

Normal Bacterial Flora

Case #1: A See Change

A **68-year-old** Anglican bishop was transferred two months ago to a new diocese, which has involved his moving from Ontario to Quebec. This new posting has proved to be **extremely stressful** for him because of various contentious statements which had been made by his predecessor related to Québec separatism, gay marriage, as well as to the ordination of women as ministers within the church. As a result, the bishop has found that he has increased his **smoking** to 2 packs of cigarettes per day and has been having so much trouble sleeping he has taken to **drinking 2-4 whiskey highballs** just before bedtime.

At 3:00 A.M. last night, the bishop was awakened by a **shaking chill** and a **high fever** associated with right **pleuritic chest pain** and the production of a **rusty brown colored sputum**. He has continued to feel ill all night and has come to the Emergency Department early this morning.

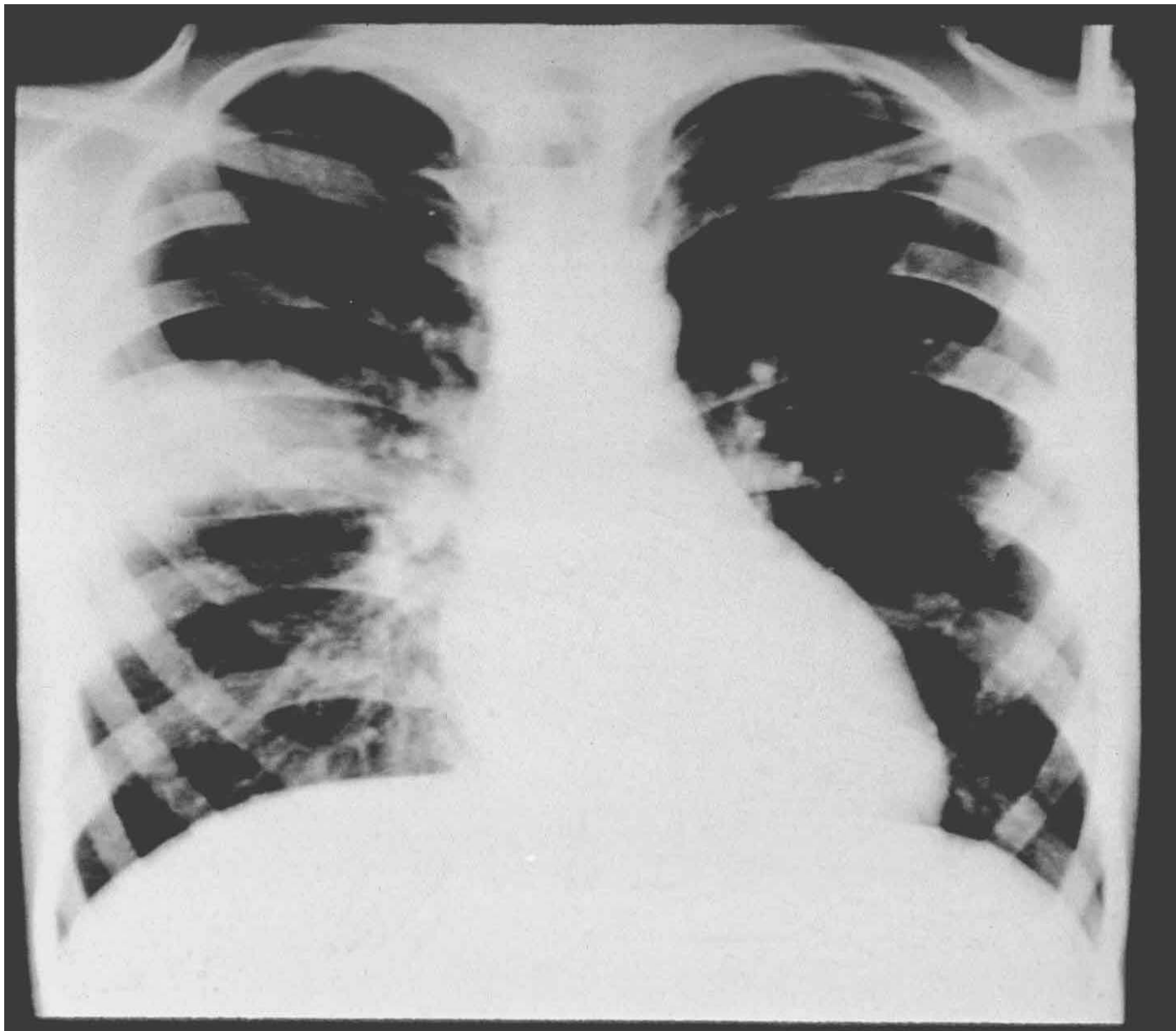


Physical examination revealed a diaphoretic elderly man in moderate distress, **T 39.4°** (orally), **BP 100/60**, **P 125/min**, **RR 36/min**, **bronchial breathing** and **coarse rales** over the right upper lobe.

Laboratory examination reveals the following:

TEST			NORMAL RANGE	
Hgb	17.8	g/dl	Male	14-18
WBC	22.4 X 10 ⁹ /l		Female	12-16
				4-10
Blood gases (Room Air):				
pH	7.42			7.36-7.46
pO2	82	mm Hg		90-112
pCO2	36	mm Hg		34-46

Chest x-ray reveals a **pneumonic infiltrate** in the right upper lobe.



The patient is initially evaluated by a 3rd year clerk.

Told by his resident to order "**pancultures**", he orders culture tests and/or gram stains from the following sites:

Anterior nares
Throat
Sputum
Skin swab from hands
Blood
Urine
Distal urethra
Stool

Which of these are appropriate sites to sample for culture in this patient? Does this patient have sepsis?
Which of these culture sites would be expected to be bacteriologically sterile in health?
From which of these culture sites would an immediate gram stain be useful?

LINK TO READING:

<http://gsbs.utmb.edu/microbook/ch006.htm>

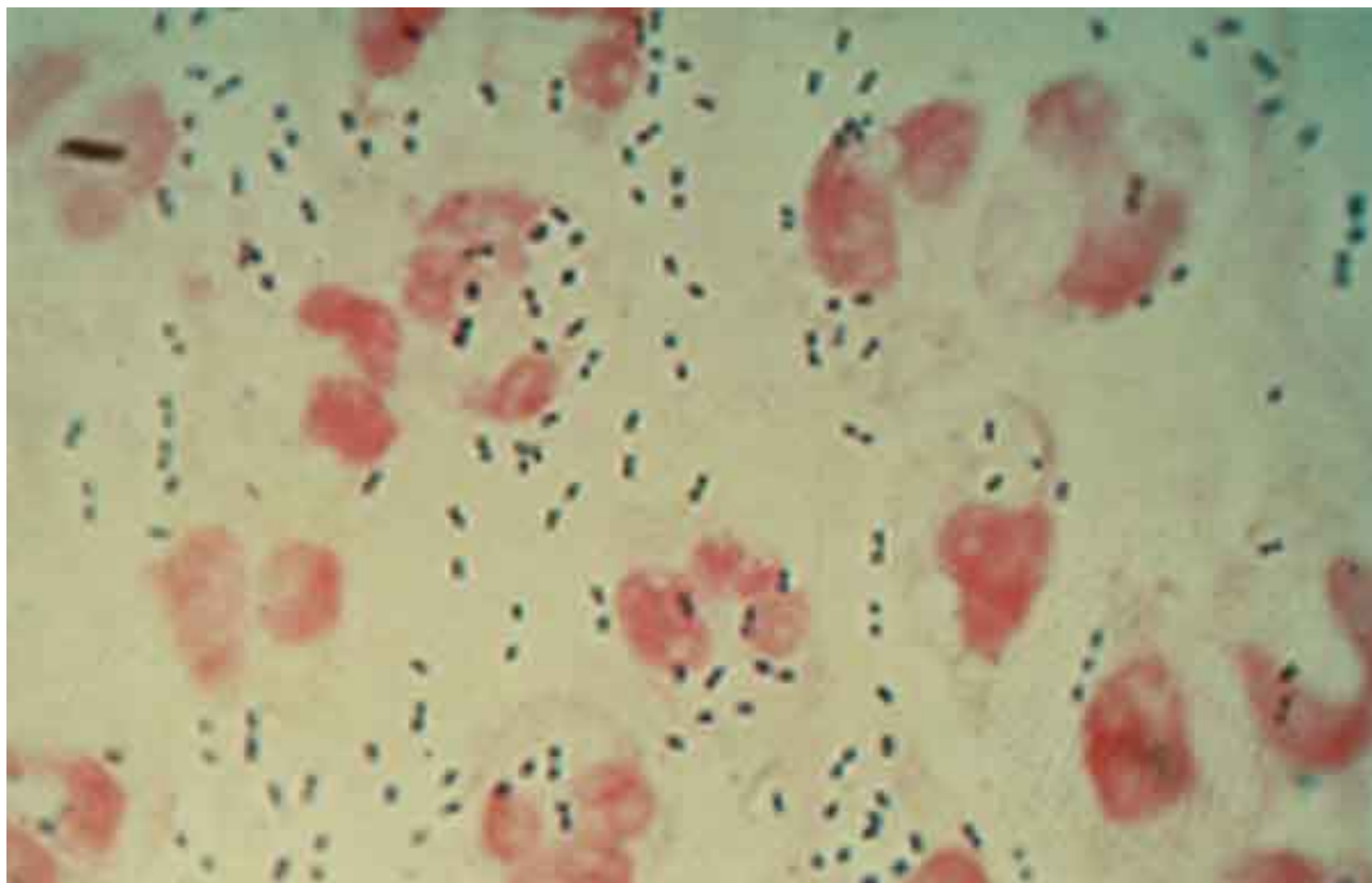
Figure 2 (below) shows the results of gram stain of the sputum sample initially taken to the microbiology laboratory by the hapless 3rd year clerk. The technician told the clerk that this specimen was contaminated and unsuitable for culture.

Why?

LINK TO READING: http://www.cbdn.ca/english/fun_with/morphology.html



After following the technician's directions, the clerk collected another sputum specimen, took it to the lab, and **Figure 3** (below) shows the gram stain of this 2nd specimen. The lab technician said: "Now you're cooking! This is a very suitable sputum specimen!"



What is the difference between these two gram stains?

What did the clerk do differently?

Does this gram stain help focus therapy? How so?

The bishop was begun on antibiotic therapy and admitted to hospital. The next day the following culture results became available:

Anterior nares	2+ coagulase-negative staphylococci
Throat	4+ Viridans streptococci 1+ Streptococcus pneumoniae 1+ Neisseria meningitides
Sputum	4+ Streptococcus pneumoniae
Skin swab from hands	4+ coagulase-negative staphylococci
Blood Set #1	
Aerobic bottle	gram-positive cocci in pairs and short chains
Anaerobic bottle	gram-positive cocci in pairs and short chains
Blood Set #2	
aerobic bottle	gram-positive cocci in groups
anaerobic bottle	no organisms seen
Urine	no growth
Distal urethra	1+ coagulase-negative staphylococci
Stool	4+ Escherichia coli

Which of these culture results are likely significant and which probably represent normal non-pathogenic flora?





At 48 hrs after admission, the bishop has become afebrile and is feeling much better. The blood culture results are as follows:

Blood	Set #1	
	aerobic bottle	<i>Streptococcus pneumonia</i>
	anaerobic bottle	<i>Streptococcus pneumonia</i>
Blood	Set #2	
	aerobic bottle	coagulase negative staphylococci
	anaerobic bottle	no growth

What is the significance of the differing results between the two sets of blood cultures?
Can coagulase negative staphylococci represent real pathogens in blood cultures?

Case #2: A dyspneic drug user

A 27-year-old man comes to hospital with a 3-week history of **progressive dyspnea** on exertion, **cough** productive of yellow sputum and poorly defined chest pain. He takes methadone on a daily basis and supplements this with frequent **intravenous injections** of amphetamine and occasional intravenous injections of **resuspended Valium tablets** or heroin. He frequently smokes crack cocaine as well as about **50 cigarettes a day** but does not drink alcohol. Despite injected drug use for 5 years, his only previous hospitalization was for drainage of an **injection site abscess** in the groin two years ago. He denies shared needles, has not regular sexual partner, and had negative tests for HIV and hepatitis B within the past 6 months.

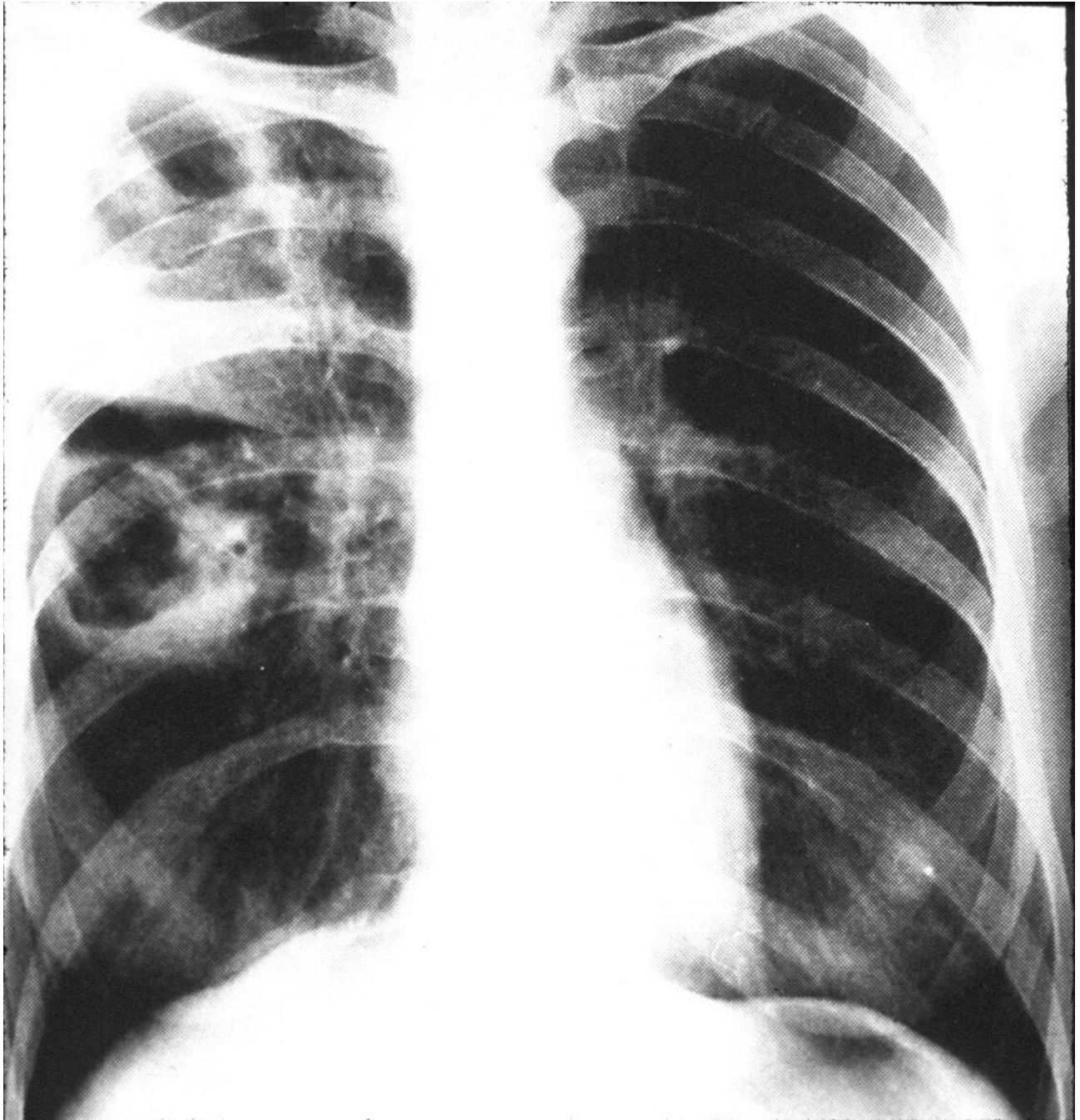
Examination reveals a pale, ill-appearing man with poor dentition. **T 39°**, P 100, BP 100/70, RR 18. He has **widespread coarse crackles** throughout both lung fields but no cardiac murmurs are audible. A number of purple nonblanching skin lesions are seen on his hands and feet



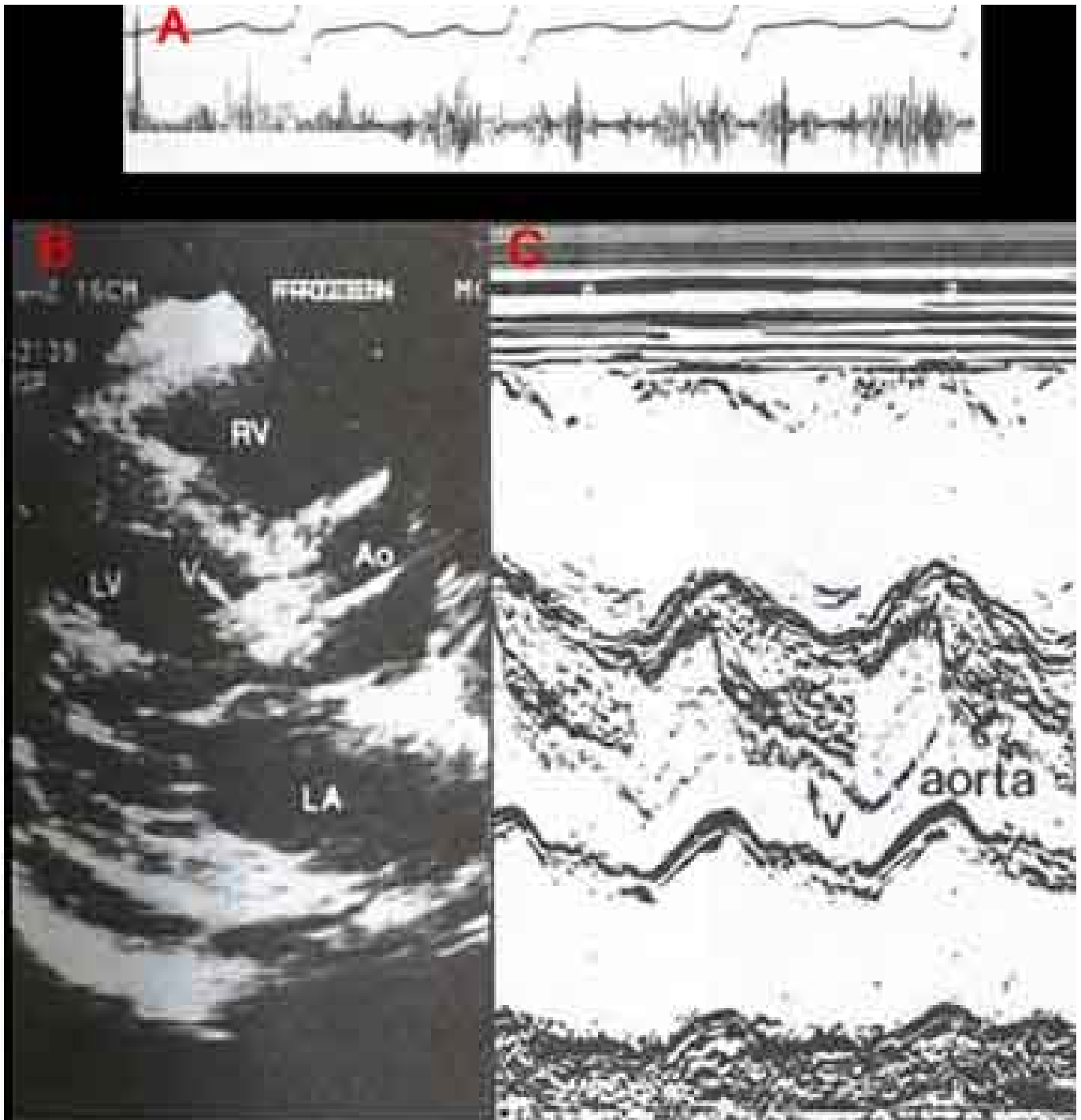
Laboratory examination reveals the following:

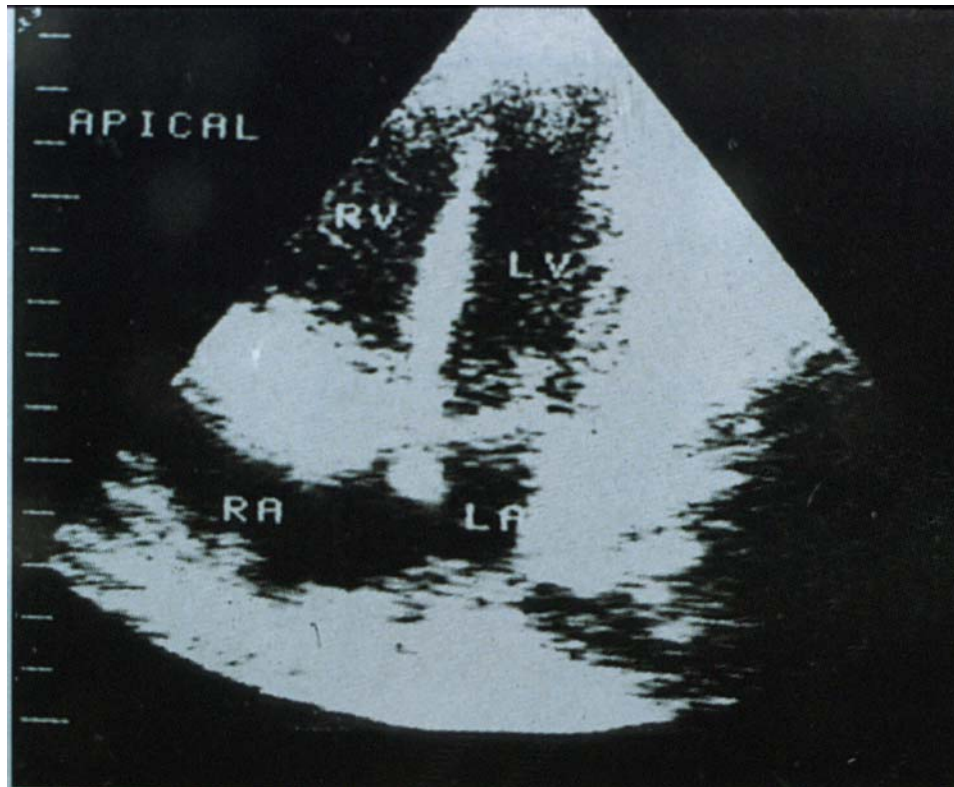
TEST			NORMAL RANGE	
Hgb	7.1	g/dl	Male	14-18
			Female	12-16
WBC	7.4	X 10 ⁹ /l		4-10

Chest x-ray shows **multiple areas of consolidation** in the left lung field containing rounded opacities with cavitation suggestive of lung abscess.



An echocardiogram reveals a **large vegetation** on the tricuspid valve. Six sets of blood cultures were taken and the patient is begun on IV antibiotics





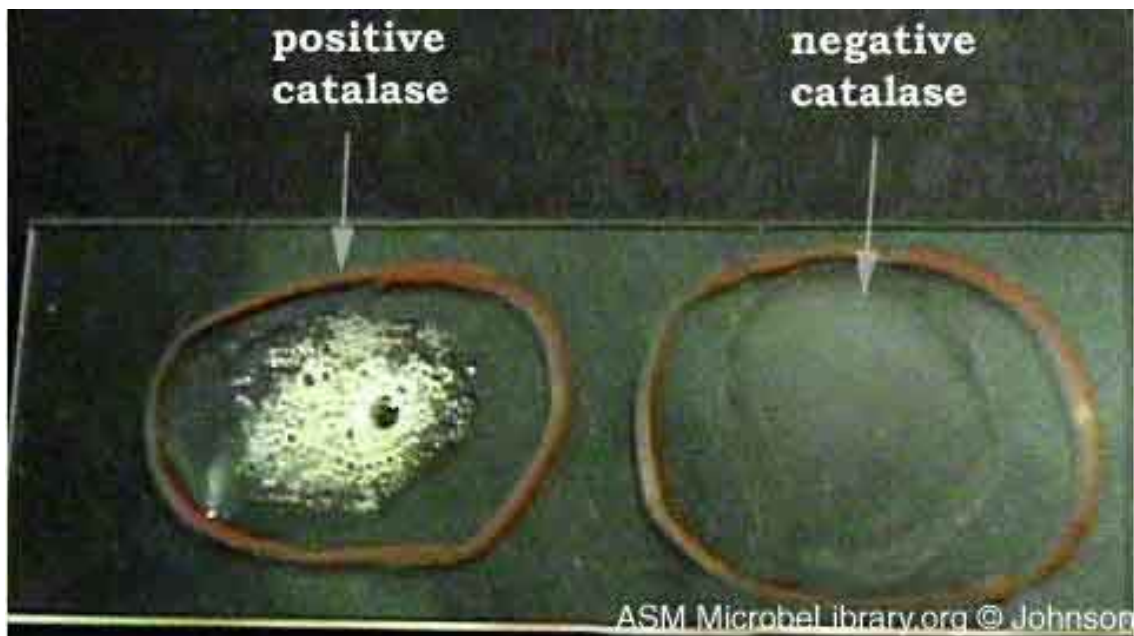
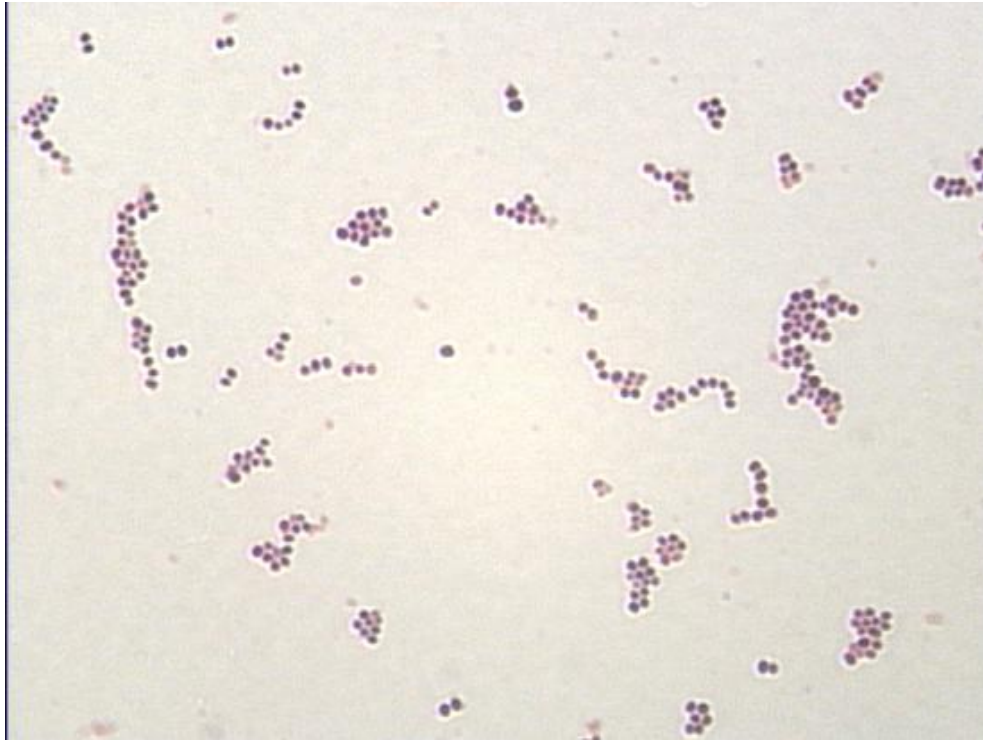
What is the diagnosis?

What is the organism in the blood cultures likely to be? Where is it likely to have come from?

What other organisms might one have expected to see in a patient who is not an intravenous drug abuser?

Is the left side of the heart likely also to be involved?

The next day gram-positive cocci in clusters were seen in all blood culture bottles.





What is the diagnosis?

What is the organism in the blood cultures likely to be? Where is it likely to have come from?

Which side(s) of the heart is likely also to be involved?

The man's fever decreased on therapy, but had not returned to normal by the seventh hospital day, when there was **radiological evidence of further embolization** to the lungs.



The patient developed **worsening right-sided heart failure** and further septic emboli but **refused surgery**.

The patient **eventually left hospital after a total of 82 days**.

Five years later he is still abusing drugs and has **cardiac cirrhosis associated with severe tricuspid incompetence**.