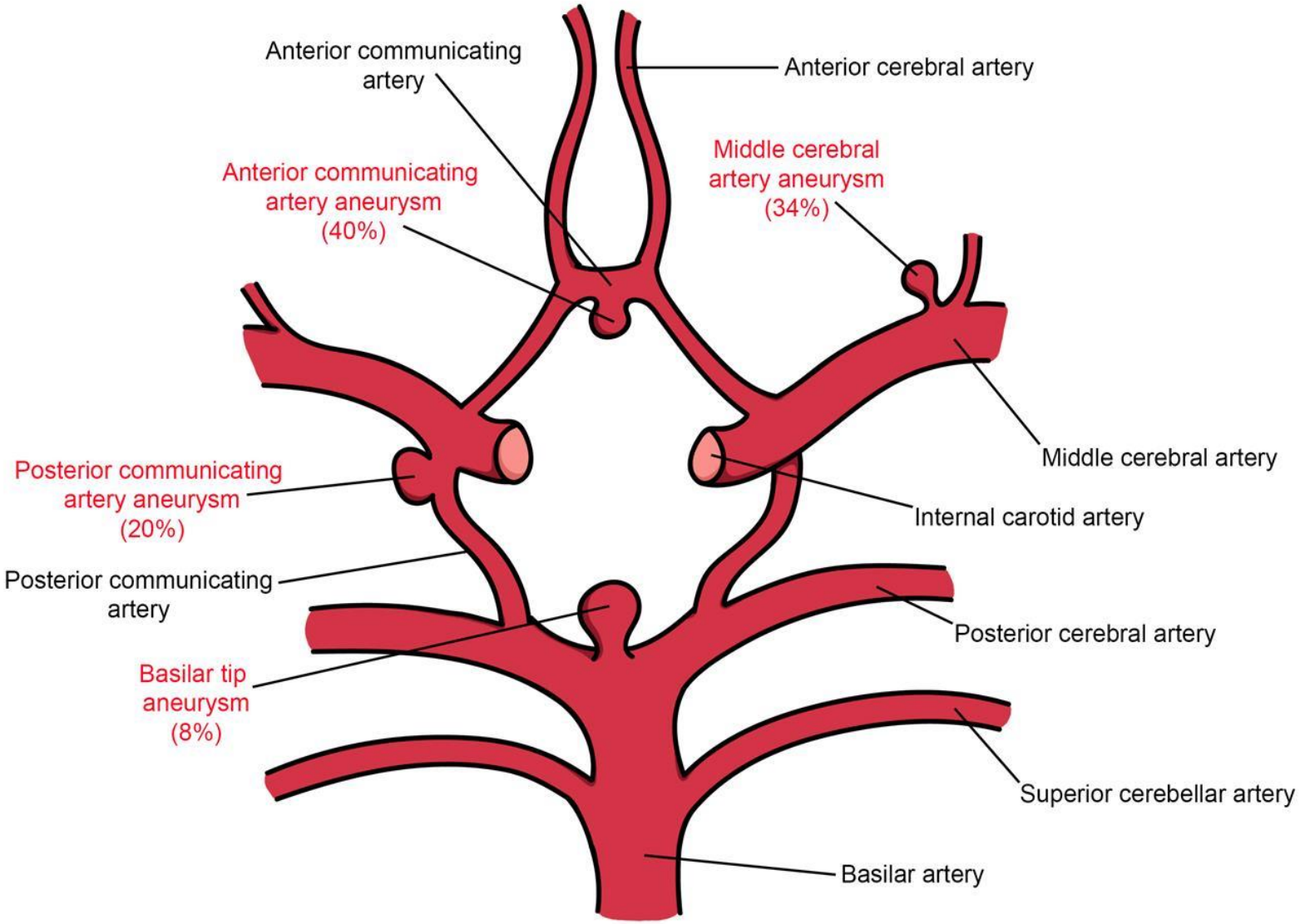
INTRACEREBRAL HEMORRHAGE

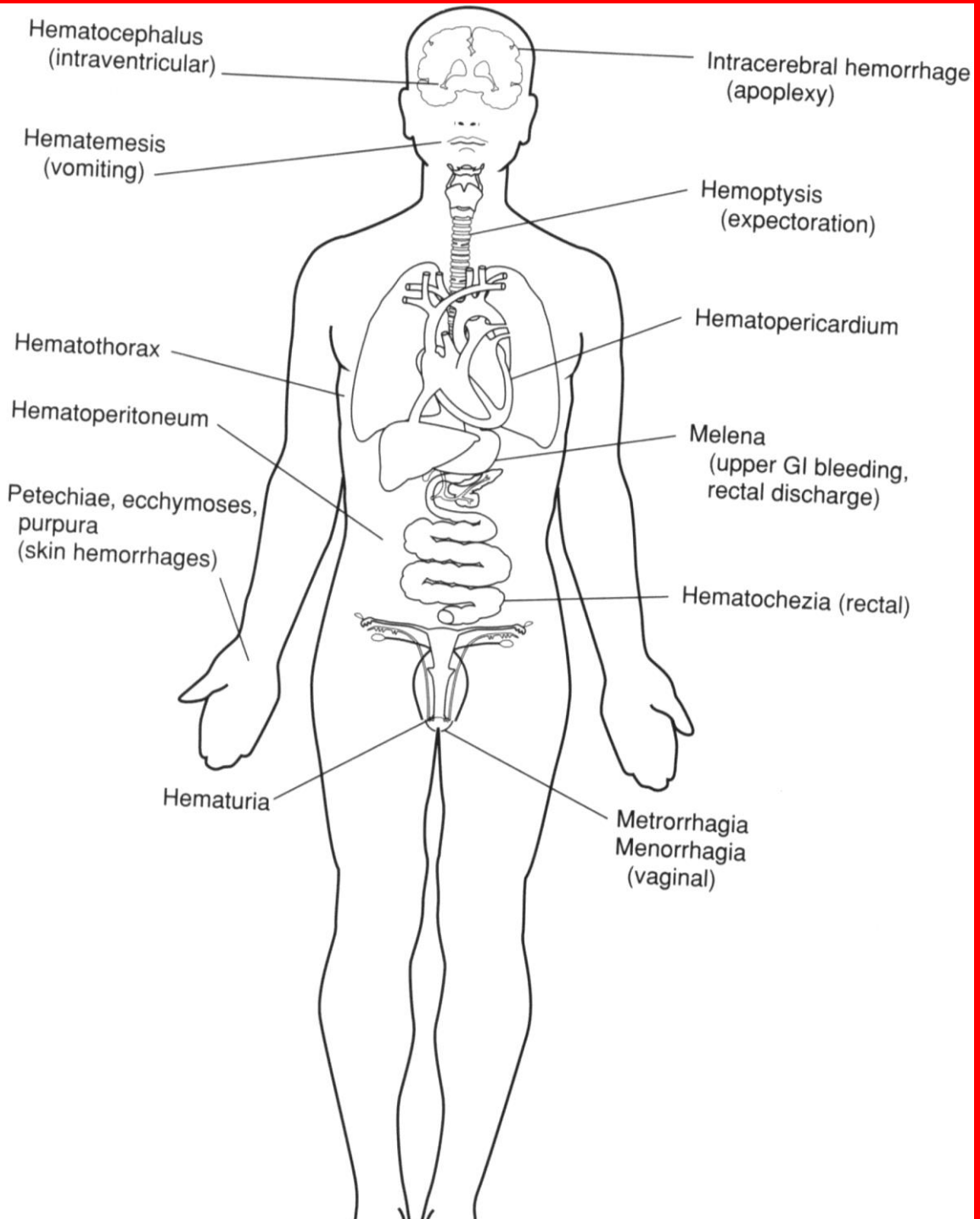


INTRACEREBRAL HEMORRHAGE



Saccular (Berry) Aneuryms of the Circle of Willis





MOST IMPORTANT TYPES OF HEMORRHAGE

Metrorrhagia – pathological

Menorrhagia – pathological (profuse menses)

Menorrhea = Menses – physiological

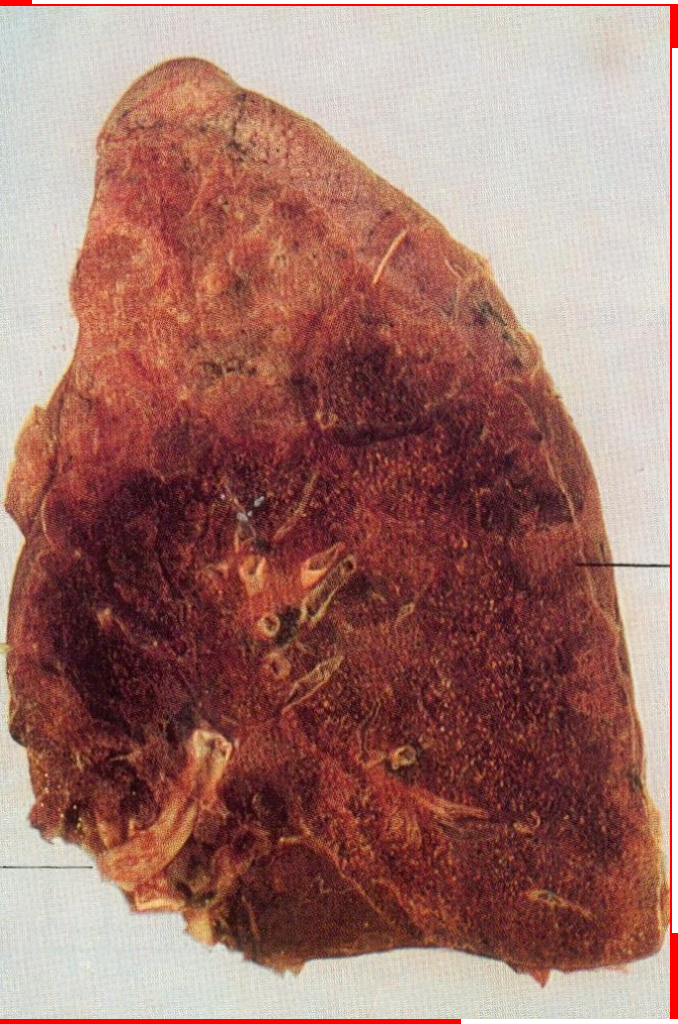
Hematochezia – fresh blood in stool

HEMATOCHEZIA

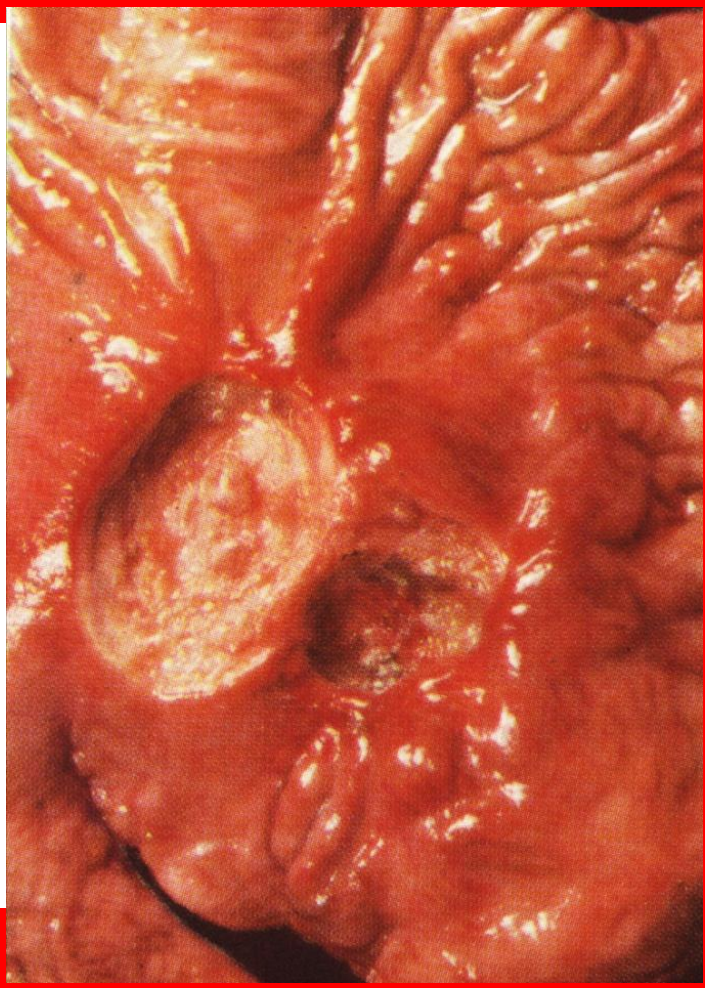
- Possible causes of blood in stool include:
- Diverticular disease
- Anal fissures
- Colitis
- Angiodysplasia: condition in which fragile, abnormal blood vessels lead to bleeding
- Non-cancer ulcers
- Polyps or cancer (e.g. adenocarcinoma)

1. TERMINOLOGY OF HEMORRHAGES

A HEMORRHAGE WITHIN ORGAN = ORGAN NAME + ENDING „RRHAGIA” (ENGLISH: „RRHAGE”)



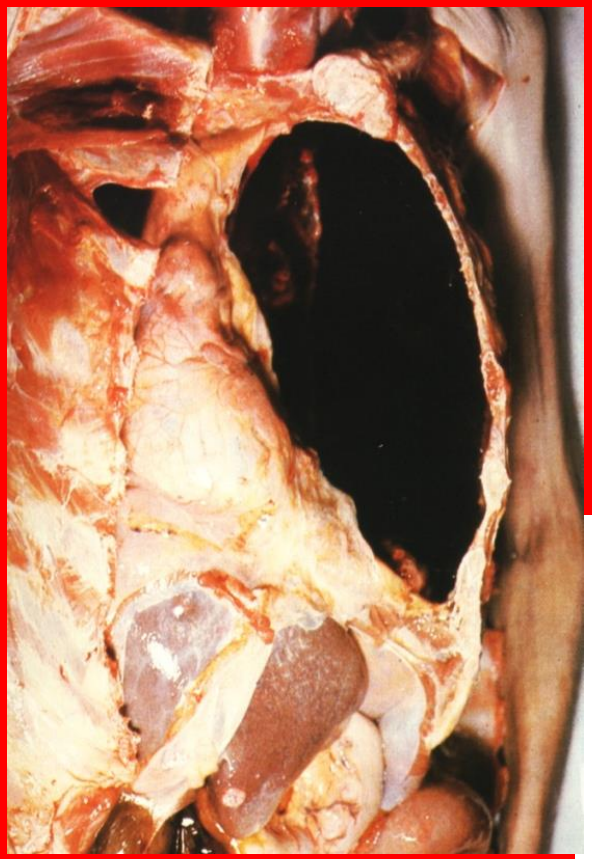
PNEUMORRHAGIA
BRONCHORRHAGIA
GASTRORRHAGIA
ENTERORRHAGIA
COLORRHAGIA
METRORRHAGIA
MENORRHAGIA
UROCYSTORRHAGIA
ESOPHAGORRHAGIA
IEIUNORRHAGIA
ILEORRHAGIA
DUODENORRHAGIA
PYELORRHAGIA
URETERORRHAGIA
ETC



BLEEDING FROM THE NOSE - EPISTAXIS
MENSTRUAL BLEEDING - MENORRHEA

2. TERMINOLOGY

HEMO/HEMATO AND THE NAME OF AN ORGAN



HEMOTHORAX

HEMOCEPHALUS
HEMOTHORAX
HEMOPERICARDIUM
HEMASCOS
HEMATOSALPINX
HEMATOMETRA
HEMATOCOLPOS

HEMATURIA

HEMOPTOE

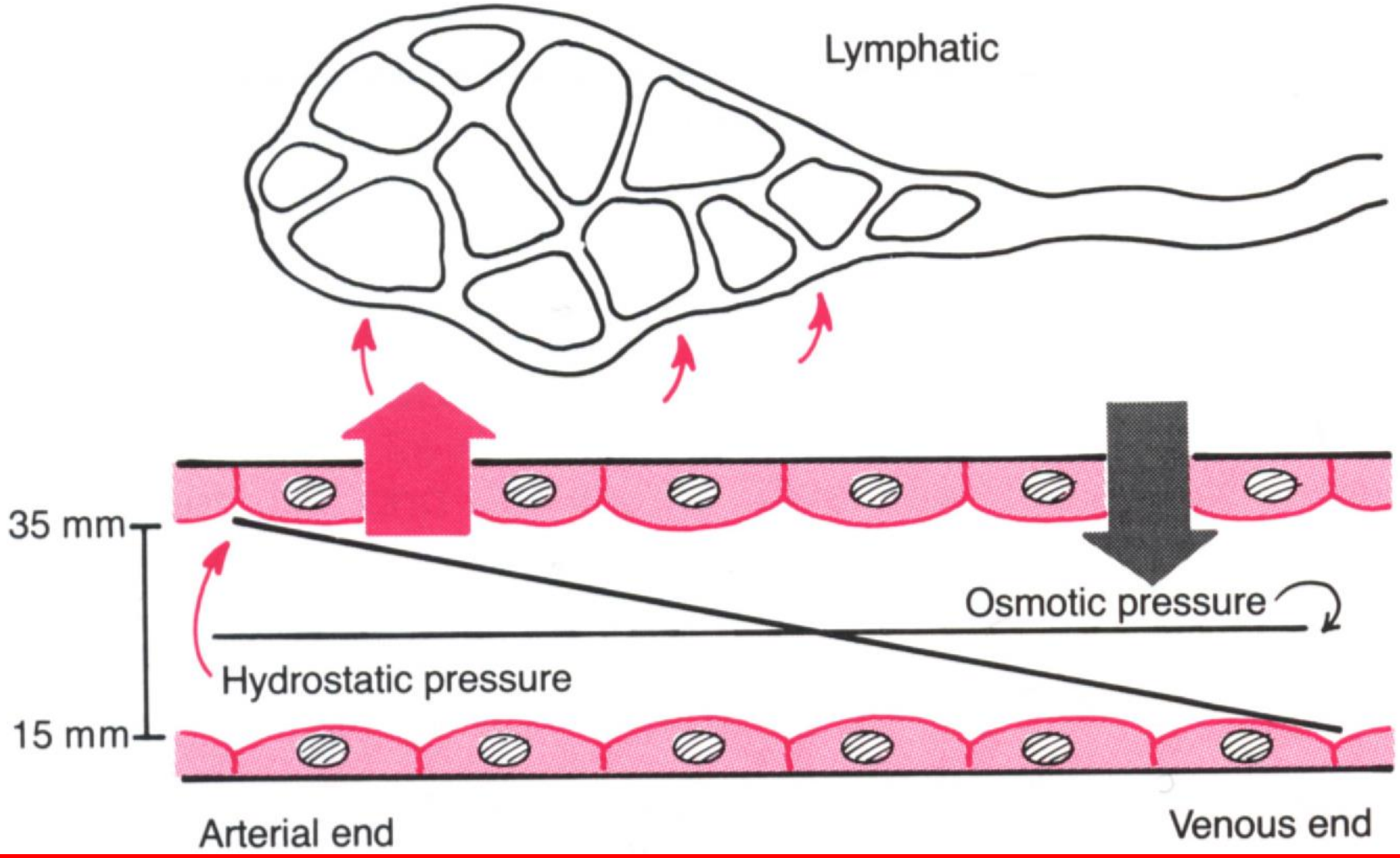
MELENA (SEDES CRUENTES)
HEMATEMESIS
MENORRHEA
PURPURA
EPISTAXIS

HEMOPERICARDIUM

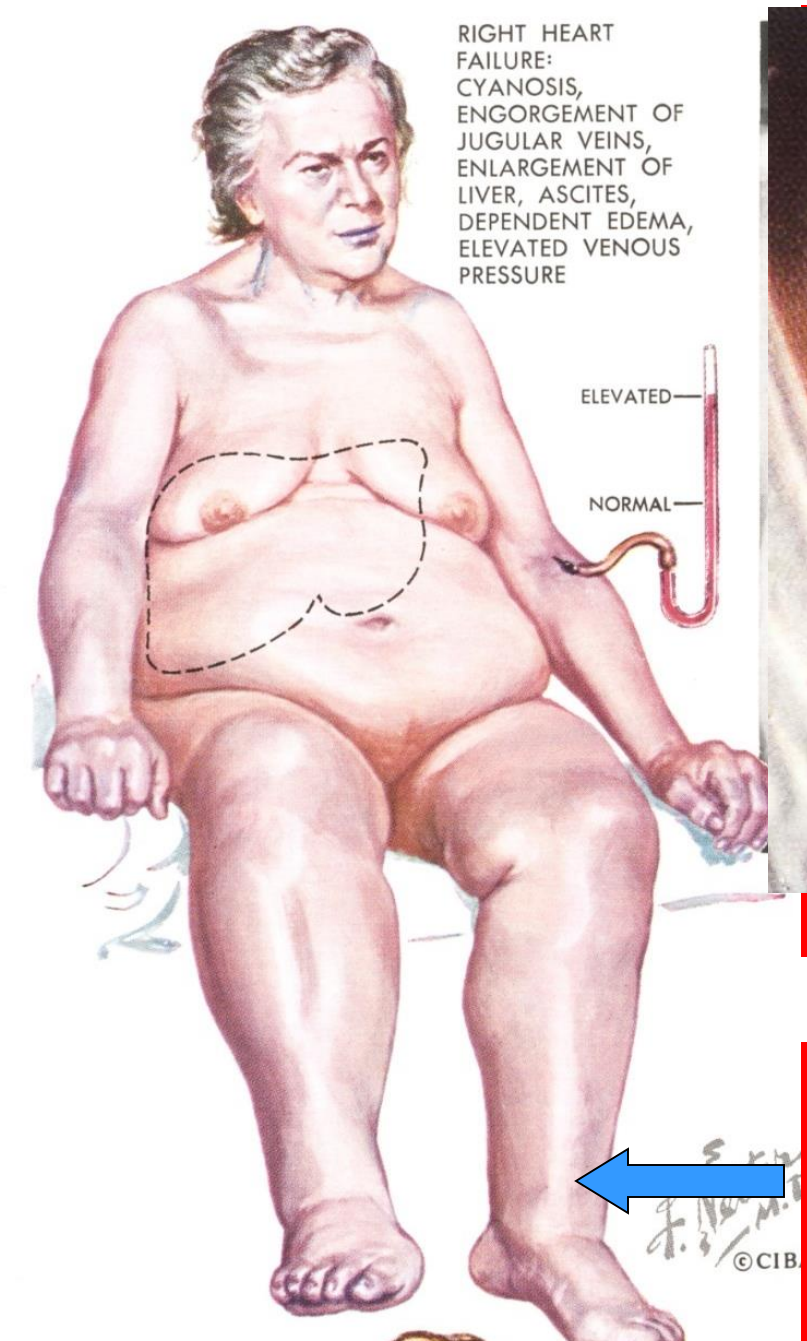
WHAT IS EDEMA ?

- **abnormal accumulation of fluid in the interstitium, located beneath the skin and/or in the cavities of the body**
- **Latin: oedema**

PATHOMECHANISM OF EDEMA



VENOSTATIC EDEMA



ASCITES

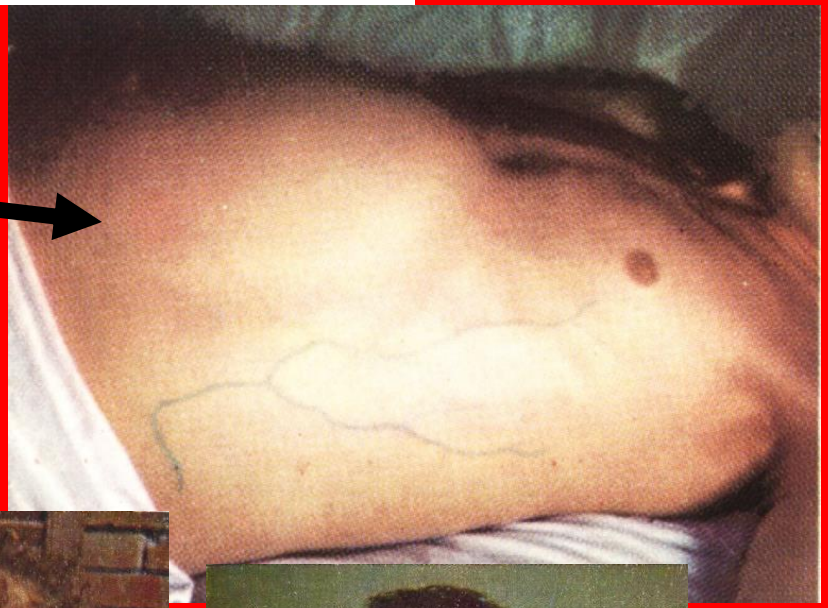
ANASARCA (SUBCUTANEOUS TISSUE)

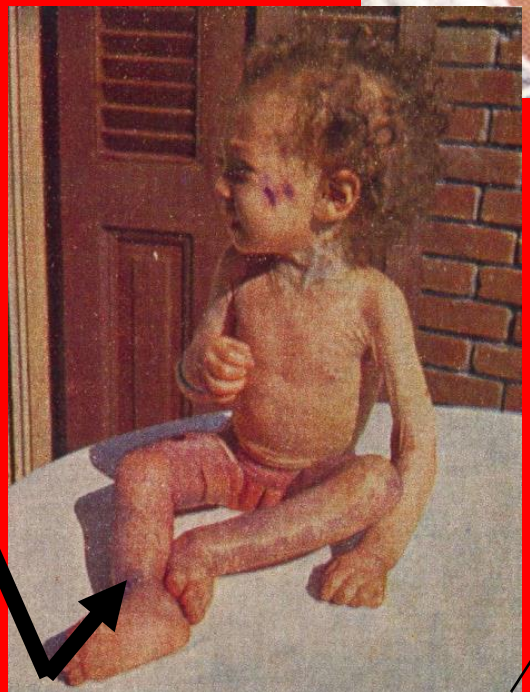
RENAL EDEMA

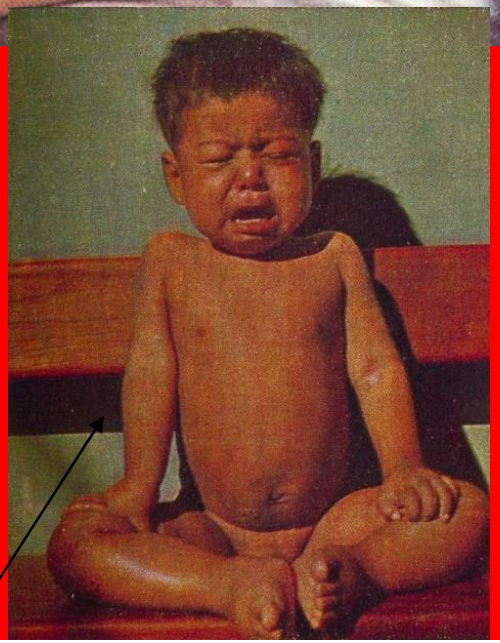
EDEMA BEFORE AND AFTER TREATMENT

HUNGER EDEMA (MARANTIC EDEMA)

HEPATIC EDEMA
CAUSED BY DEFICIENCY IN ALBUMIN IN CASE OF LIVER DAMAGE







EDEMA CAUSED BY DEFICIENCY IN PROTEINS BECAUSE OF THE LACK OF FOOD OR IN CANCER PATIENTS

HUNGER EDEMA (MARANTIC EDEMA, CACHECTIC EDEMA)

edema occurring in diseases characterized by wasting and hypoproteinemia; due to low plasma oncotic pressure.

TOXIC EDEMA

RESULT OF WAR GASES: CHLORINE, MUSTARD GAS, ETC.

ANGIONEUROTIC EDEMA

BEFORE AND AFTER ADMINISTRATION OF ANTIHISTAMINE

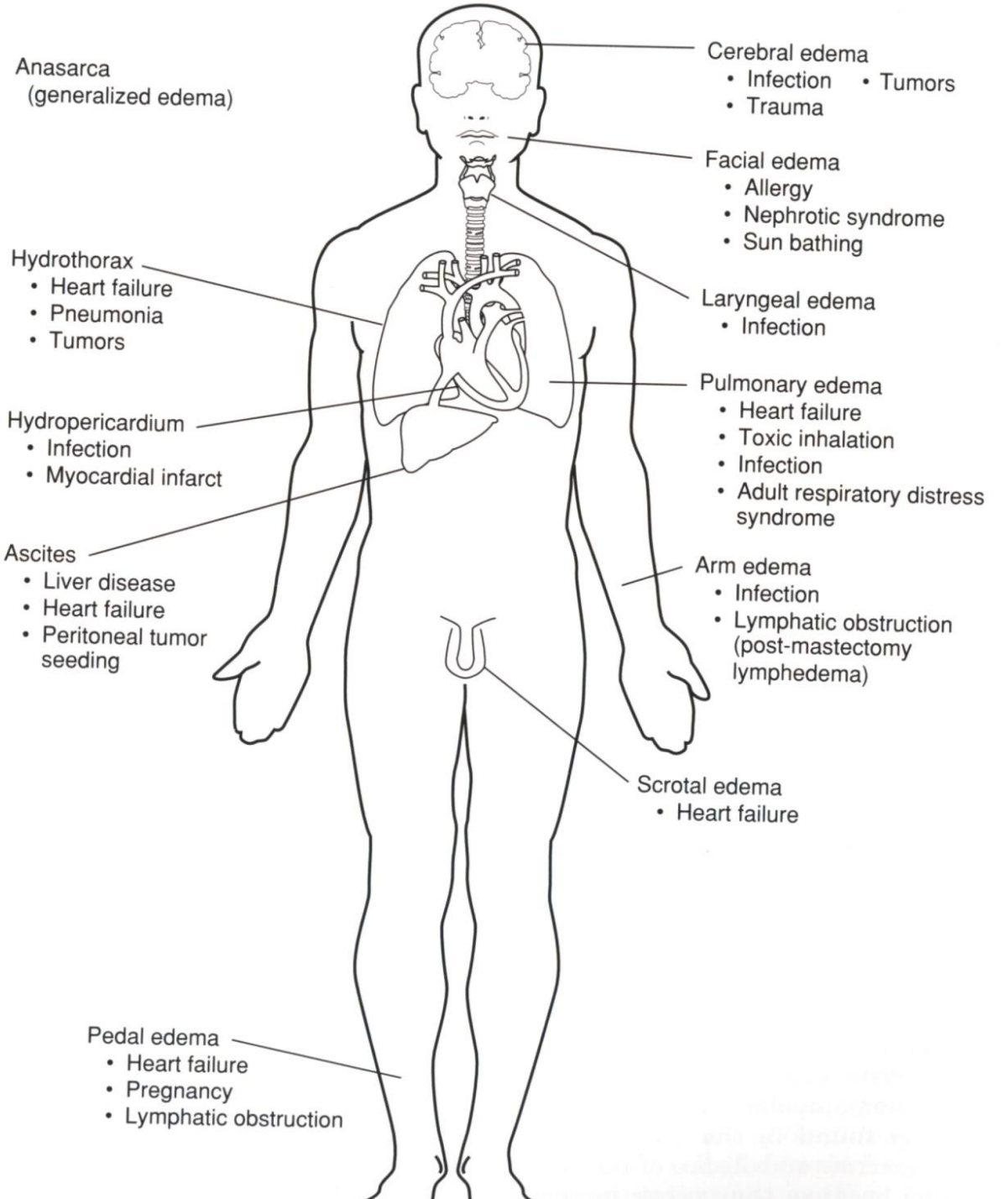
Angioneurotic edema, hereditary: A genetic form of angioedema which is also referred to as Quinke's disease. Persons with it are born lacking an inhibitor protein (called C1 esterase inhibitor) that normally prevents activation of a cascade of proteins leading to the swelling of angioedema.

Patients can develop recurrent attacks of swollen tissues, pain in the abdomen, and swelling of the voice box (larynx) which can compromise breathing → death.

The diagnosis is suspected with a history of recurrent angioedema.

It is confirmed by finding abnormally low levels of C1 esterase inhibitor in the blood. Treatment options include antihistamines and male steroids (androgens) that can also prevent the recurrent attacks.

MOST IMPORTANT CLINICAL FORMS OF EDEMA

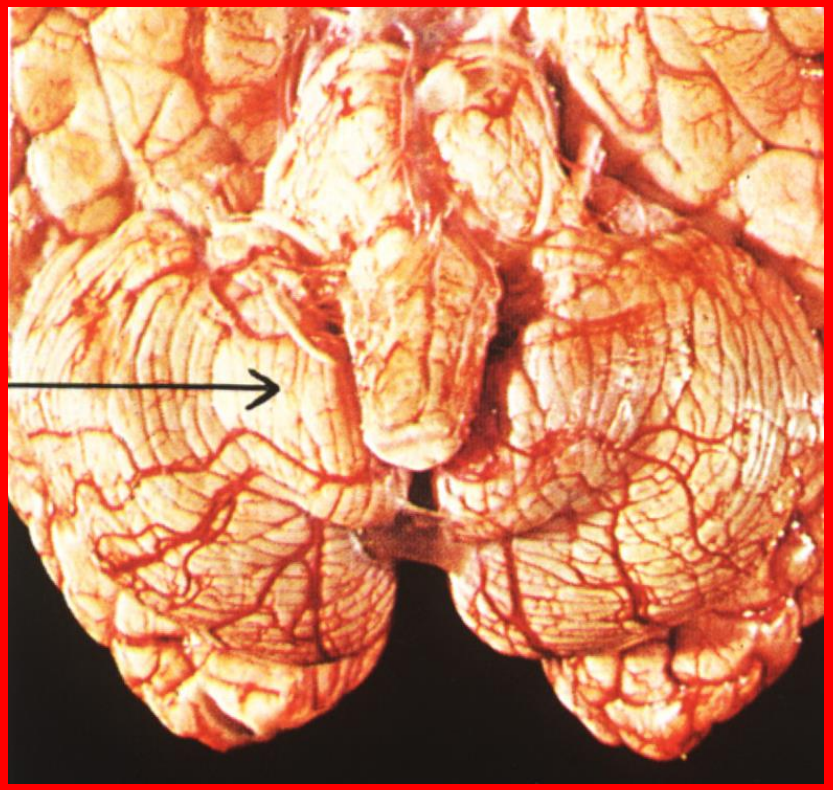


EDEMA

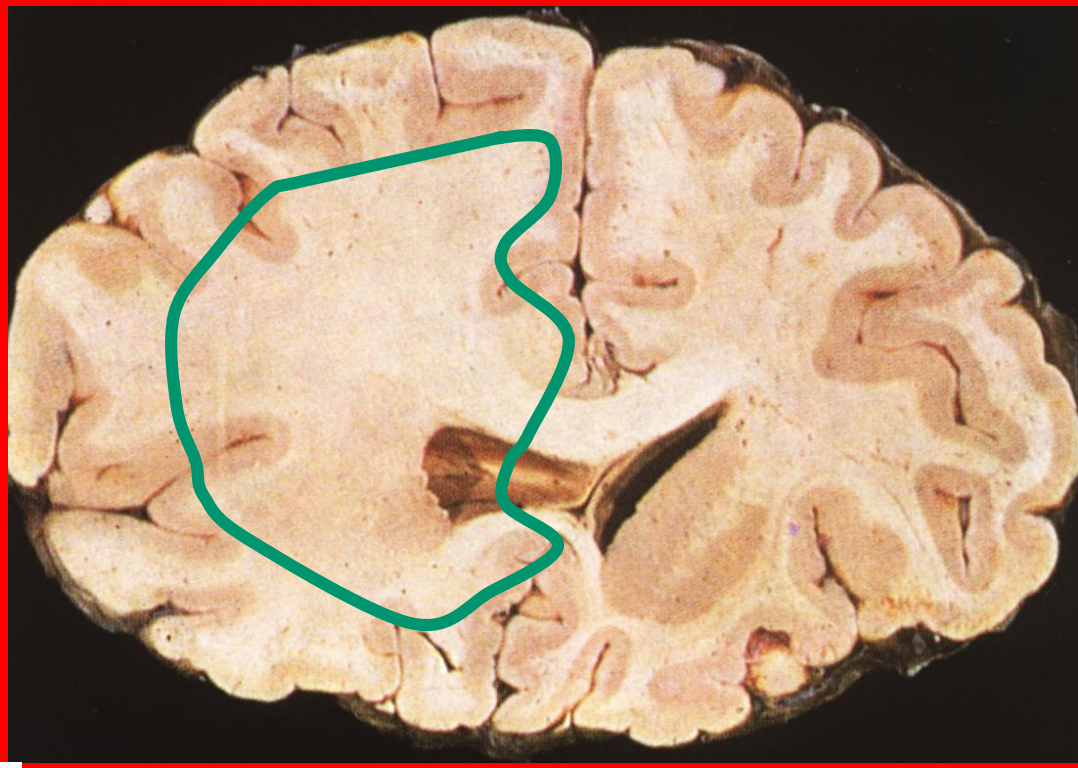
THE LARYNX IN A CHILD DIFFERS FROM LARYNX IN ADULT PERSON – IT EASILY BECOMES SWOLLEN

1. **IT IS SLIMMER**
2. **EPIGLOTTIS IS NARROW**
3. **IT CONTAINS A SIGNIFICANTLY LARGER AMOUNTS OF FIBROUS TISSUE, WHICH EASILY AND QUICKLY INCREASES ITS VOLUME**
4. **ELASTIC STRUCTURE. CONNECTIONS BETWEEN CARTILAGES ARE ALSO ELASTIC**

BRAIN EDEMA



CEREBELLAR TONSILS HERNIATION



COLLATERAL EDEMA

HERNIATION occurs when brain tissue, blood, and cerebrospinal fluid (CSF) shifts from their normal position inside the skull

There are three main types of brain herniation

subfalcine: brain moves underneath the falx cerebri in the middle of the brain. Brain tissue ends up being pushed across to the other side. The most common type of brain herniation.

transtentorial herniation, two types:

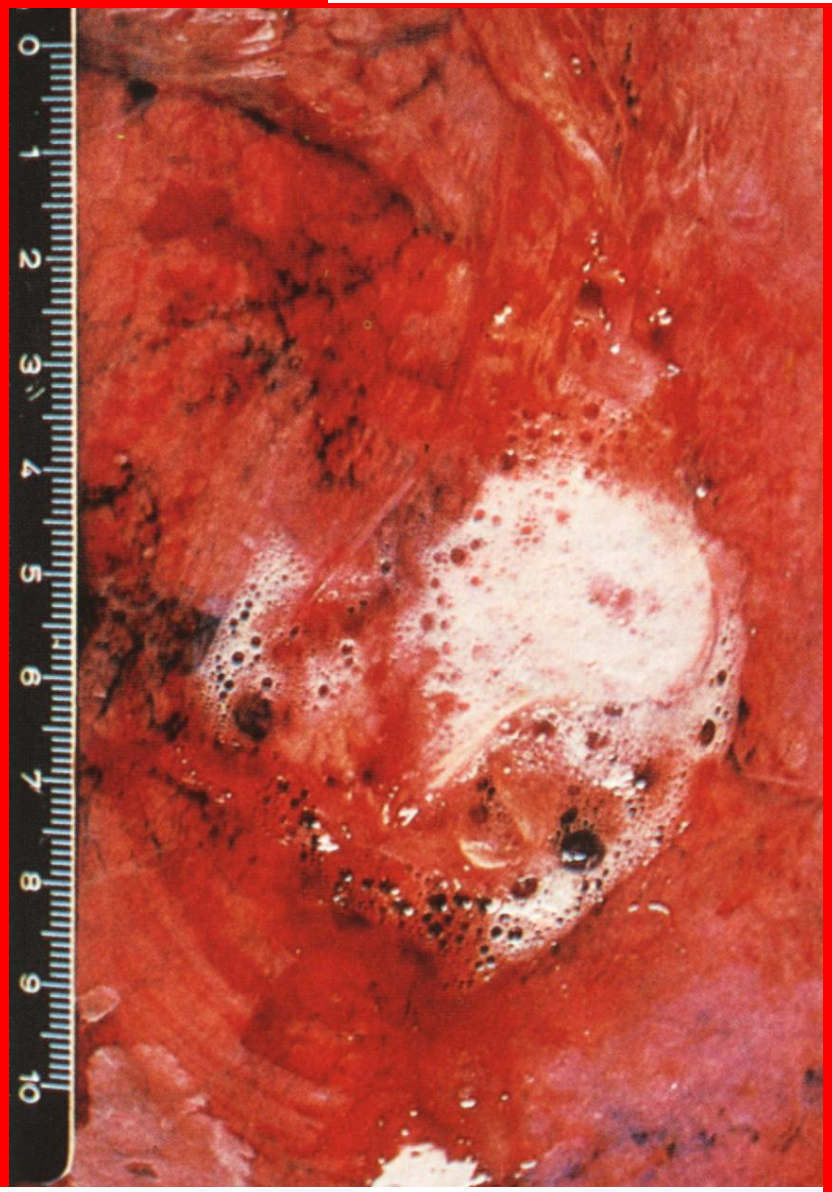
1. descending transtentorial or uncal. The uncus, part of the temporal lobe, is shifted downward into an area known as the posterior fossa. This is the second most common type of brain herniation.

2. ascending transtentorial herniation. The cerebellum and the brainstem move upward through a notch in a membrane called the tentorium cerebelli.

cerebellar tonsillar: tonsils move downward through the foramen magnum, where the spinal cord connects to the brain.

A brain herniation can also occur through a hole that was created previously during surgery.

PULMONARY EDEMA



FOAMY DISCHARGE SEEN DURING AUTOPSY

TRANSUDATE IN LUMEN OF VESICLES

LYMPHEDEMA - LYMPHATIC EDEMA

LYMPHEDEMA – AFTER A RADICAL OPERATION ON BREAST WITH REMOVAL OF LYMPH NODES

ELEPHANTIASIS: DURING FILARIASIS – OBSTRUCTION OF LYMPH NODES/VESSELS BY PARASITES

Elephantiasis/Filariasis

Elephantiasis/Filariasis

Cause:

Elephantiasis is caused by filarial worms, *Wuchereria (W.bancrofti and W.malayi).*

Mode of Transmission:

The parasite is transmitted by the bite of female mosquito vectors.

SHOCK

TYPE OF SHOCK	CLINICAL EXAMPLES	MAIN MECHANISMS
CARDIOGENIC	MYOCARDIAL INFARCTION DISRUPTURE OF HEART, DISTURBANCE IN THE HEART RHYTHM, PULMONARY EMBOLISM, OTHERS	DAMAGE OF „HEART PUMP”
HYPOVOLEMIC	HEMORRHAGE, LOSS OF FLUIDS (BURNS, VOMITTING, DIARRHEA, TRAUMA)	LOWERING OF BLOOD OR PLASMA DENSITY/AMOUNT
SEPTIC	BACTERIAL INFECTIONS (GRAM -) – ENDOTOXIC SHOCK (GRAM+) - SEPSIS	DILATION OF PERIPHERAL VESSELS, STASIS, ACTIVATION OF LEUKOCYTES

Sudden Cardiac Death can occur with:

Coronary artery occlusion: atherosclerotic plaque, thrombus, platelet aggregates, embolus

Coronary artery aneurysm / rupture: associated with Kawasaki disease, vasculitis, connective tissue disease

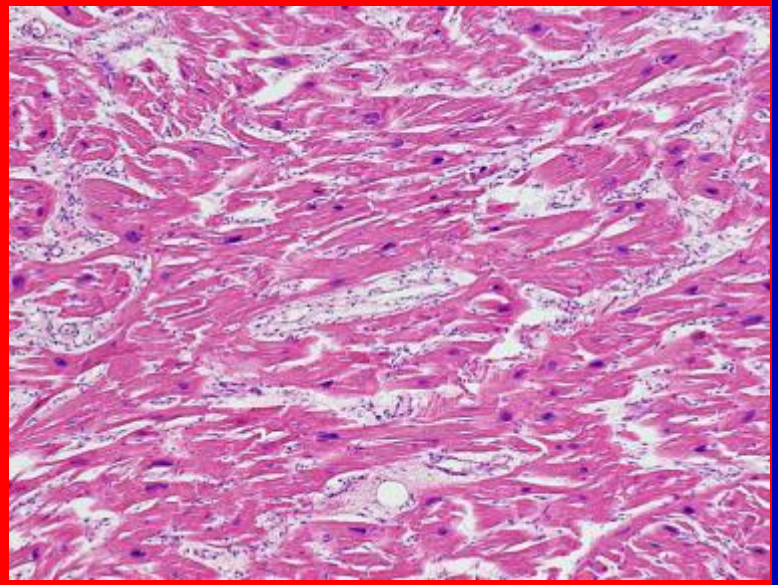
Coronary artery dissection: often young females, multifocal, and associated with increased eosinophils

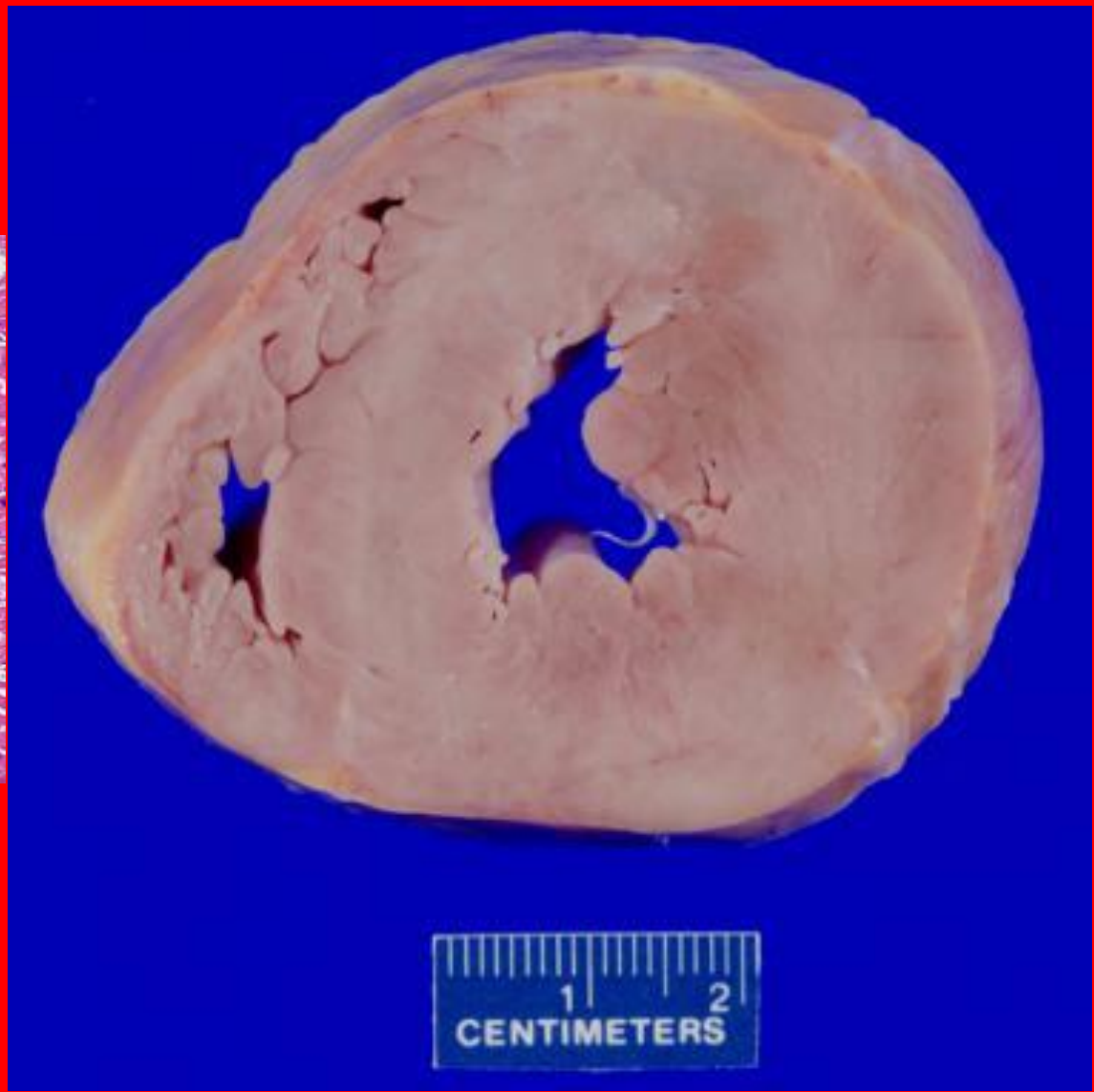
Arteritis: Multiple vasculitides, rheumatic conditions, connective tissue disorders and drugs (eg, cocaine)

Coronary artery spasm

Congenital anomalies of coronary vessels: abnormal origin and course, osteal malformations, hypoplasia, coronary artery tunneling

Cardiomegaly (220 g) and symmetric left ventricular hypertrophy from the autopsy of a 6-year-old boy who suddenly collapsed while on a walk with his family. These findings are consistent with symmetric hypertrophic cardiomyopathy.

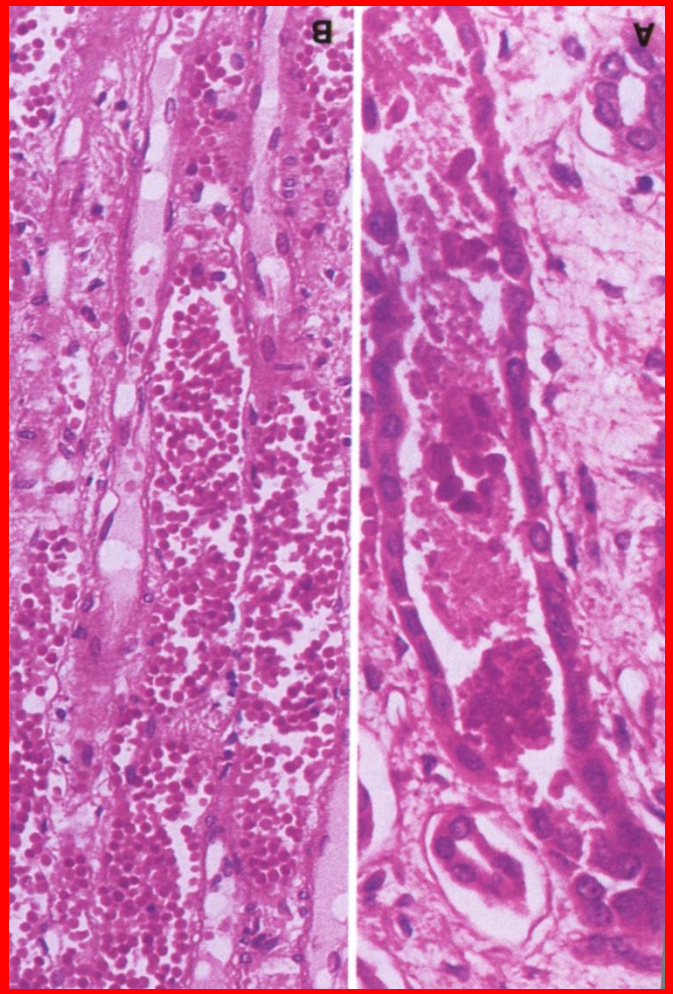




SHOCK - CHANGES IN KIDNEYS

PALE PART OF CORTEX AND MANY HEMORRHAGES

A. B.



A. DILATION OF VESSELS IN MEDULLA

B. NECROSIS OF CANALICULAR EPITHELIUM, EDEMA OF STROMA

THANK YOU