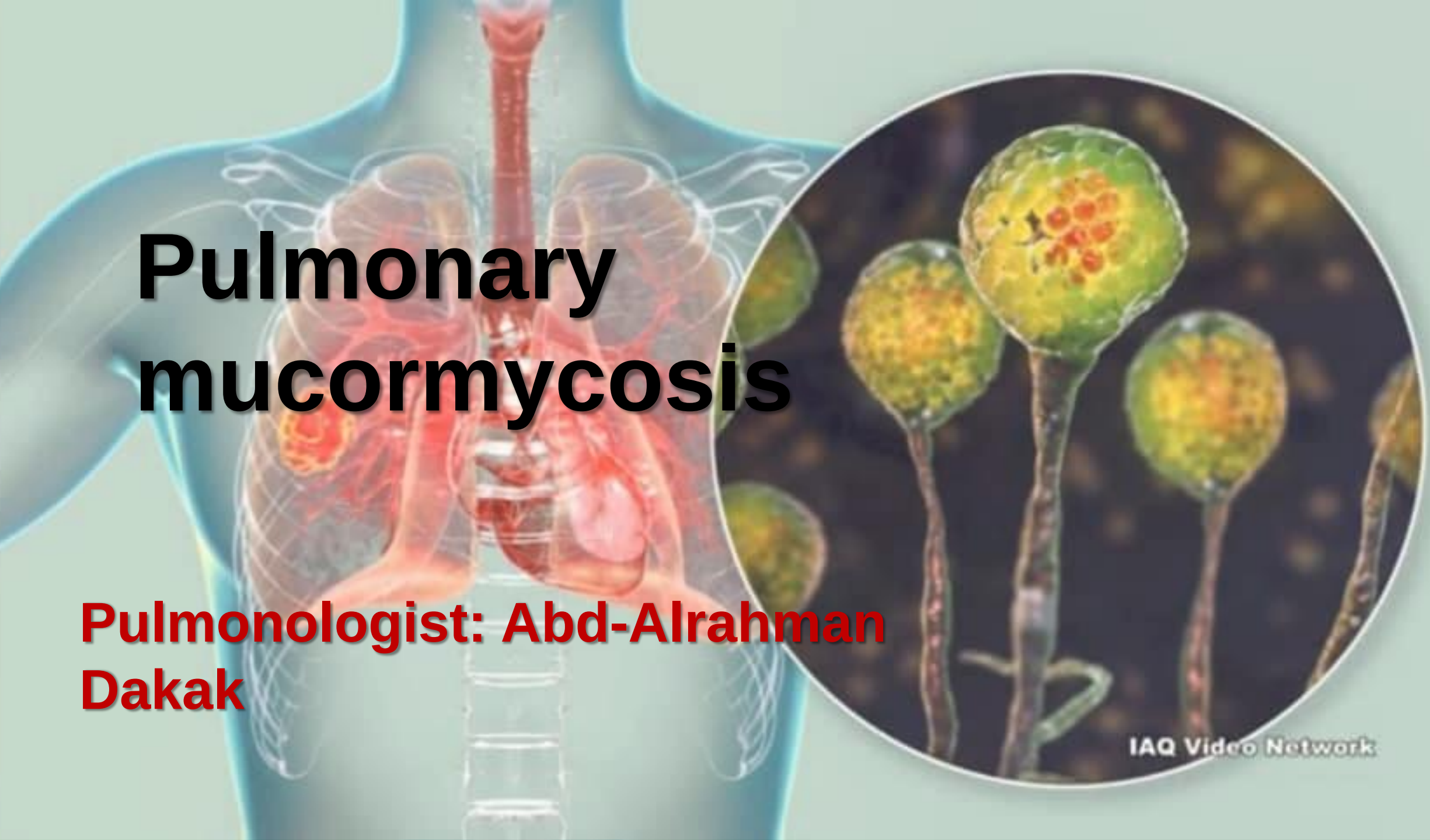
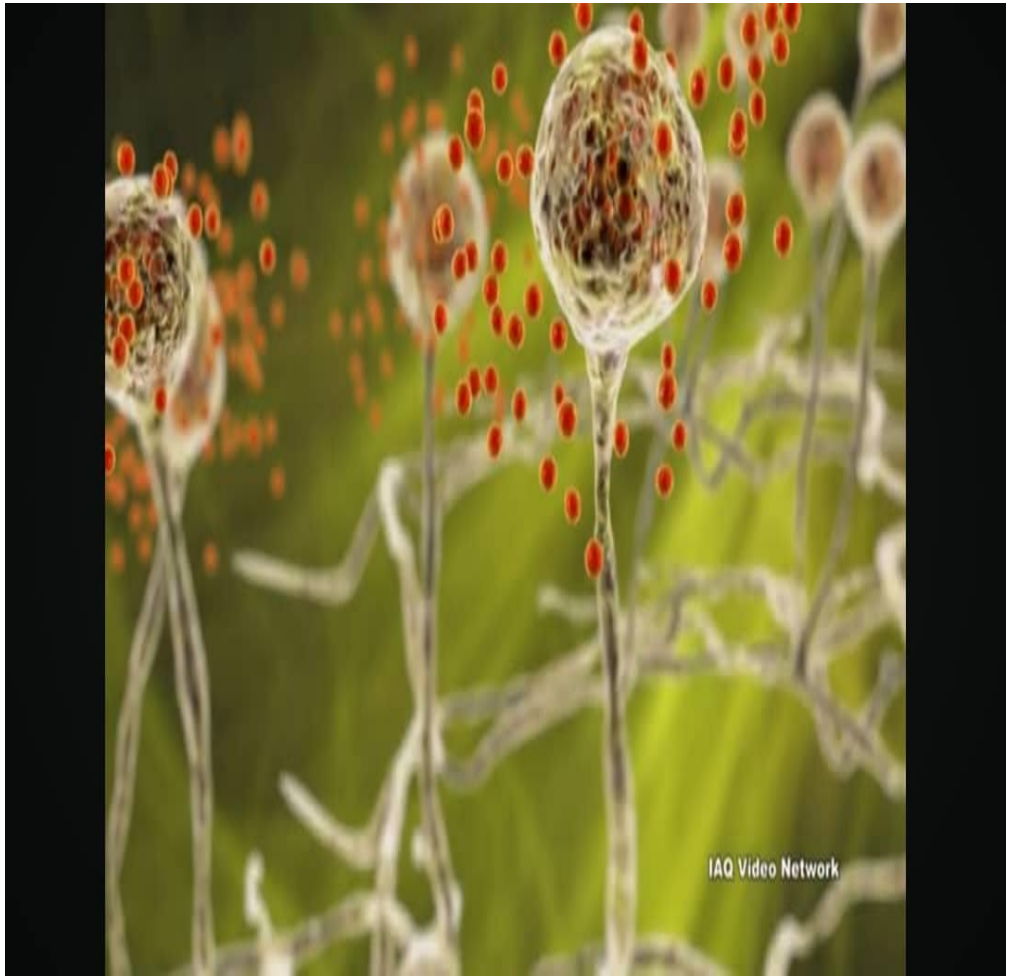
Pulmonary mucormycosis



Pulmonologist: Abd-Alrahman Dakak

Pulmonary mucormycosis



- Opportunistic infection
- Life-threatening
- due to molds belonging to the order Mucorales

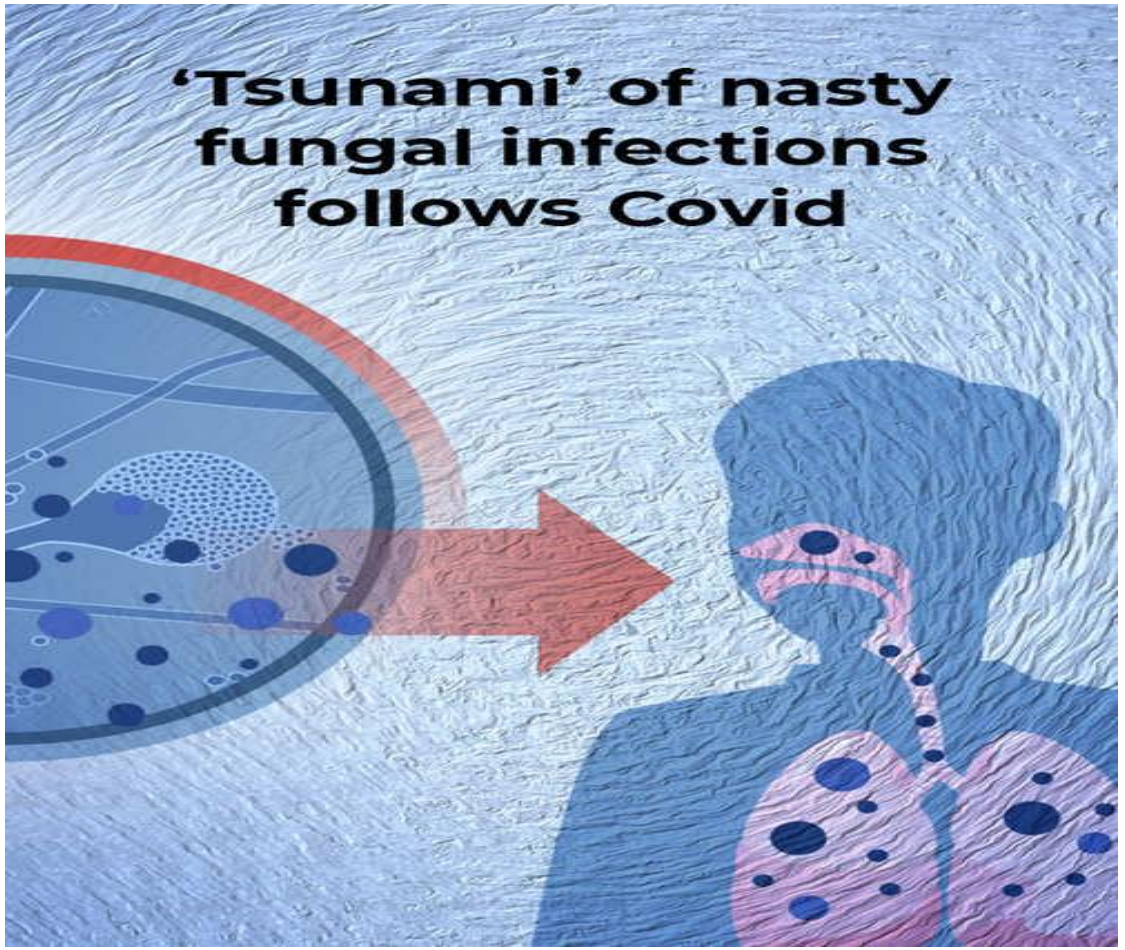
Agents of mucormycosis are ubiquitous fungi commonly found in decaying organic substrates, including but not limited to bread, fruits, vegetable matter, soil, compost piles and animal excreta.

They comprise a group of filamentous fungi in the subphylum Mucoromycotina with spores ranging from 3-11 µm in diameter.

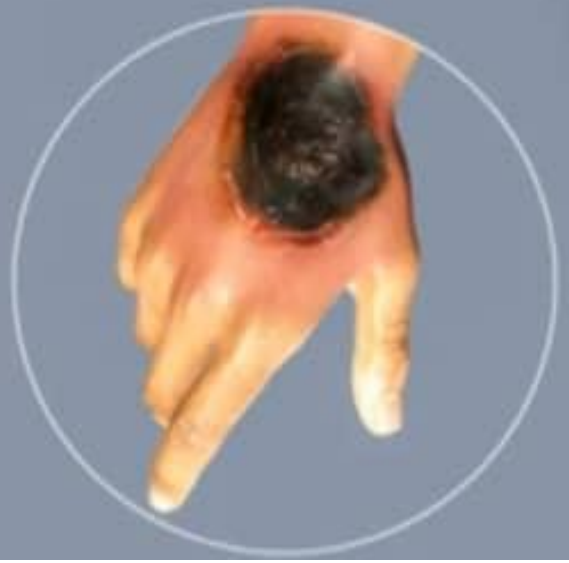
Epidemiology

1) The incidence has been increasing over recent decades.

2) Pulmonary mucormycosis is the third main location for the infection after the rhino-orbito-cerebral (ROC) areas and the skin.



MUCORMYCOSIS



Clinical spectrum of mucormycosis:

1- Rhino-Orbito-Cerebral (ROC) (Brain and nasal sinuses) Most common.

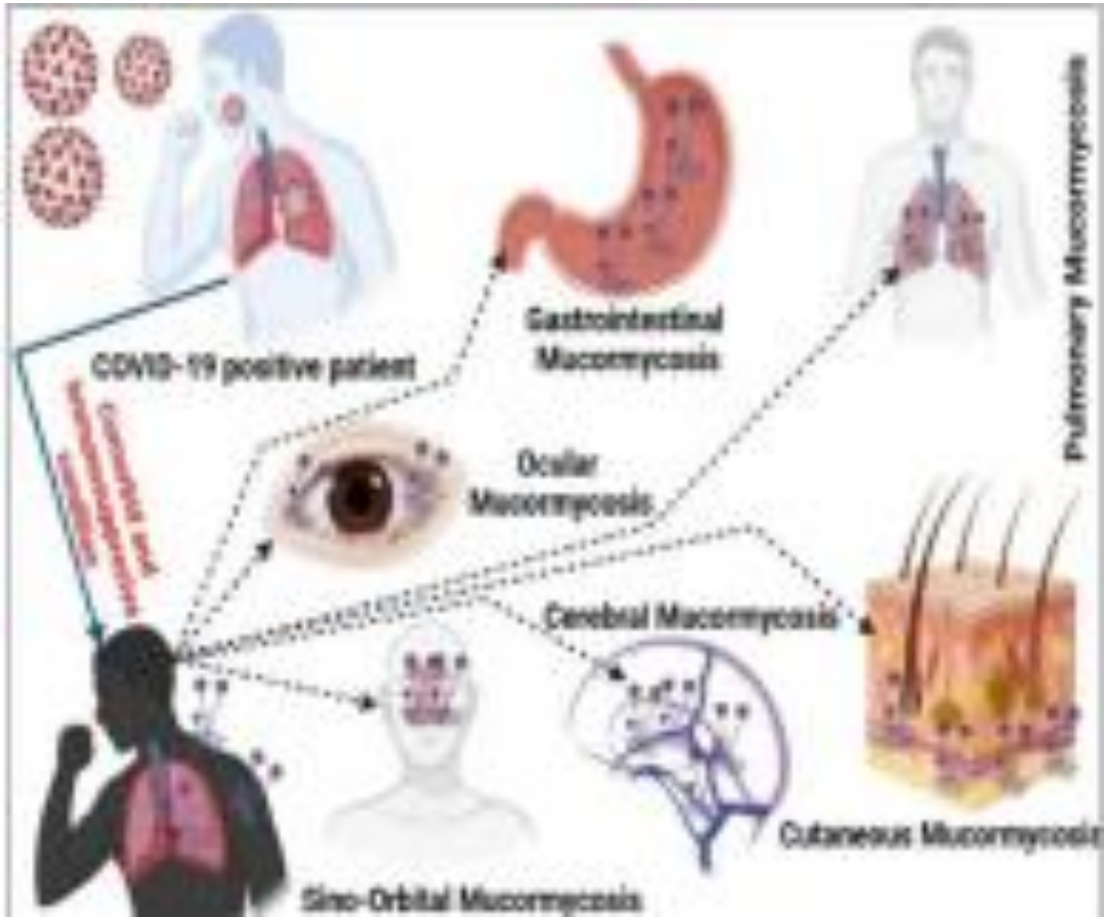
2- Pulmonary mucormycosis.

3- Cutaneous mucormycosis.

4- Gastrointestinal mucormycosis.

5- Disseminated mucormycosis.

6- Isolated renal mucormycosis.



Main Risk Factors

The main risk factors for PM include:

1) **<u>hematological malignancies</u> and**
2) **<u>solid organ transplantation</u>,**

whereas ROC infections classically are favored by

- **<u>diabetes mellitus</u>.**

Other Risk Factors

1) Uncontrolled DM / DKA :
   80-90% of ROC mucormycosis.
2) Prolonged neutropenia (Organ or bone marrow transplantation).
3) Deferoxamine (iron-chelator) therapy.
4) Iron / Aluminium overload.
5) Burns.
6) Severe trauma (tsunamis- war).
7) Protein energy malnutrition.
8) Metabolic acidosis other than DKA.
9) Treatment with immunosuppressive drugs (corticosteroids – anti-neoplastics).
10) Malignancies.
11) IV drug abuse.
12) Prematurity and low birthweight (gastro-intestinal mucormycosis).
13) HIV / AIDS.
14) CKD.
15) Liver cirrhosis and hepatic failure.

Clinical Case 1: 28/09/2023

- **المريض** : انثى ع.ق
- **العمر** : 73
- **السوابق المرضية** : سكري غير مضبوط – قصور كلية مزمن

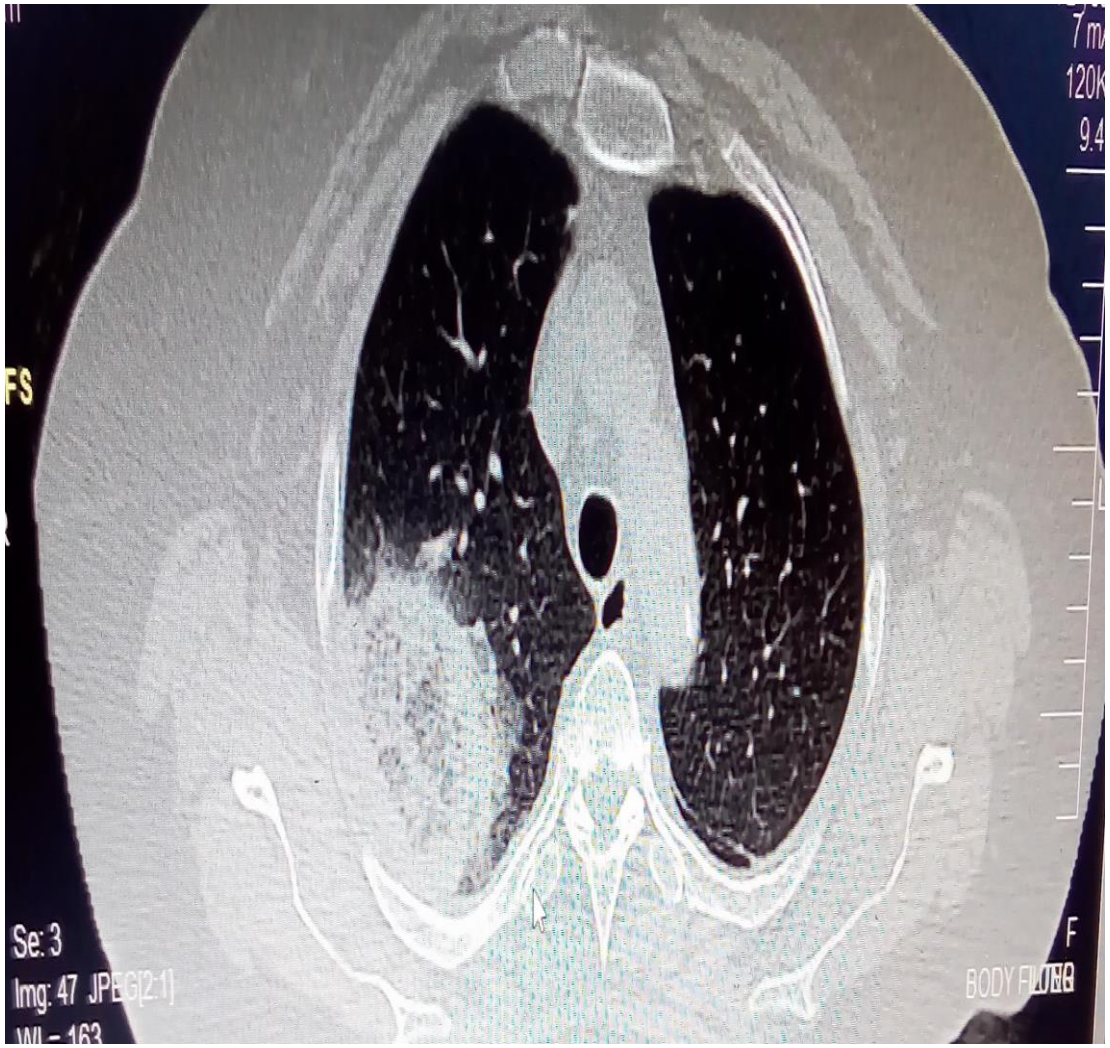
الأعراض السريرية: تعب عام – ألم صدري جداري الصفات – تراجع وارد فموي – ترفع حروري- سعال – قشع اصفر مع خيوط دموية.

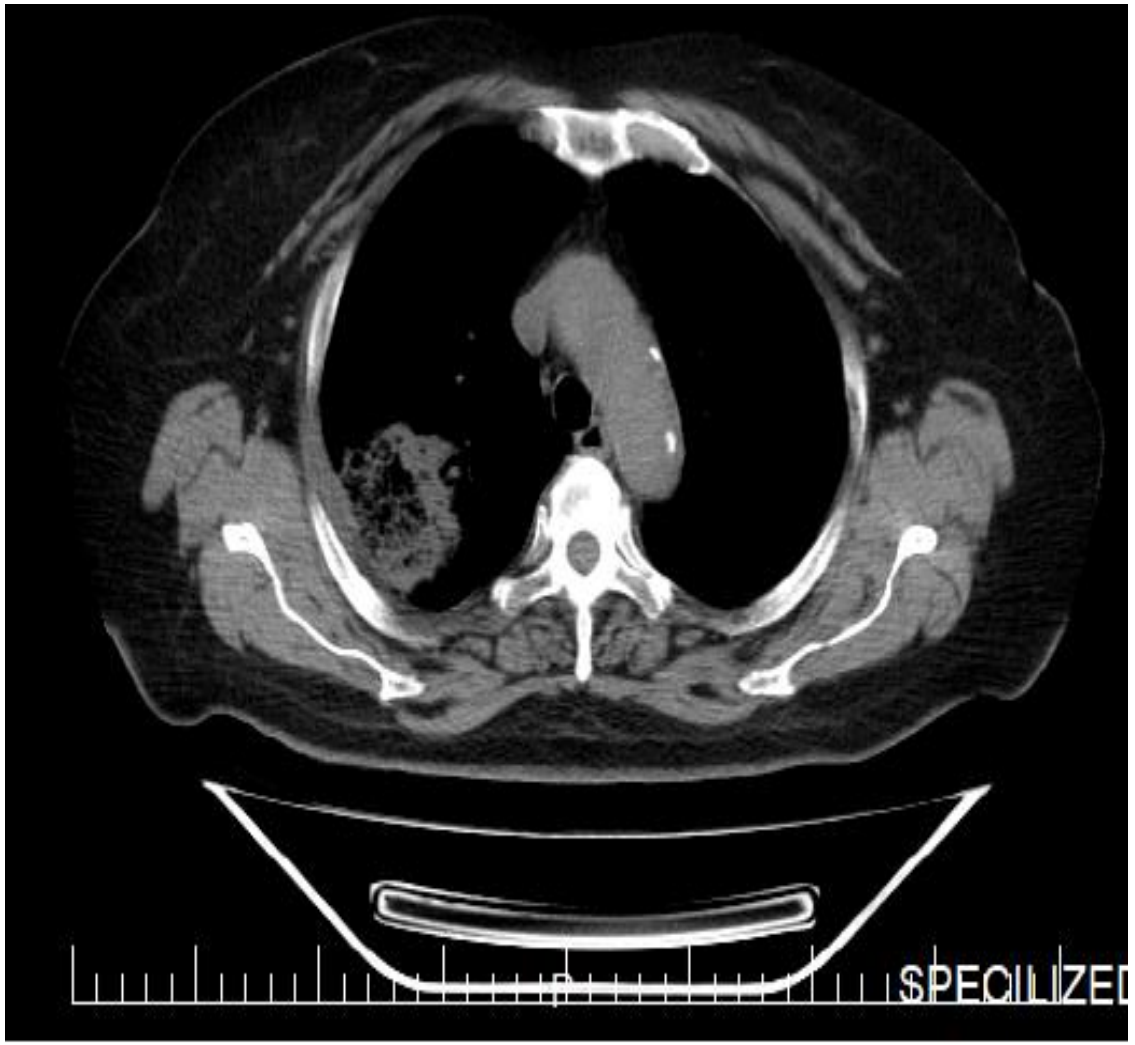
- **مخبرياً** :

السكر 340 ملغ/دل- الكرياتينين 5.4 - البولة 231 - الكيتون سلبي - سرعة التثفل 100

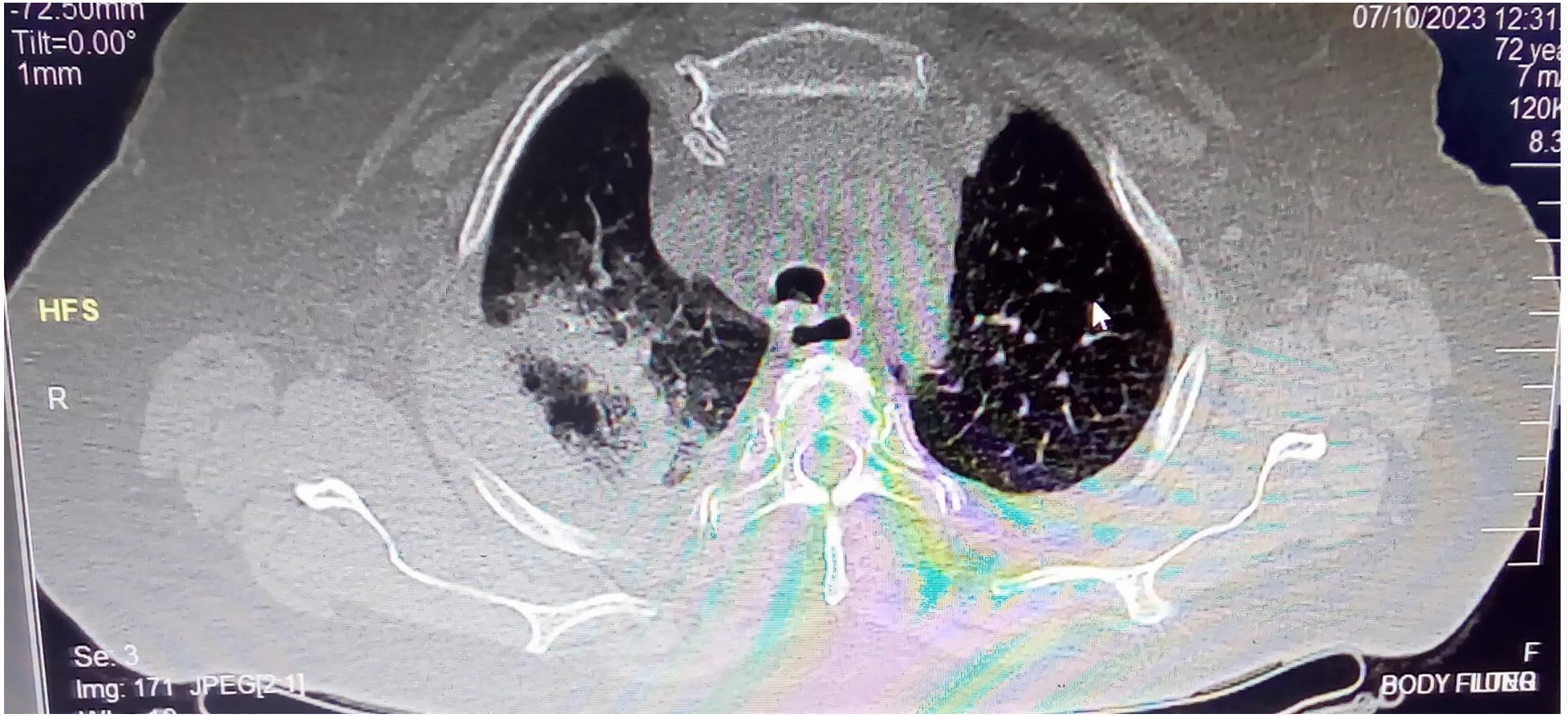
تلقت علاج بالصادات الوريدية بدون تحسن.

2023 / 9 / 28



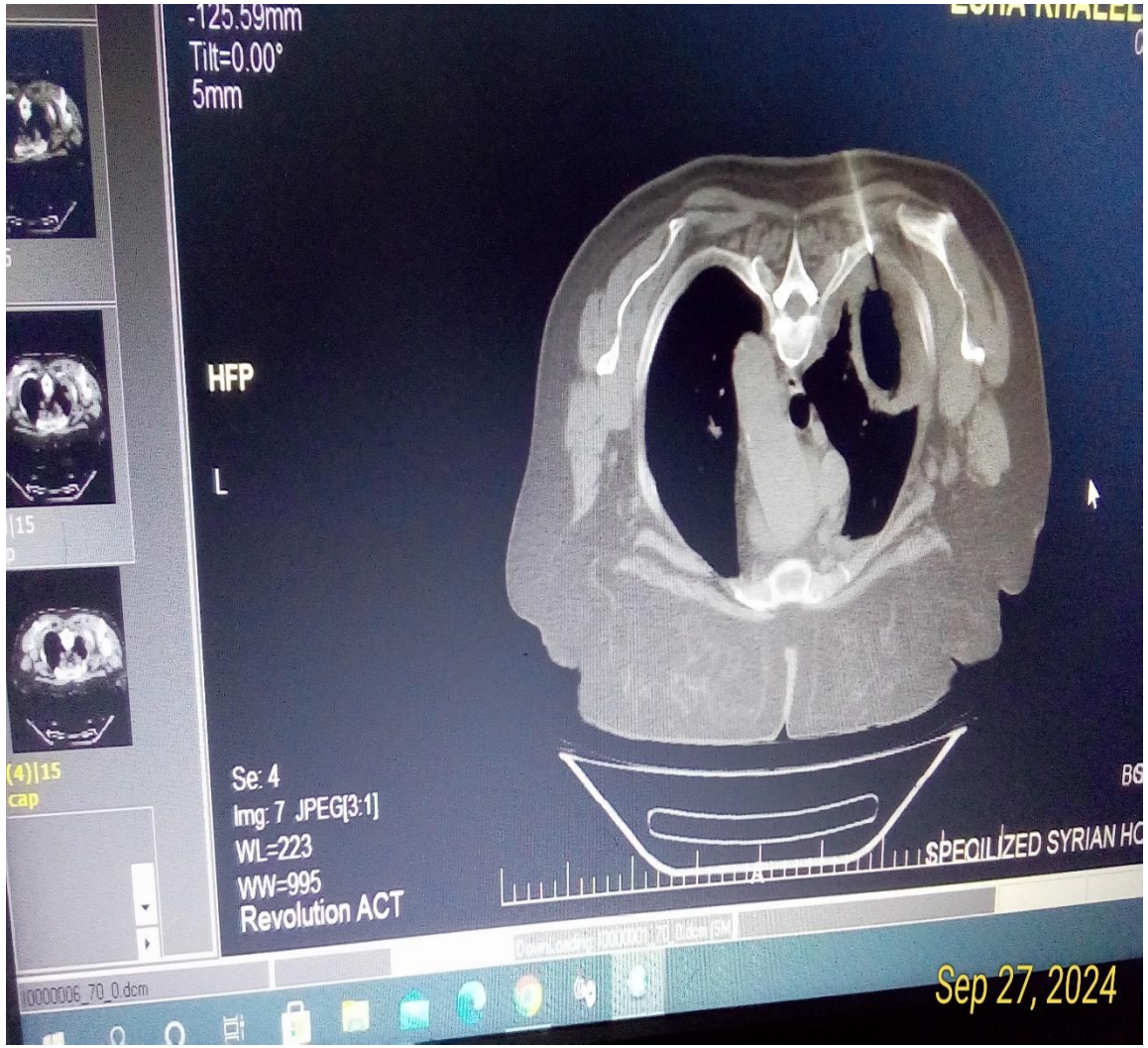


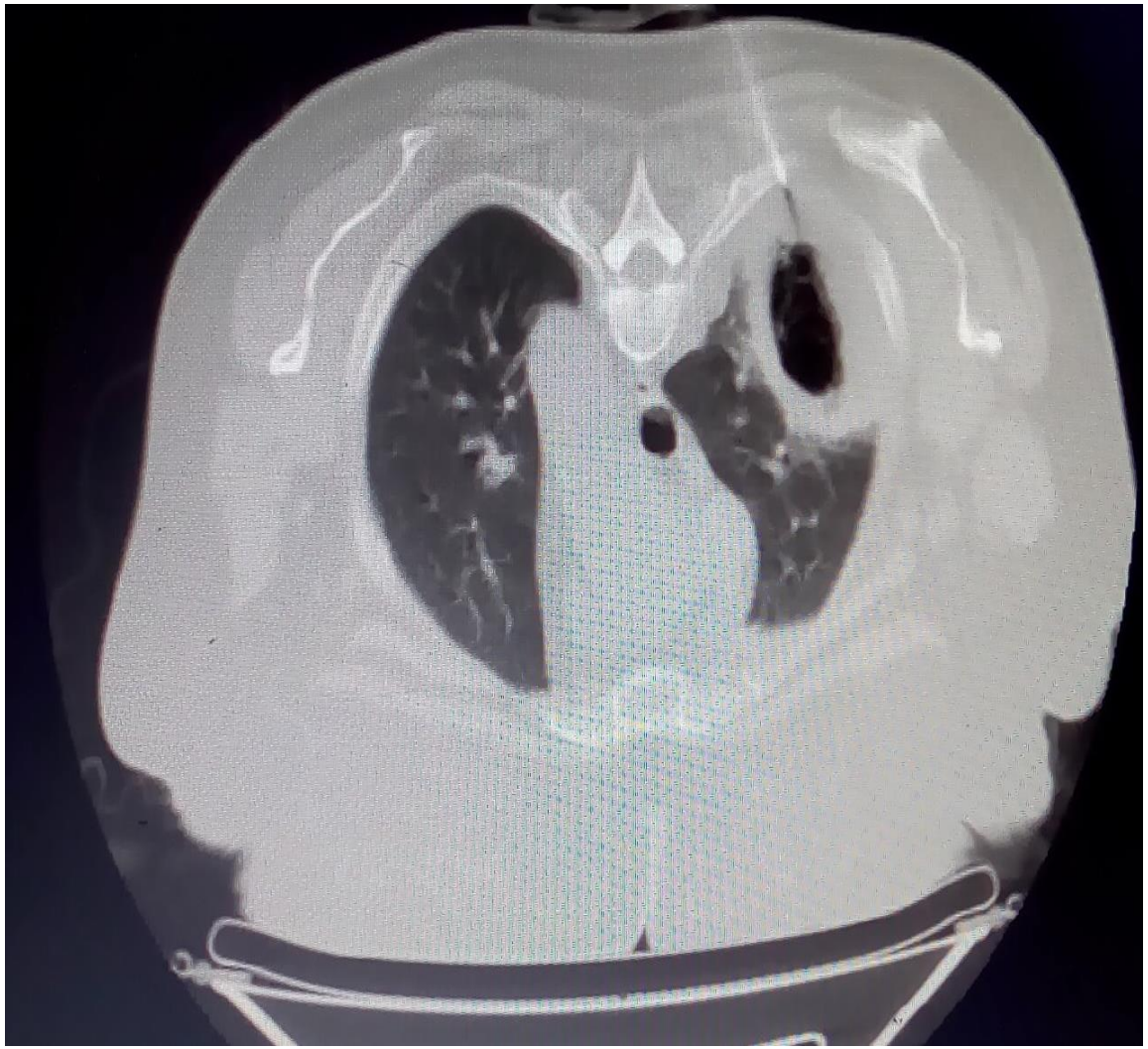
2023 / 10 / 7



Tru Cut Biopsy

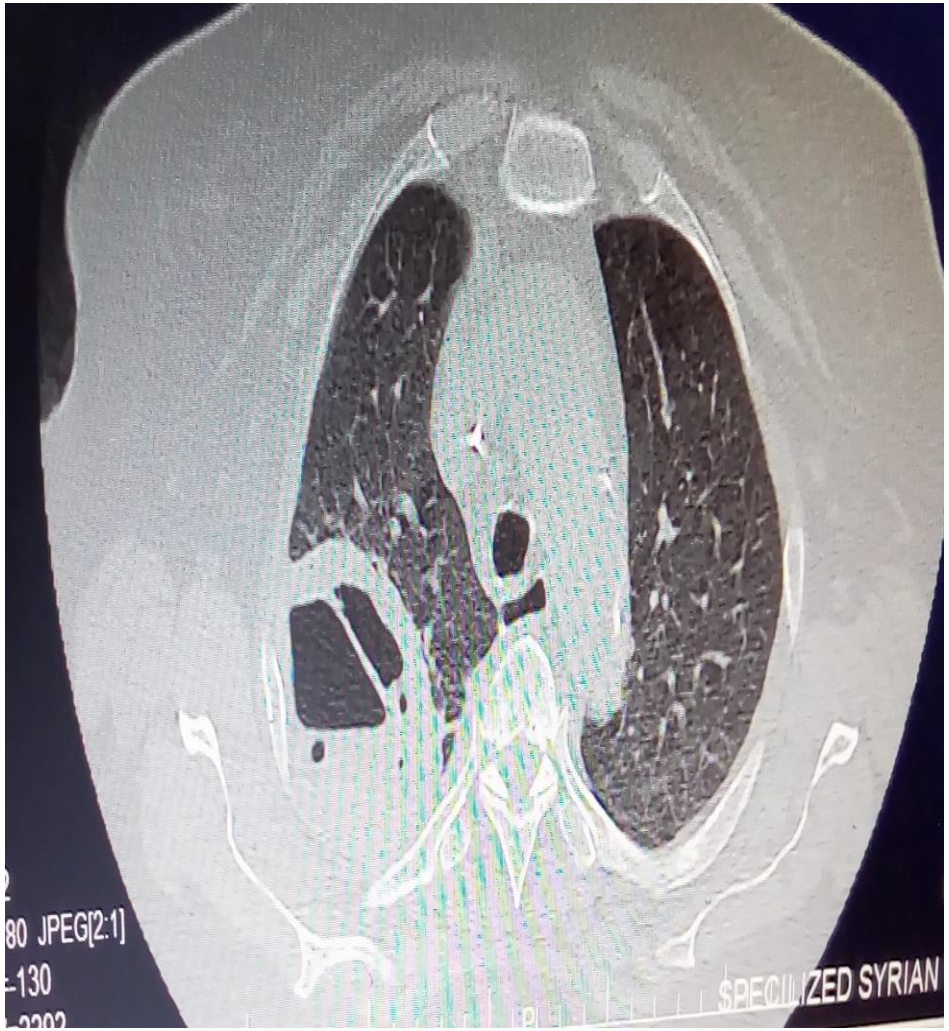
2023 / 10 / 9



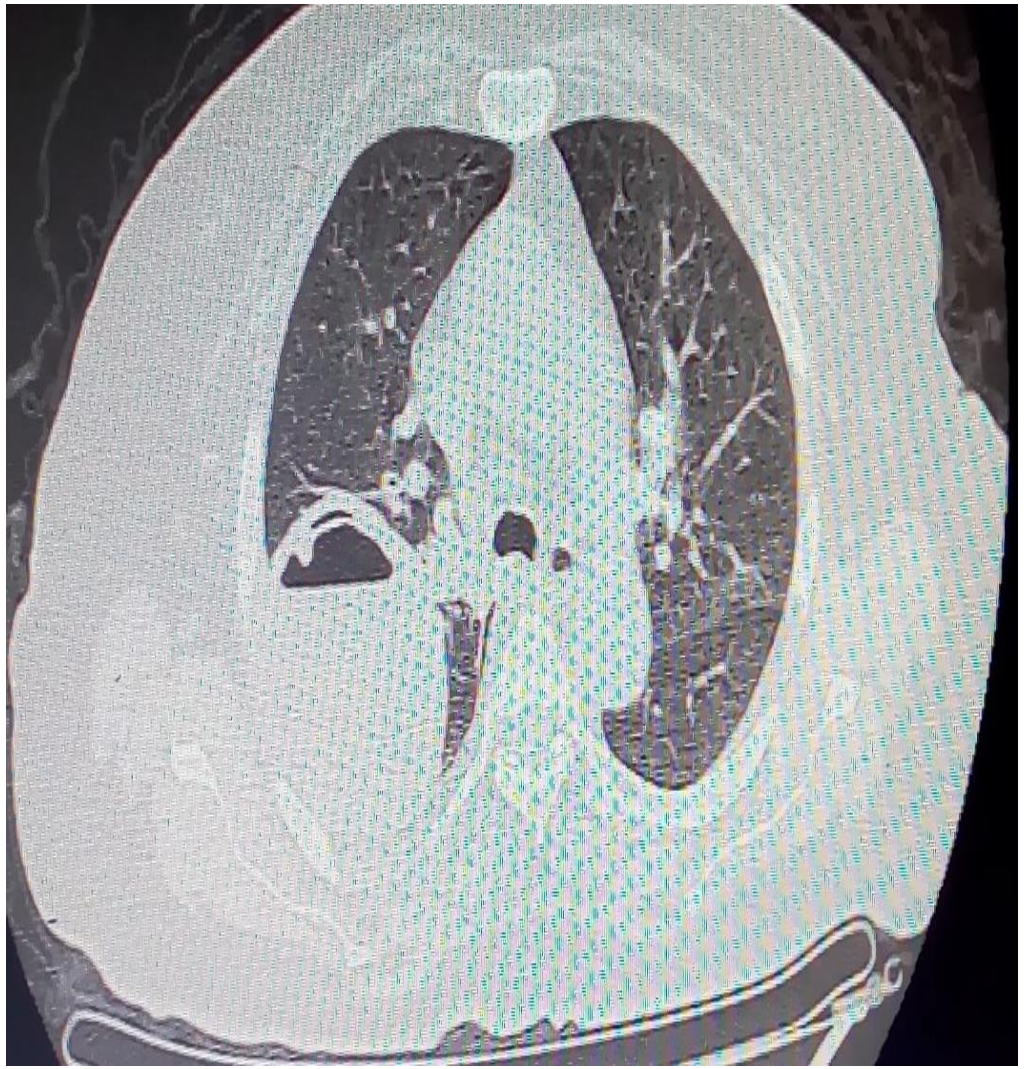


After Tru Cut Biopsy

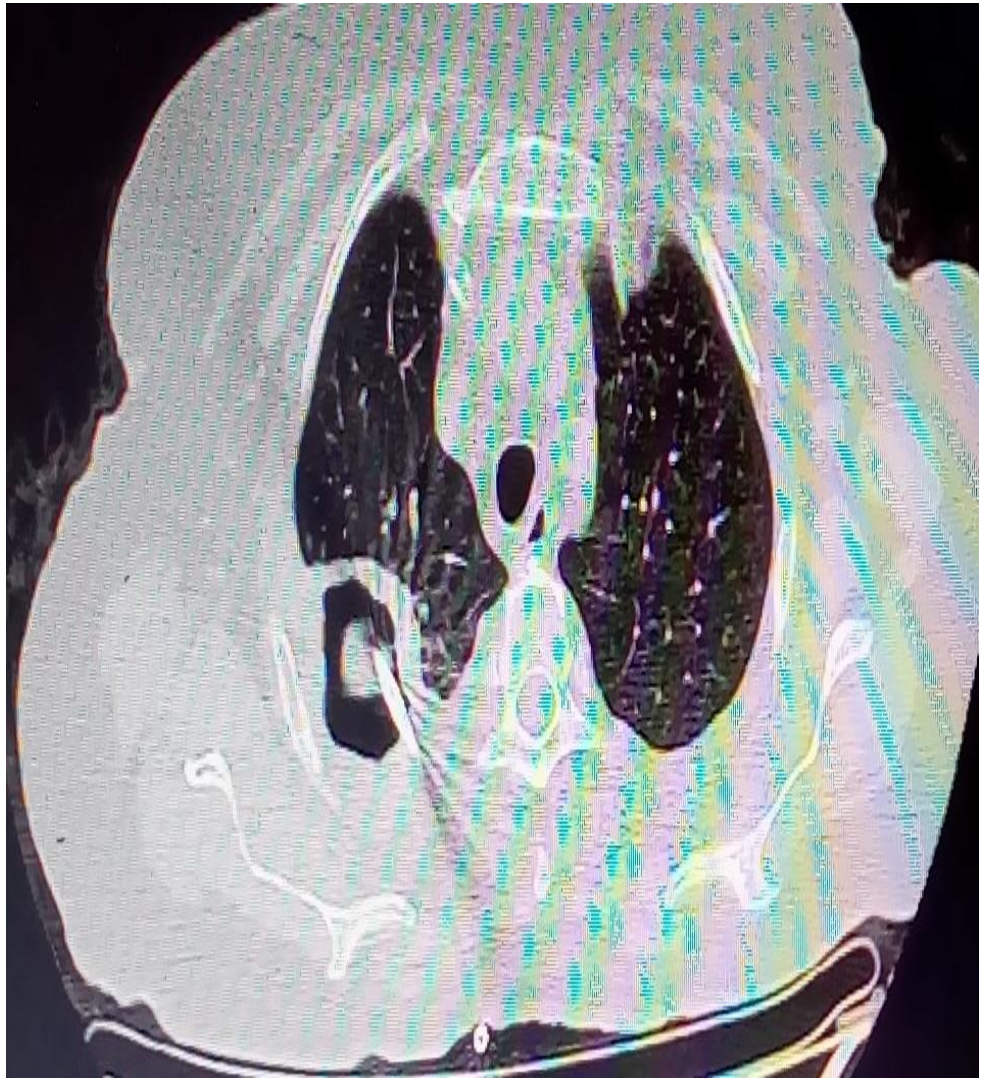
2023 / 10 / 31



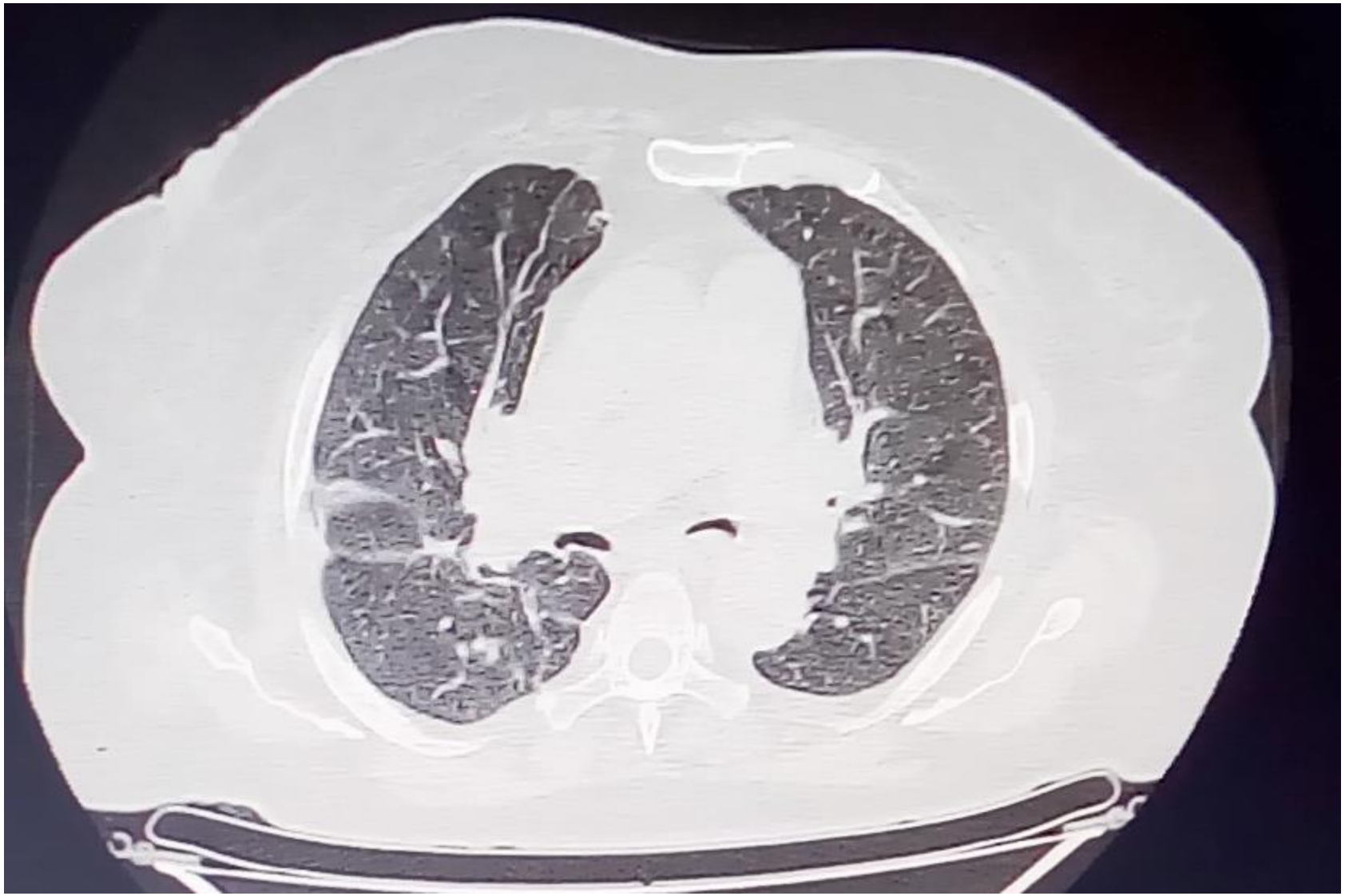
2023 / 11 / 20



2023 /12 25



بعد اجراء العمل الجراحي :
تم استئصال الآفة

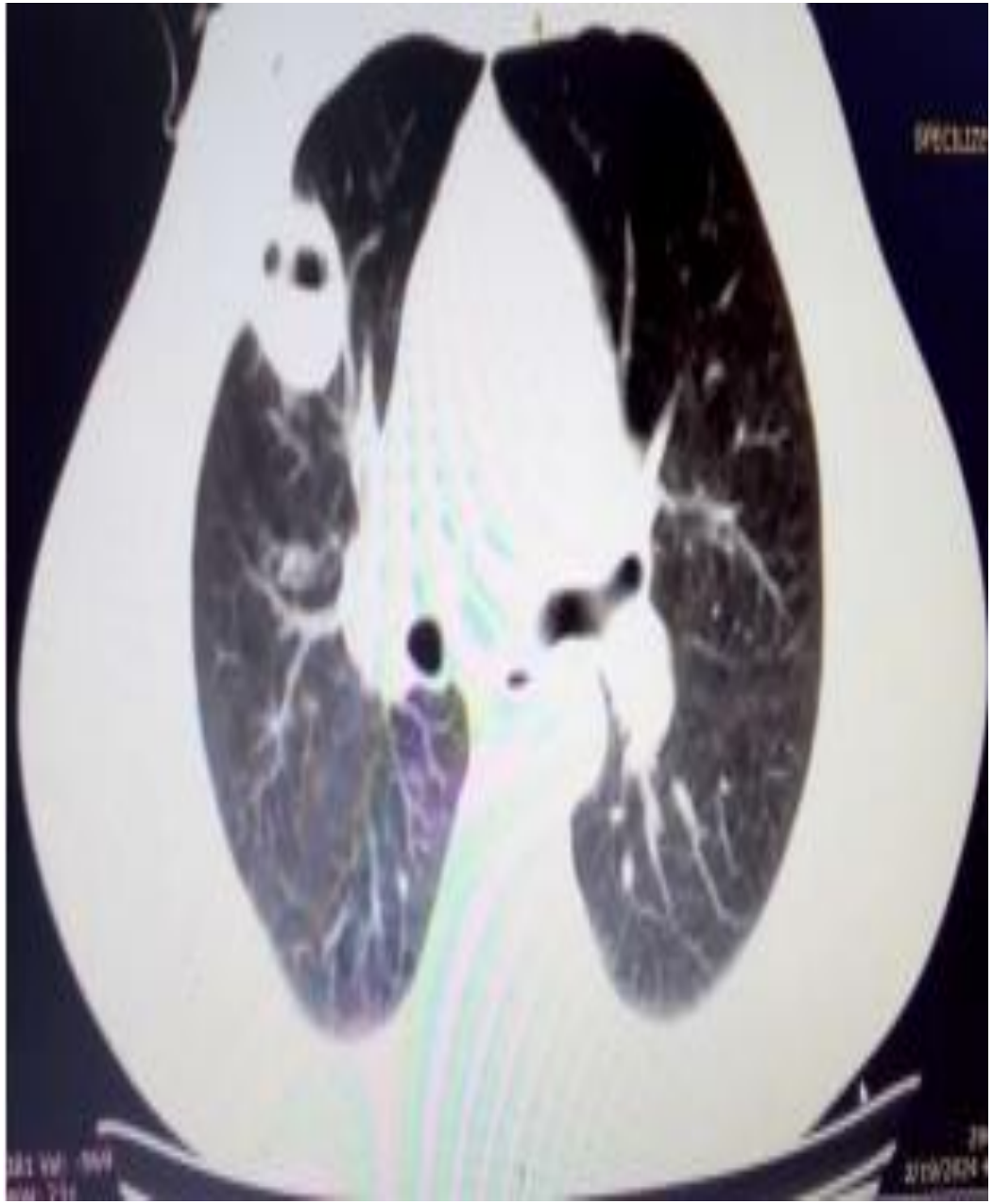


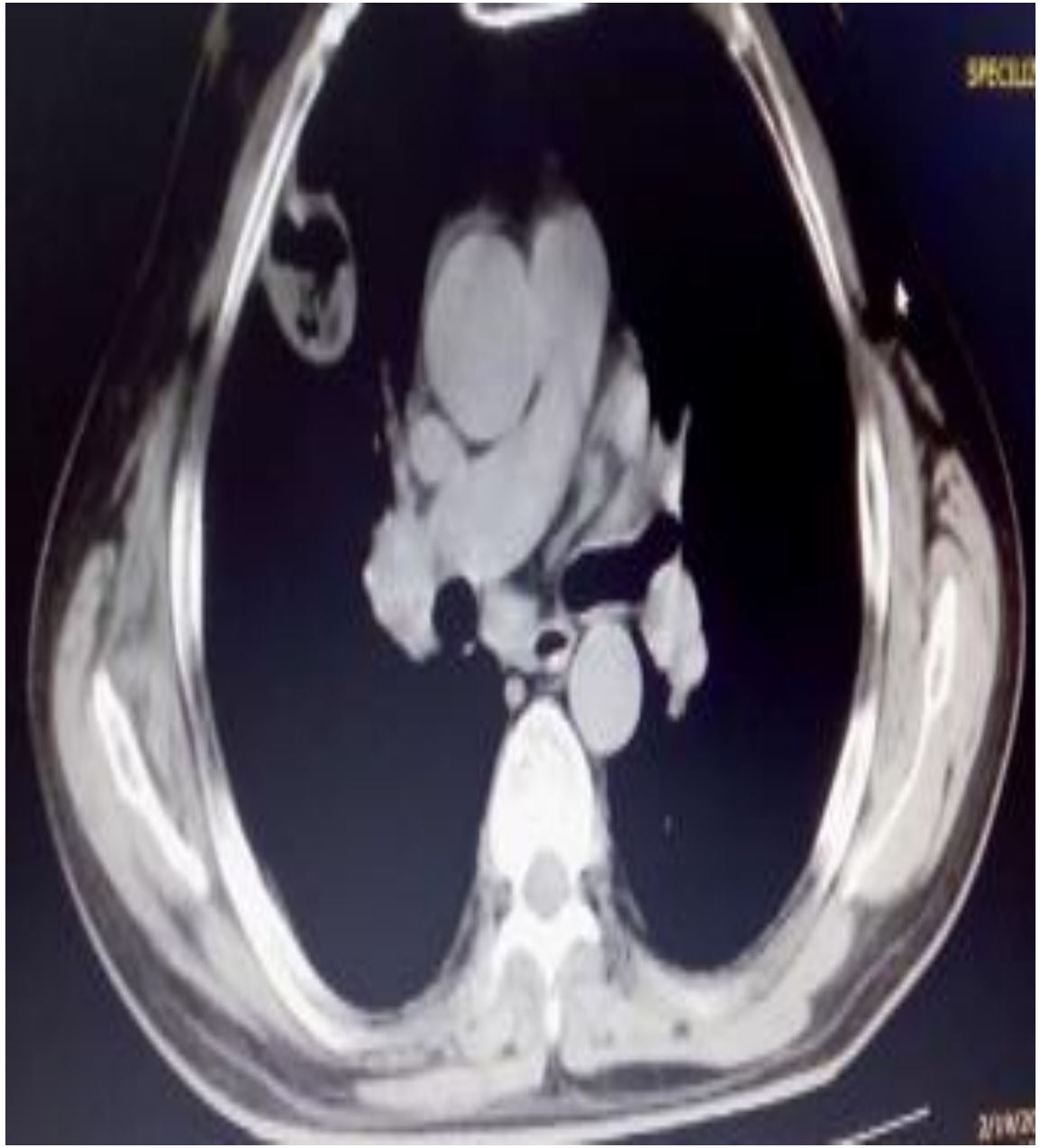
بعد الاستئصال

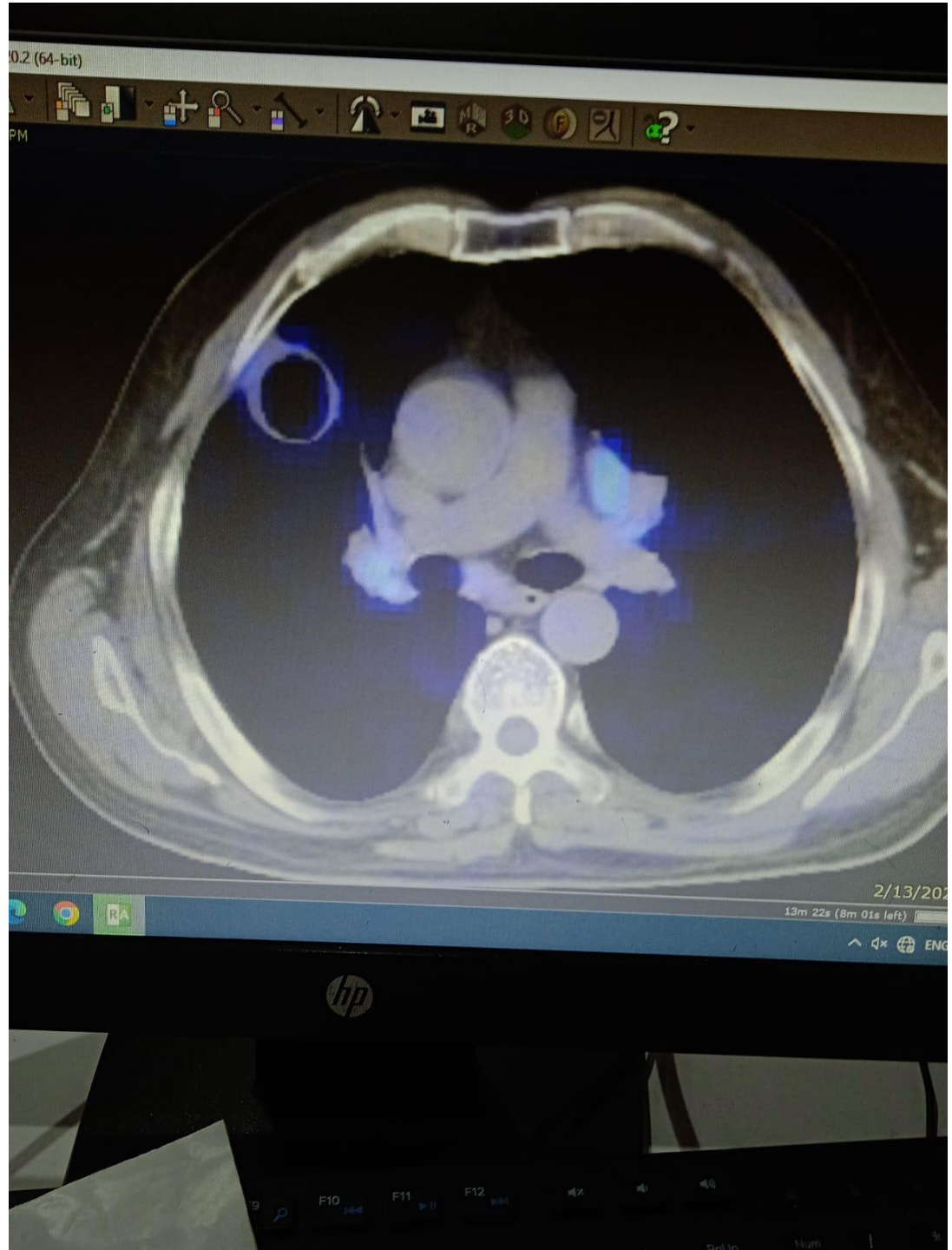
17/8/2024

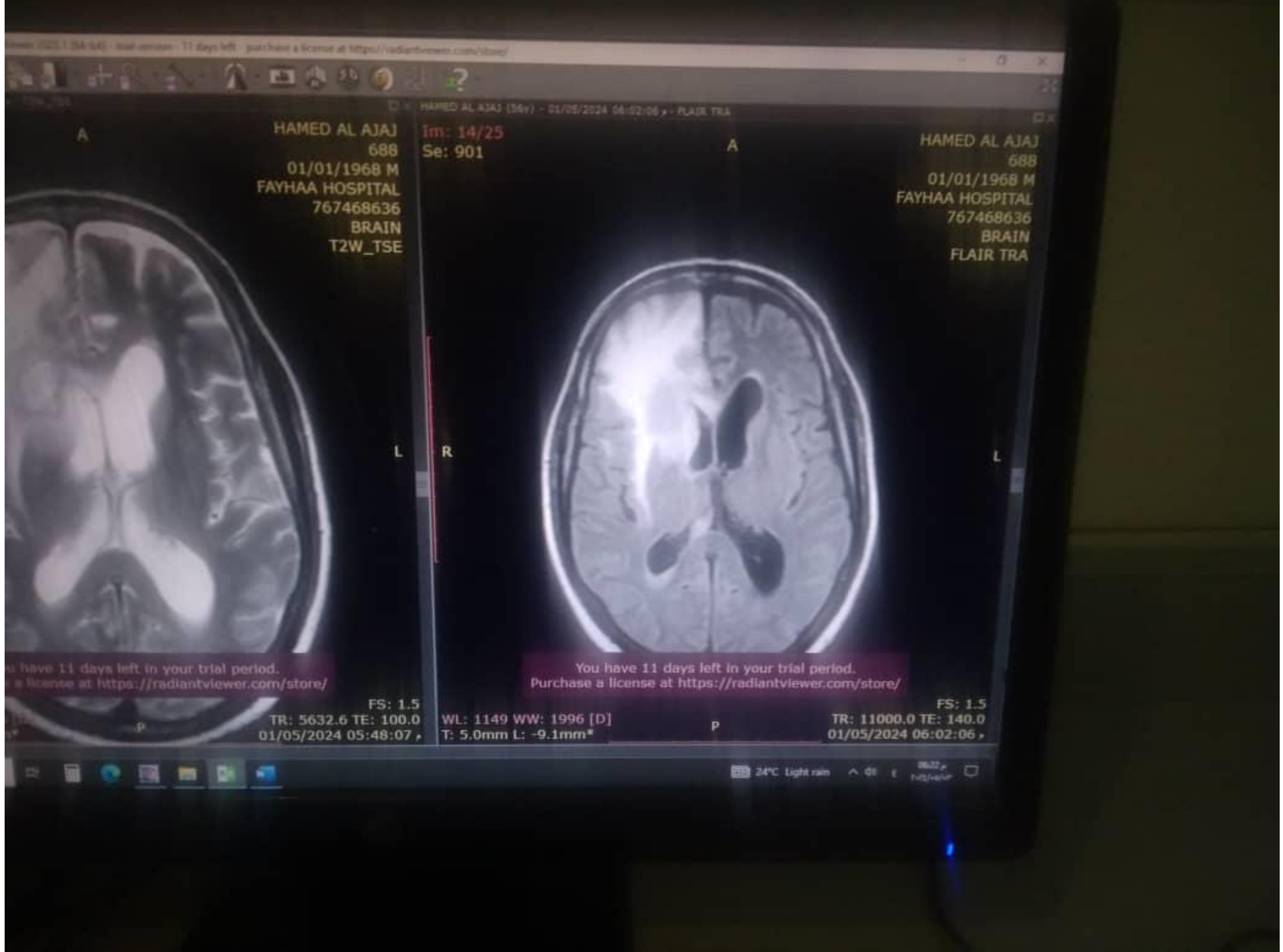
Clinical Case 2: 18 / 2 / 2024

- **المريضة:** ذكر ح.ع
- **العمر:** 65 سنة
- السوابق المرضية: سكري نمط ثاني غير معالج
- **الأعراض السريرية:** تعب عام - ألم صدري جداري الصفات - سعال خفيف الشدة
- **مخبريا:** ESR= 123 - CRP = 198 (up to 5) - السكر = 354
- تلقى عالج بالصادات الوريدية دون تحس






0.2 (64-bit)
PM
2/13/202
13m 22s (8m 01s left)
ENG
F10
F11
F12


HAMED AL AJAJ
688
01/01/1968 M
FAYHAA HOSPITAL
767468636
BRAIN
T2W_TSE
FS: 1.5
TR: 5632.6 TE: 100.0
01/05/2024 05:48:07
HAMED AL AJAJ (56y) - 01/05/2024 06:02:06 - FLAIR TRA
Im: 14/25
Se: 901
HAMED AL AJAJ
688
01/01/1968 M
FAYHAA HOSPITAL
767468636
BRAIN
FLAIR TRA
You have 11 days left in your trial period.
Purchase a license at https://radiantviewer.com/store/
WL: 1149 WW: 1996 [D]
T: 5.0mm L: -9.1mm*
FS: 1.5
TR: 11000.0 TE: 140.0
01/05/2024 06:02:06

Clinical Case 3: 6/4/2024

- **المريض** : ذكر أ.م
- **العمر** : 63
- **السوابق المرضية** : سكري غير مضبوط – حصيات كلوية

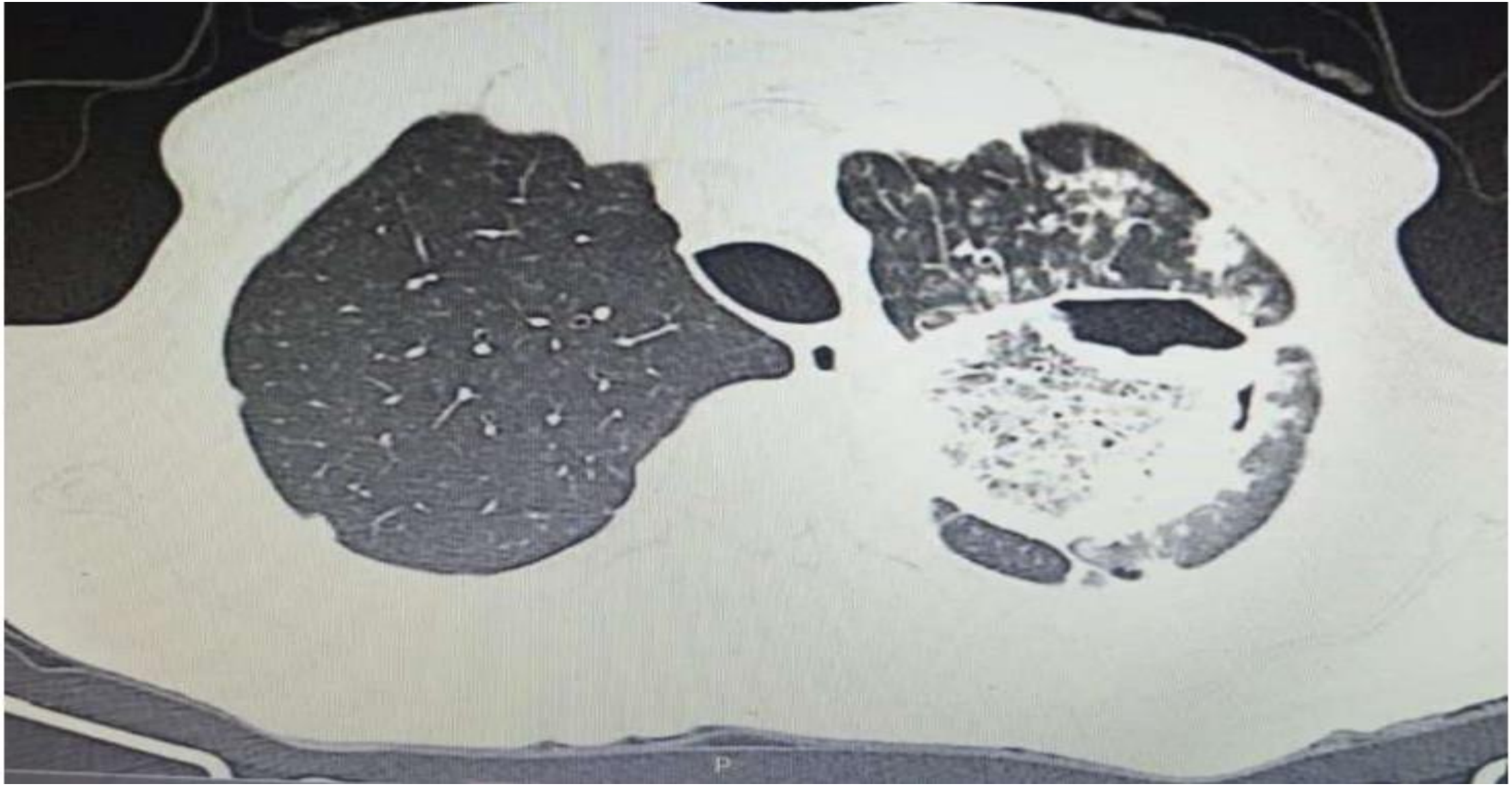
الأعراض السريرية: تعب عام – ألم صدري جداري الصفات – تراجع وارد فموي – ترفع حروري- سعال – قشع قيحي بني اللون مدمى.

- **حيوياً** : الحرارة 37.7 – اشباع الاكسجين 91% - ضغط الدم 120/70 – النبض 115 – معدل التنفس 38.
- **مخبرياً** :

السكر 541 ملغ/دل- الكرياتينين 1.9 - البولة 64 - سرعة التثفل 105 – CRP121 – الكريات البيض 20000 – الصفيحات 566.

تلقت علاج بالصادات الوريدية اسبوعين بدون تحسن.


R



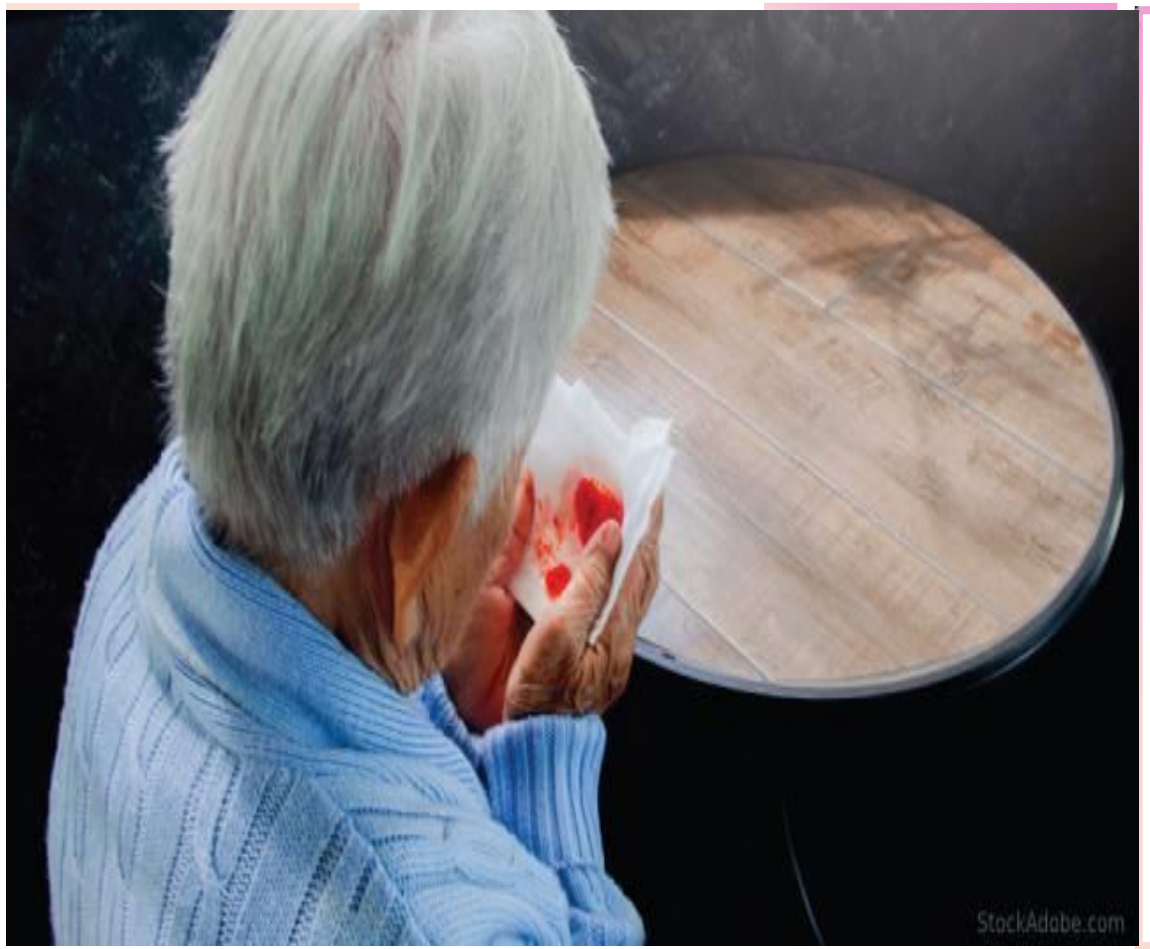
Clinical presentation

Pulmonary infection is clinically indistinguishable from more common molds such as invasive pulmonary aspergillosis (IPA).

Symptoms may comprise:

1) fever refractory to broad-spectrum antibiotics,
2) nonproductive cough,
3) and progressive dyspnea.
4) Pleuritic chest *pain*, *hemoptysis*, and pleural *effusion* are seen less frequently.

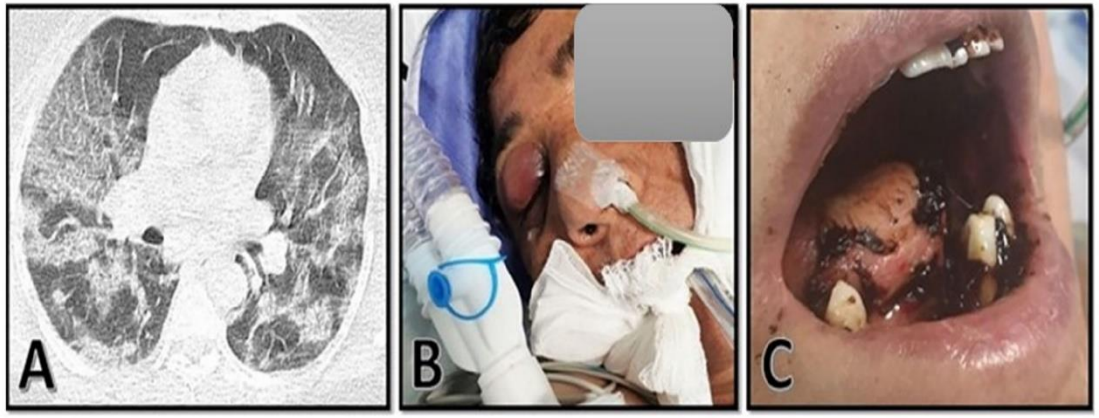
Clinical presentation



Invasion of the major pulmonary blood vessels by hyphae may lead to ***massive, potentially fatal hemoptysis***.

Invasion of adjacent organs by traversing tissue planes, including the diaphragm, chest wall, and pleura have also been described .

Diagnosis

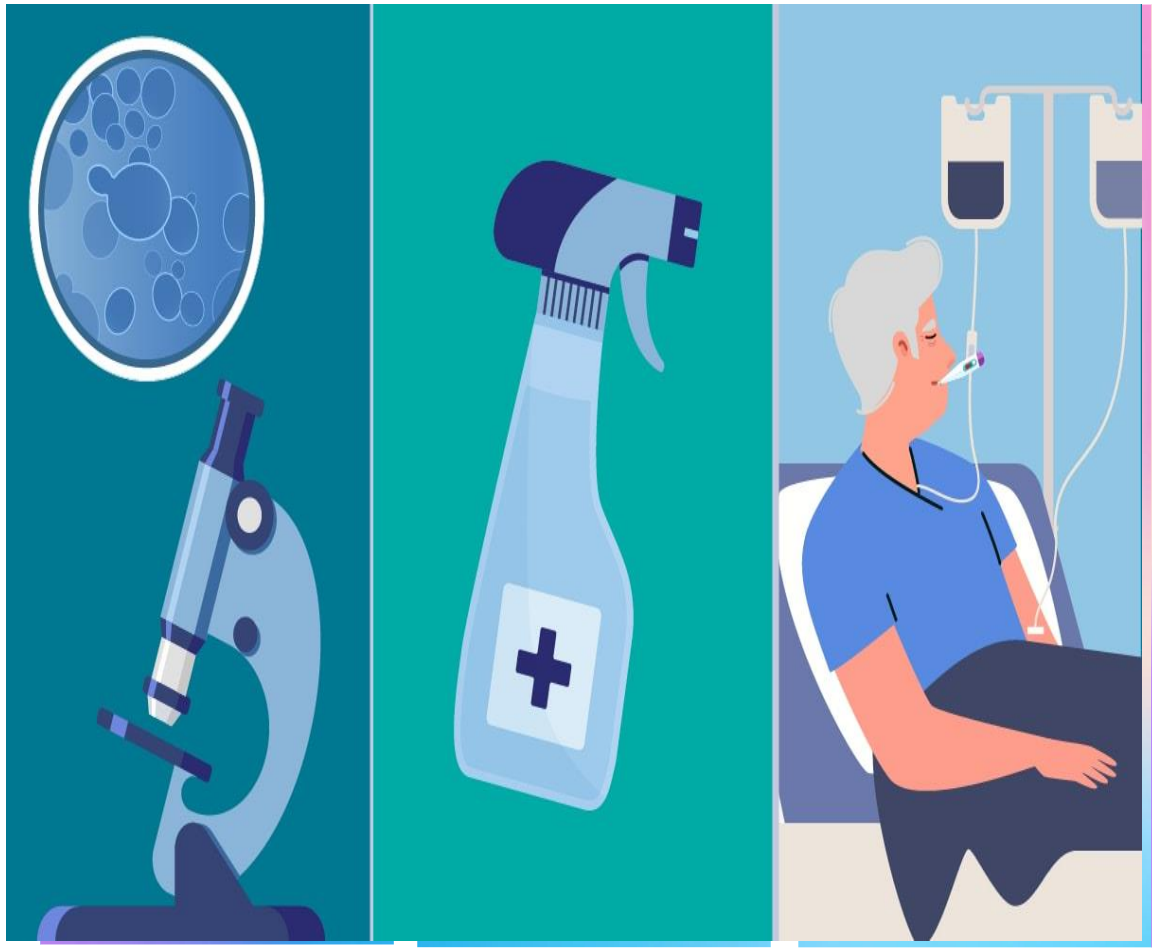


The diagnosis of PM relies on:

1) **CT scans,**
2) **cultures,**
3) **PCR tests,**
4) **and histology.**

Recently, the serum PCR test showed a very encouraging performance for the diagnosis and follow-up of mucormycosis.

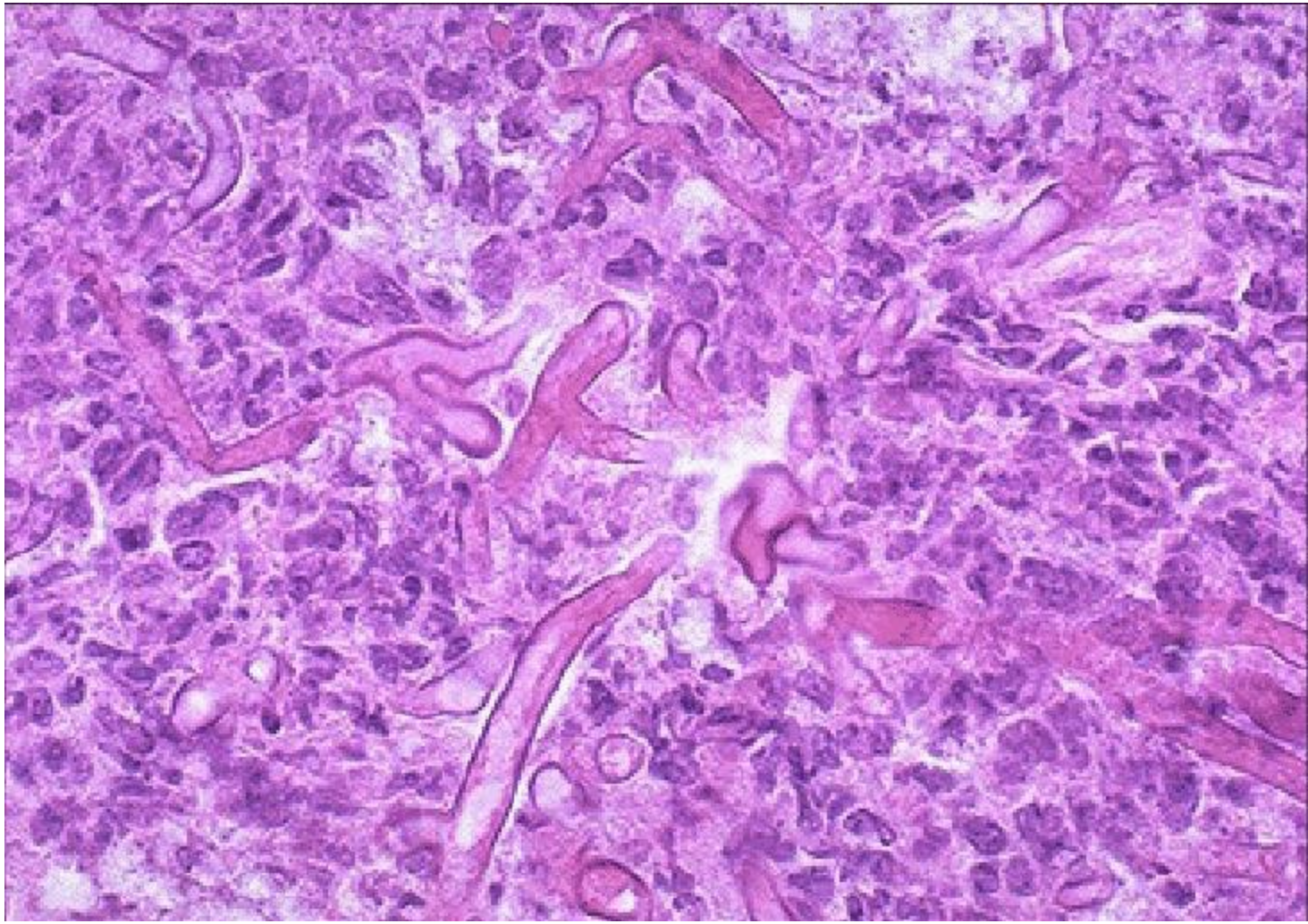
Diagnosis: Laboratory:



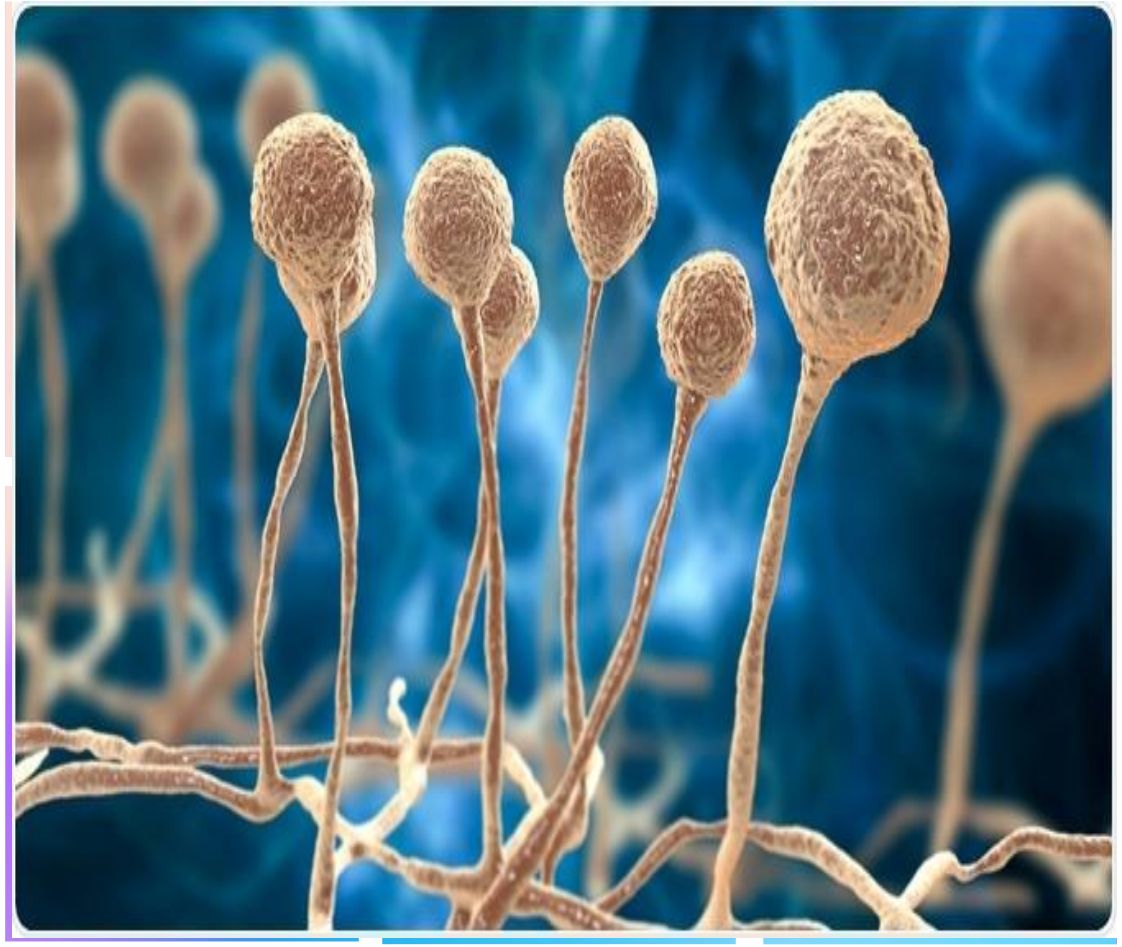
- **Sample collection**
  - **1) Tissue biopsy – Gold standard**
  - **2) Tissue swaba – Unreliable**
- **Culture**
  - **1) Blood cultures are rarely positive**
  - **2) Positive tissue cultures alone are not sufficient to make a diagnosis**

Diagnosis: Histopathology:

Histopathology smear showing broad nonseptate hyphae of Mucor



Diagnosis



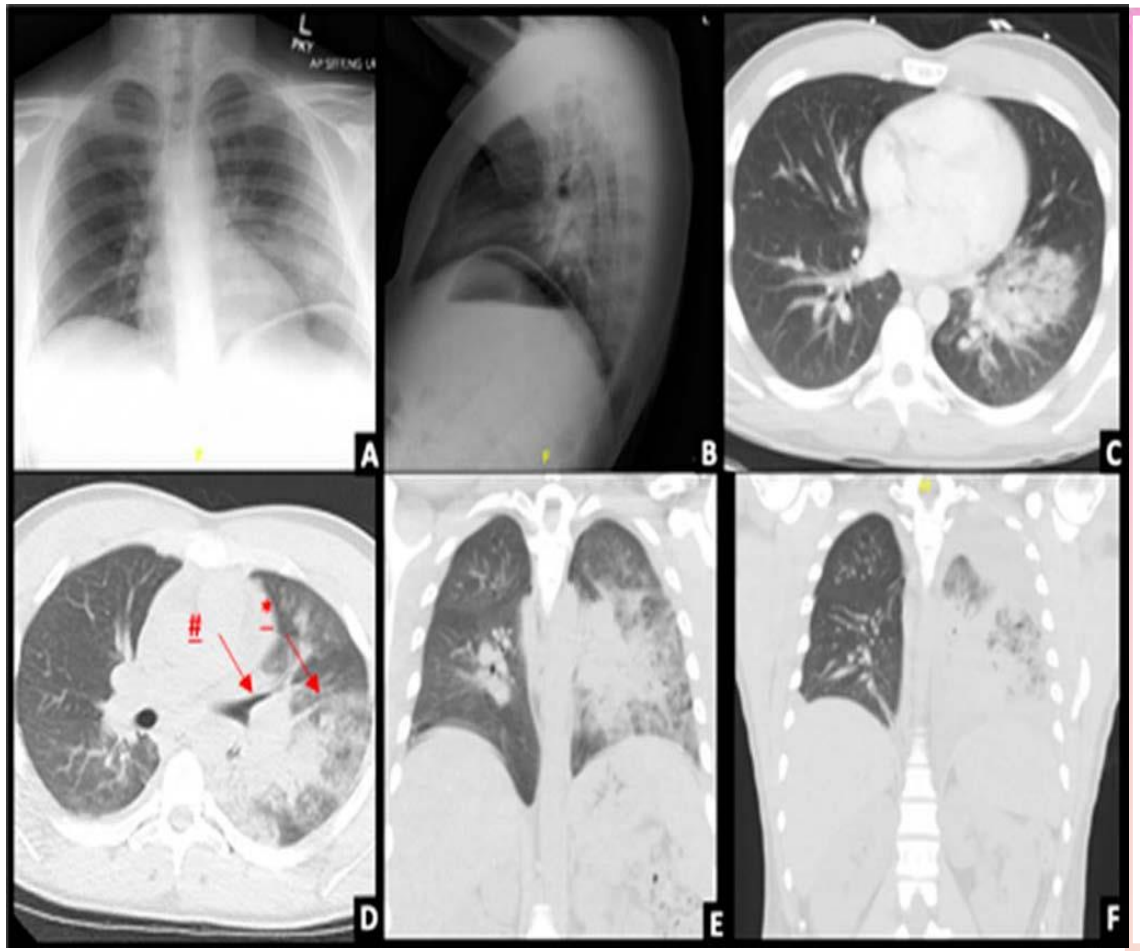
Clinical signs and symptoms of mucormycosis are nonspecific.

Microbiological assessment usually makes the diagnosis, but can be hampered by contamination with normal flora.

Samples from the nasal cavity are often included .

A high level of suspicion in susceptible patient populations is of paramount importance.

Radiographic features

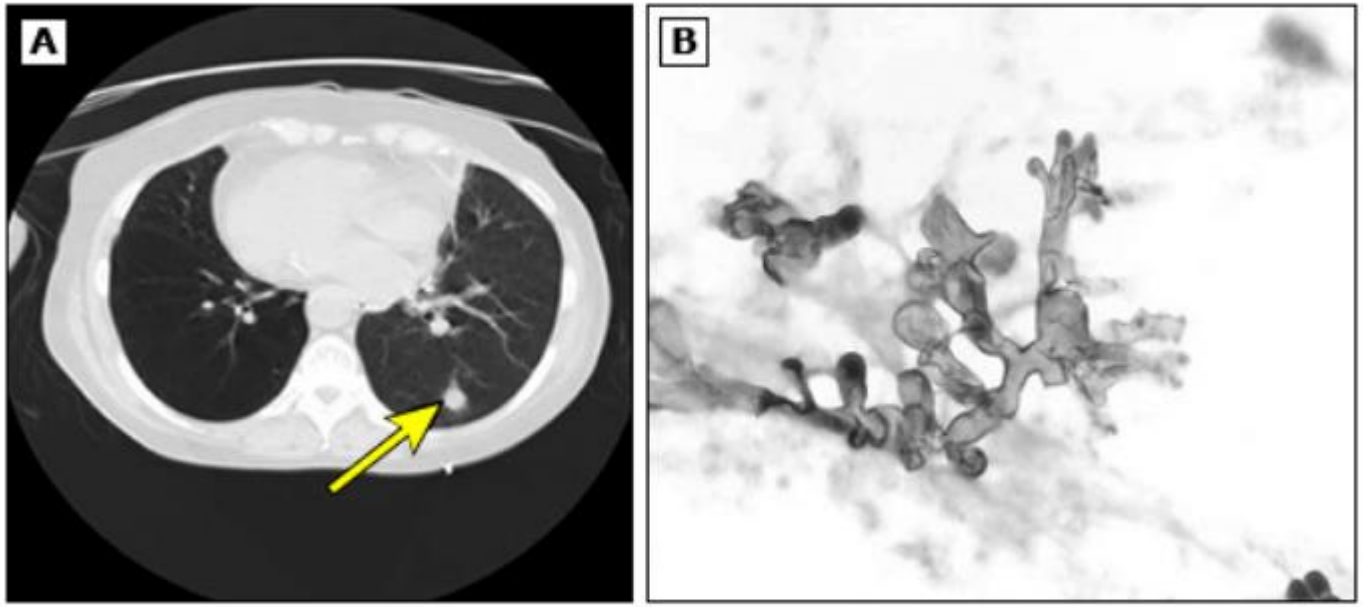


Imaging features in pulmonary mucormycosis are nonspecific, it can present as:

1) **A solitary nodule,**
2) **Lobular consolidation as in pneumonia,**
3) **Cavitary lesion**
4) **or in disseminated form.**

Radiographic features

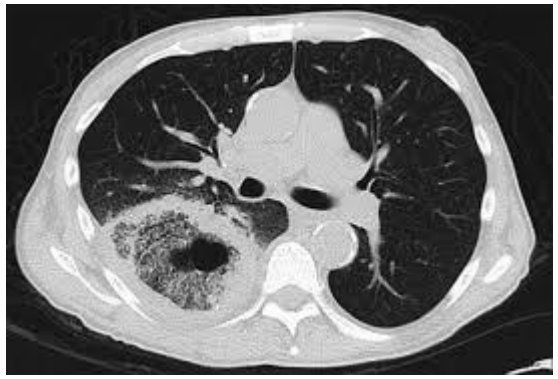
Pulmonary mucormycosis in a lung transplant recipient

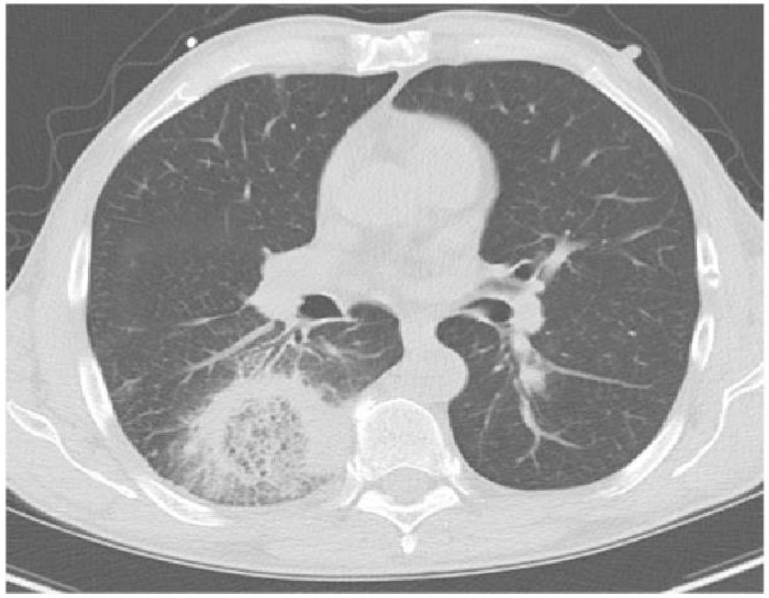


(A) Computed tomography (CT) scan of lung showing pulmonary nodule in left lower lobe and (B) fine needle aspiration showing aseptate hyphae

Radiographic features

reversed halo sign





CT

On CT, ground-glass opacities may be encountered.

The reversed halo sign or bird's nest sign has been demonstrated as a fairly specific sign capable of suggesting the diagnosis in the correct clinical setting.

The reversed halo sign is an early, but very suggestive sign of PM in neutropenic patients.

Treatment

Early surgical debridement (associated with improved survival)

+

Antifungal therapy

+

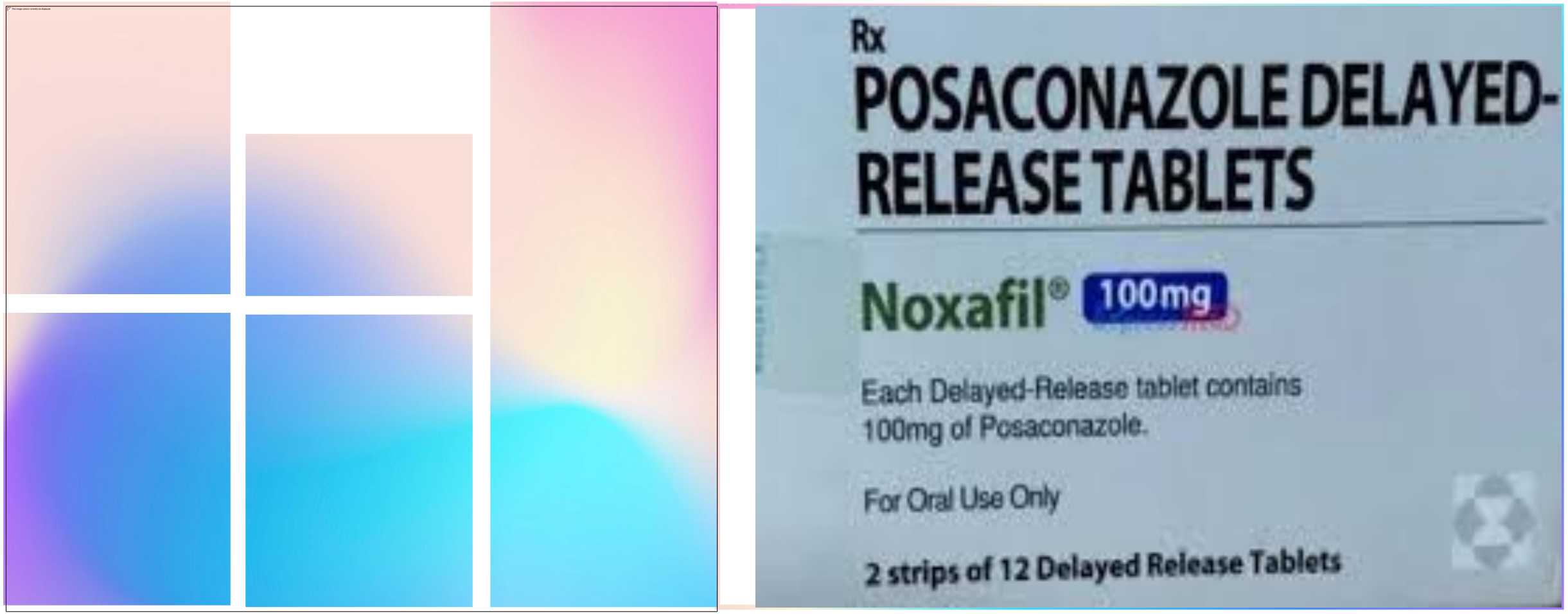
Control of underlying risk factor

Treatment

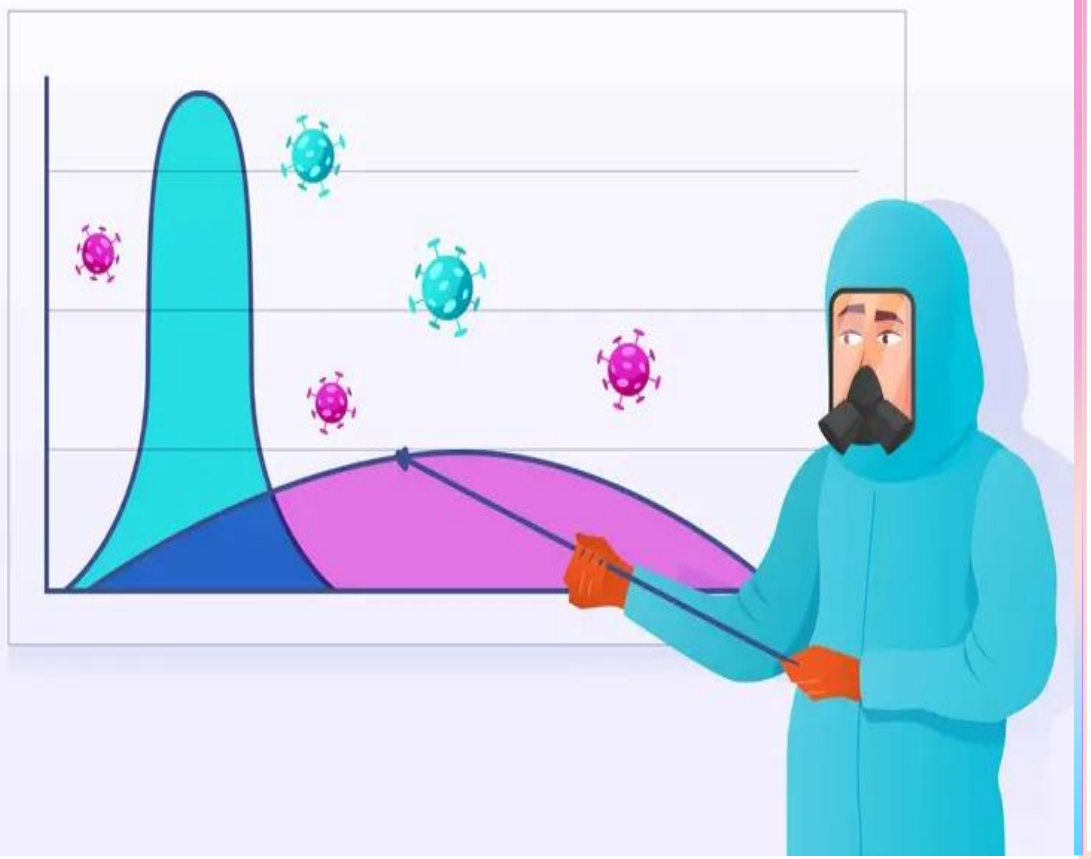
1) Liposomal **amphotericin B** is the drug of choice for first-line therapy, together with
2) correction of underlying disease
3) and surgery when feasible.

After a stable or partial response, the step-down treatment includes oral ***isavuconazole or posaconazole*** delayed release tablets until a complete response is achieved.

Treatment


Rx
POSACONAZOLE DELAYED-RELEASE TABLETS
Noxafil® 100mg
Each Delayed-Release tablet contains 100mg of Posaconazole.
For Oral Use Only
2 strips of 12 Delayed Release Tablets

Prognosis



All-cause mortality rate 54%

<u>Mortality rates depends on:</u>

1) Clinical form
2) Type of fungus
3) Severity
4) Underlying risk factors
5) Use of surgical intervention

Prognosis

Mortality rate according to Clinical form:

- Mucormycosis in AIDS --- 100% mortality
- Disseminated Mucormycosis --- 90%
- ROC Mucormycosis --- 30-85%
- **Pulmonary Mucormycosis --- 76%**
- Cutaneous Mucormycosis --- 4-10%

Prognosis

Despite these novelties, the mortality rate from PM remains higher than 50%.

Therefore, future research must define the place for combination therapy and adjunctive treatments, while the development of new treatments is necessary.


THANKS FOR YOUR ATTENTION