

In the light of the Case series published-
Nocardia infection causing non-healing surgical
wounds: A case series from Bangladesh

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Evidence Based Practice

is the idea that occupational practices ought to be based on scientific research

Criteria of for EBM or EBP

Clinical expertise/expert opinion

Evidence (external or internal)

Client/patient or/caregiver perspective

<https://www.asha.org/research/ebp>

Father of early modern medicine--Ibne Sina

Father of evidence based medicine– Archie Cochrane

Evidence-Based Practice (EBP)



“Evidence based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research.”

Sackett et al., 1996



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Nocardia infection causing non-healing surgical wounds: A case series from Bangladesh

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Highlights



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Louis Pasteur (1822-1895)-Father of Microbiology



In the field of observation, chance favours only the prepared mind.

Louis Pasteur

The Journey of Nocardia detection started in 2016 – A **Vision** from a great surgeon Late Prof. A. A. Ashraf Ali and the **Mission** taken by the Microbiology Department



- A Nocardiosis case- **Which door to knock?**

Published in 2017

ia skin and lung infection x SE Detection of Nocardia from Chro x +

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Detection of Nocardia from Chronic Skin and Lung Infections in Bangladeshi Patients

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American Journal of Infectious Diseases and Microbiology. 2017, 5(2), 80-86. DOI: 10.12691/ajidm-5-2-2
Published online: May 10, 2017

chronic skin infection discharging sinus Nocardia non healing wound
primary cutaneous nocardiosis

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Both diagnostic services and clinical practice depends on observation at the beginning



Dependency of the Laboratory Division and our expectations

Depends on

- Doctors who caters direct service to patients
- Patients who voluntarily collect and supply
- Receptionist/Phlebotomist who receives or collects sample

Our Expectations


- Proper request
- Additional request
- Correct samples
- Authentic samples so that does not fall into the “sample rejection” criteria

i.e., swab/pus/discharge
not tissue in formalin

Background

- *Nocardia* can be introduced **accidentally** or by **unhygienic** habit leading to non-healing surgical wounds. It should not be an endogenous source.
- This is enigmatic for clinicians and troublesome for patients because of **festering** infections for months or years as **culture needs >5 days or extended incubation and treatment needs >6 months antibiotic– both of which exceptional.**
- With timely diagnosis and by appropriate treatment, *Nocardiosis* can be **cured**.
- Delayed or missed diagnosis can lead to the development of **antimicrobial resistance**.

Objectives



Eliminate
diagnostic
dilemma



Disseminate to
the doctors



Treatment before
unwanted delay

Methodology

- All patients were **referred** to the Microbiology Laboratory of AWMCH and different hospitals or labs of Dhaka and other districts.
- Detailed **history** with cell **phone** noted.
- **Antibiotic withdrawn** 3-7 days before sample collection
- Samples from wounds were **collected** in the laboratory under supervision.
- *Nocardia* identification and susceptibility testing were carried out by standard procedure with a little twist or in house **adaptation** for the extended culture.

Special measures taken in diagnosing Nocardia spp.

- Referred **selective** cases
- History **suggestive**
- Antibiotic **discontinued**
- Sample taken at the **lab**
- **Multiple** sample and multiple staining, culture
- **Extended** culture with special care to prevent drying and contamination
- Call to collect report as may take **7-10** days
- **Feedback** from the patient regarding treatment and recovery through phone or app to collect pictures.

Case summary:

Mrs. X, 26 year old, normotensive, a graduate from Uttara presented with the complaints of -

- Chronic ulcer on abdominal scar for 11 months.

She stated that she had elective LUCS in 2020. After 15 days since the surgery she developed infection on wound site and was given antibiotic according to wound culture. But despite repeated courses of antibiotics for 6 months, wound was not healing. Then six months back, she was diagnosed with skin TB and sinus formation in the wound site. Sinectomy was done and was given modified CAT-1 regimen with moxifloxacin. As the wound still persists, she was referred to pulmonologist for further management.

She had a H/O incomplete abortion in 2019 due to maternal Rubella and CMV infection and had developed gestational diabetes and Covid-19 during pregnancy.

On general examination: Pulse 90/min, BP 90/60 mm of Hg, Temp – normal, SaO₂ – 97% without Oxygen, six min walk test: No desaturation, weight 65 kg, Respiratory system examination: normal

Wound: multiple non healing ulcer, irregular margin, with discharge from some lesions

Family history:	NAD
Personal history:	Nothing significant
Socioeconomic history:	middle class
Occupation:	Private employee (desk job)
Travel H/O:	NAD
Exposure H/O:	NAD
Previous illness:	Maternal Rubella, HSV-1, Rubella infection in 2019, Covid-19 in 2020, gestational diabetes
H.O allergy:	NAD
Smoking History	Non-smoker
ongoing Treatment	
Previous treatment	Extended CAT-1 regimen for 9 months, Clindamicin, flucloxacillin

736

Mob. : 01637-216322



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09/11/2021

Diagnosis

1. Post LUCS chronic discharging sinus

Investigation

1. Multiplex PCR of TB & NTM (BSMMU)
2. Culture for Nocardia from biopsy sample (Prof. Afzalunnessa, Ad Din Medical College)

Treatment

1. সব ঔষধ বন্ধ থাকবে।
2. নিয়মিত ড্রেসিং করবেন।

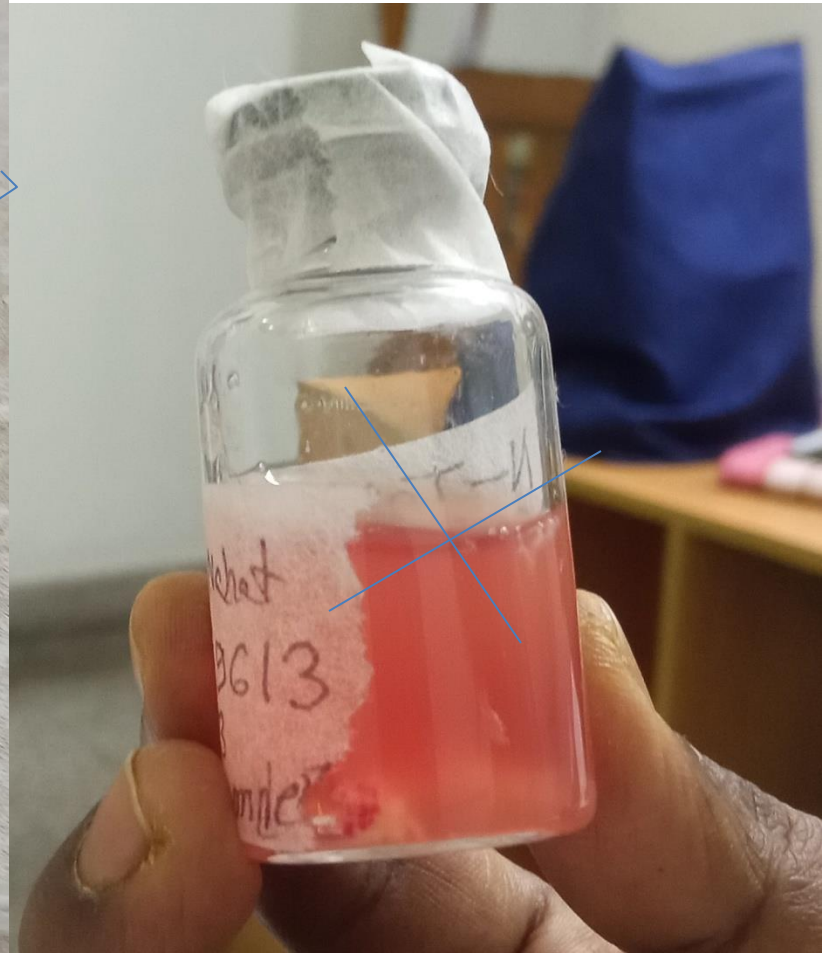
Diagnosis- based on 3 criteria

Gram stain
MZN stain
ZN stain
Culture



1. Growth positive plus
2. One Gram stain and
3. One MZN stain must have positive findings

Unavoidable-Sample rejection



Acknowledgement: Technicians, & doctors for kindly collecting samples and detailed history taking



Sample collection-points to ponder

Beware of super added infected condition



**Discontinue before collection
Antibiotic for 4 days and
Anti TB drugs for 7 days– Ref.:
Afzalunnessa et al., *American Journal of
Infectious Diseases and Microbiology*,
2017, Vol. 5, No. 2, 80-86**

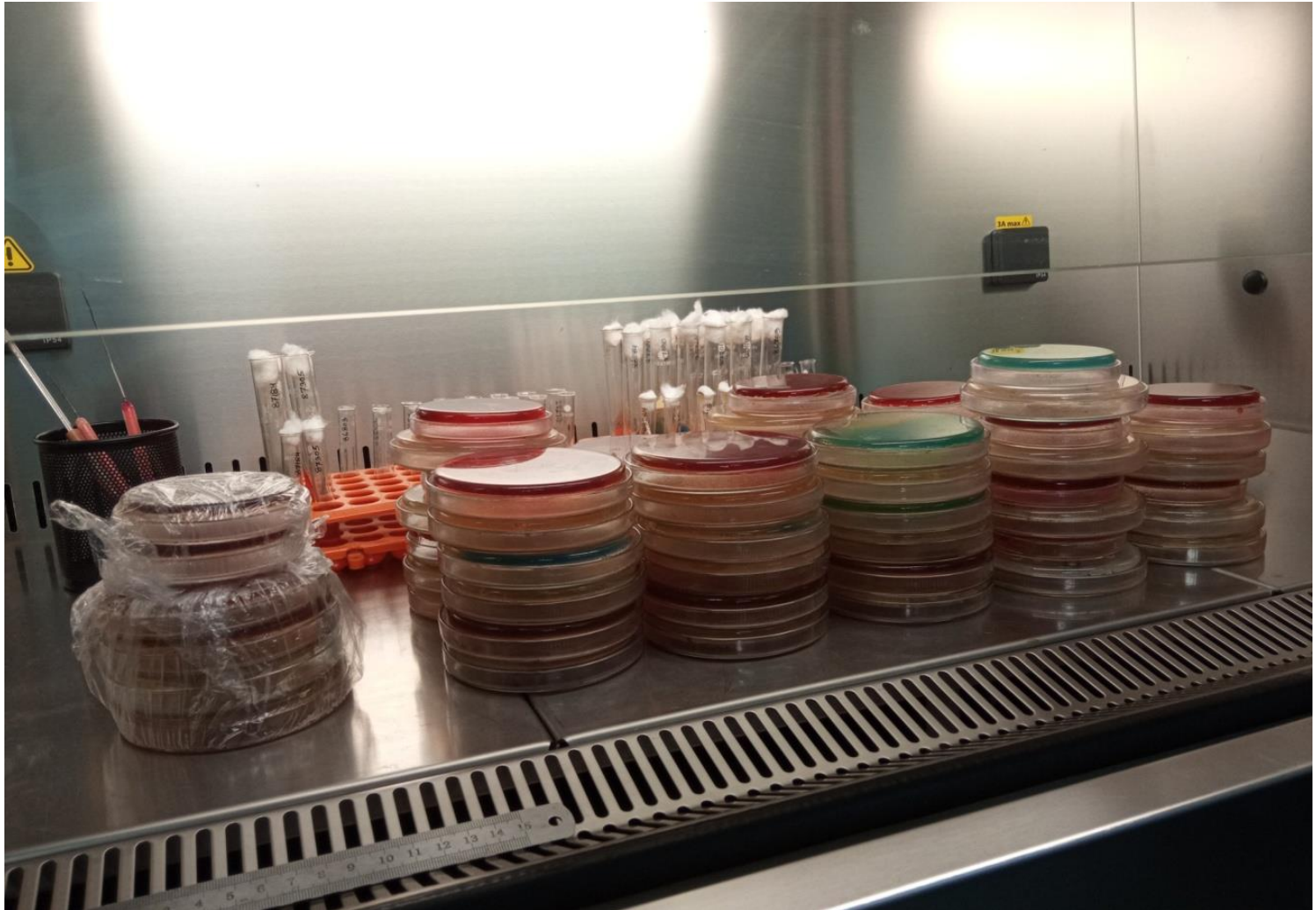


Methodology

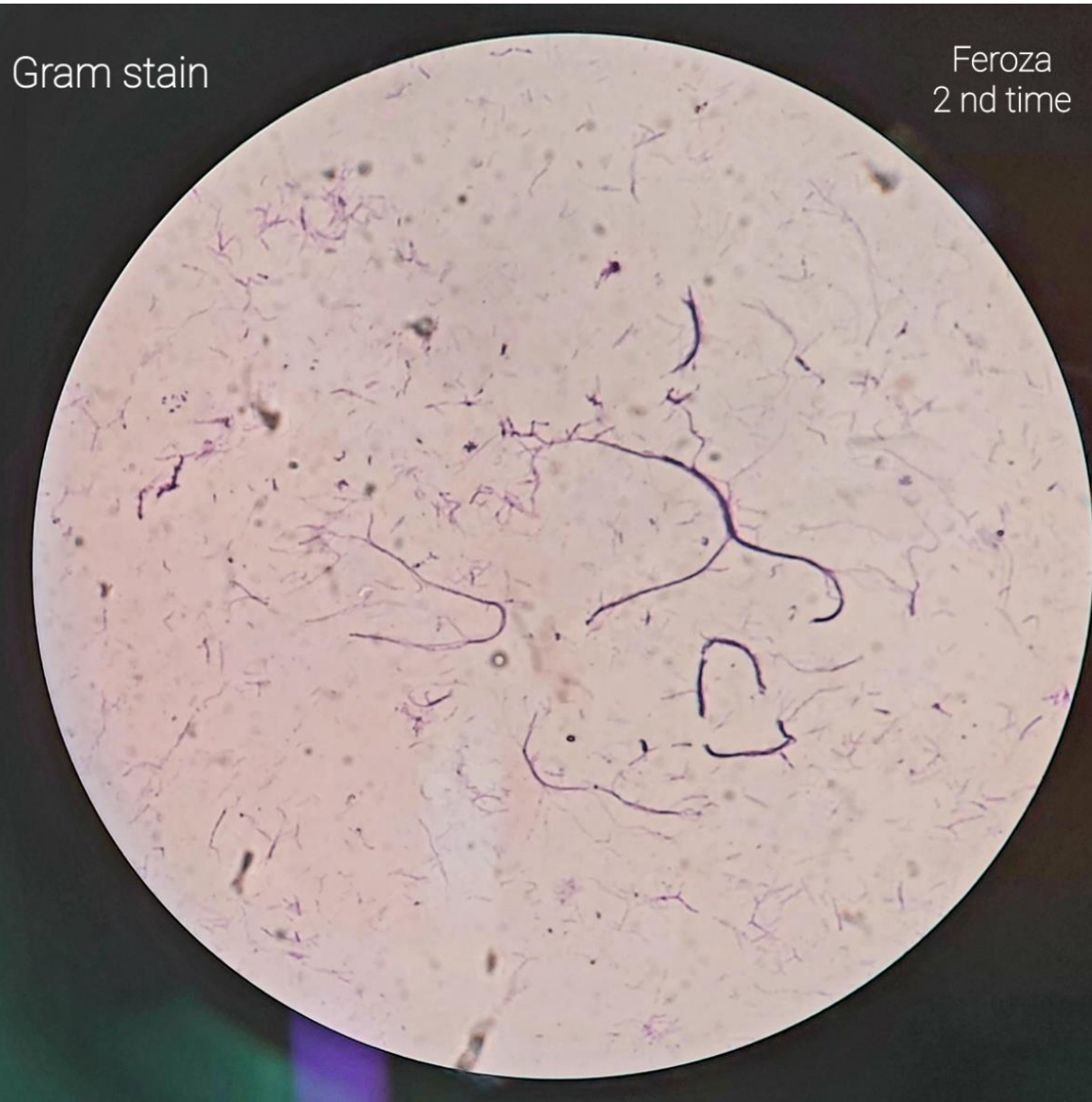
- Detailed History
- Histopathology /PCR report
- Sample
- Gram stain
- ZN stain
- MZN stain
- Culture
- Subculture
- Sensitivity
- Storage

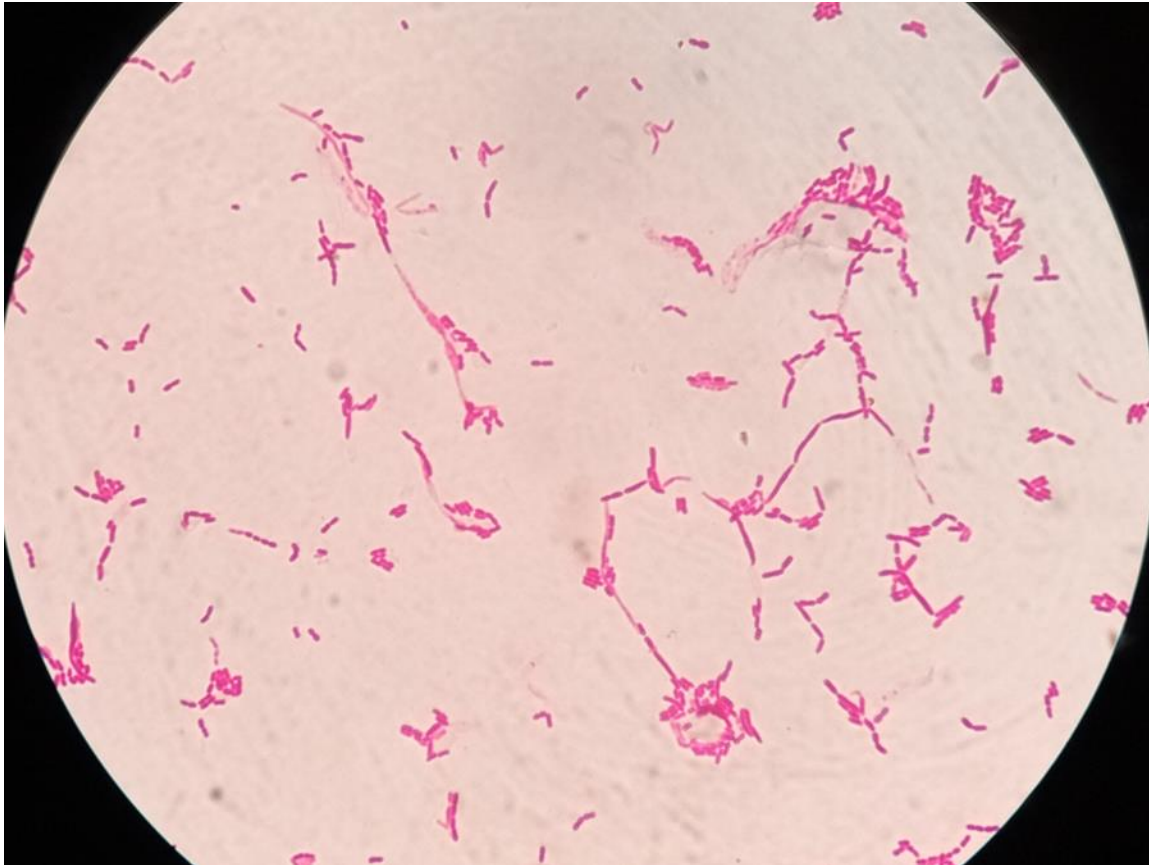


Prevent drying and contamination



Gram positive filaments in cocco-bacillary form





**Findings on MZN stain of
primary culture, like this**

Makes your day



Finding this on MZN stain



Microscopy-a tedious relentless search

- Gram staining
- Ziehl-Neelsen staining
- Modified ZN staining-3%
Sulphuric acid



Variations in growth of Nocardia



Science and Education Publishing
From Scientific Research to Knowledge

Growth of Nocardia spp. on Blood Agar plate



Ala Binte Lutfor et al. Detection of Nocardia from Chronic Skin and Lung Infections in I
Journal of Infectious Diseases and Microbiology, 2017, Vol. 5, No. 2, 80-86. doi:10.126

or(s) 2015. Published by Science and Education Publishing.

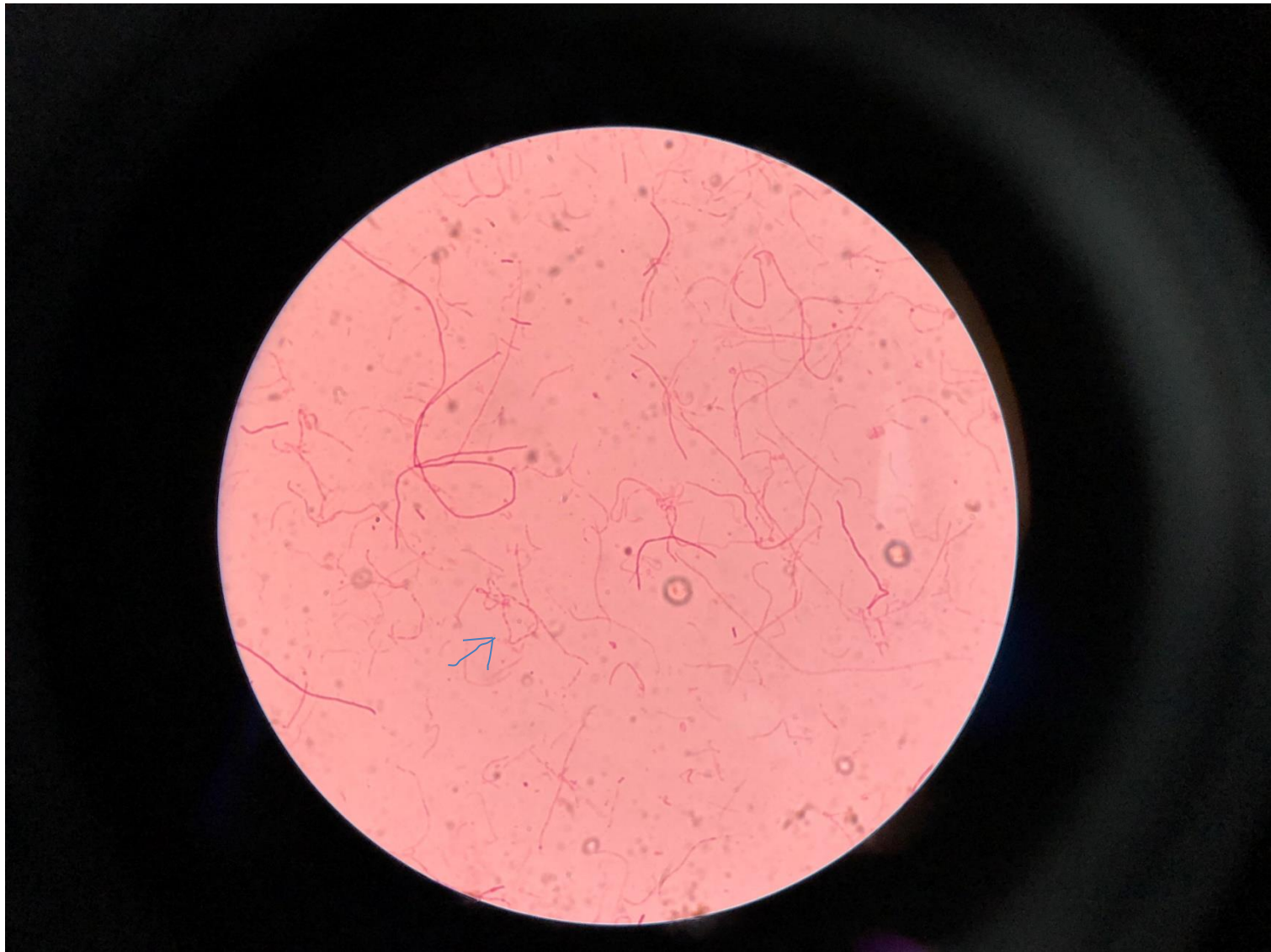
Pick up the right
colony from mixed
growth



Suspected colony grown
after 3 days incubation



Acid fast bacilli in cocco-bacillary form



Patient 11

A woman aged 56 years came with discharging as well as healed sinuses on the abdominal wall ([image8](#)). She underwent a hysterectomy and after the operation, her wound never healed. For one and a half years, she was treated with multiple antibiotics, antifungal and even anti-tubercular drugs. *Nocardia* spp. was isolated from the sinus above the stitch area and the patient was cured with co-trimoxazole taken for one year.

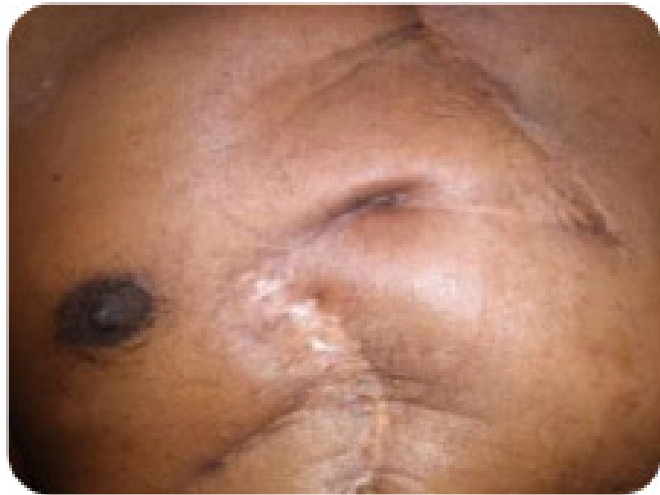


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Patient 7

A 60-year-old male presented with a few discharging sinuses following exploratory surgery on a nodule in the right infra-mammary region ([image5](#)). Culture of pus from the discharging sinus was identified as *Nocardia* spp. Doxycycline was given according to susceptibility pattern for 12 months, and the patient was cured.



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Figure 5. Few discharging sinuses which developed following exploratory surgery on a nodule in the right inframammary region of a 60-year-old businessman.

A case of RTA, taken antibiotic, antifungal, anti-TB drugs
but after diagnosis of Nocardiosis
cured with doxycycline taken for a year



Afzalunnessa et al., *International Journal of Infectious Diseases* 110 (2021) 272-278. <https://doi.org/10.1016/j.ijid.2021.07.028>





Figure 11. A 35-year-old businessman presented with a swelling in the left sub-mandibular region with multiple sinuses around the swelling.



Figure 12. Multiple discharging sinuses are visible around the appendectomy incision of a 36-year-old female.

treatment for 3 months without much improvement. *Burkholderia pseudomallei* was identified from the pus at the base of the swelling and culture from the discharging sinus near the chin found *Nocardia* spp. He was given 14 days of ceftriaxone for *Burkholderia pseudomallei* and 6 months of doxycycline for *Nocardia* spp. The patient noticed remarkable improvement after six months and is still under antimicrobial therapy.

The only immunocompromised patient- a child with X-linked agammaglobulinemia



More cases



Figure 3. A discharging sinus on the right side of neck in a 32-year-old male banker is visible along with scars of some healed sinuses.



Figure 4. Anterior abdominal wall of a 47-year-old female shows a non-healing wound above the scar of herniotomy and hernioplasty operation.



Figure 6. Lower abdominal wall of a 30-year-old female showing a discharging sinus above the horizontal incision for lower uterine caesarian section.



Figure 7. Lower abdominal wall of a 34-year-old female showing a discharging sinus above the horizontal incision for lower uterine caesarian section. Some suture material is still visible.



Development of infection after surgical procedure-a thought provoking issue for the Microbiologist-IPC team?

H/O laparoscopic surgery with port infection

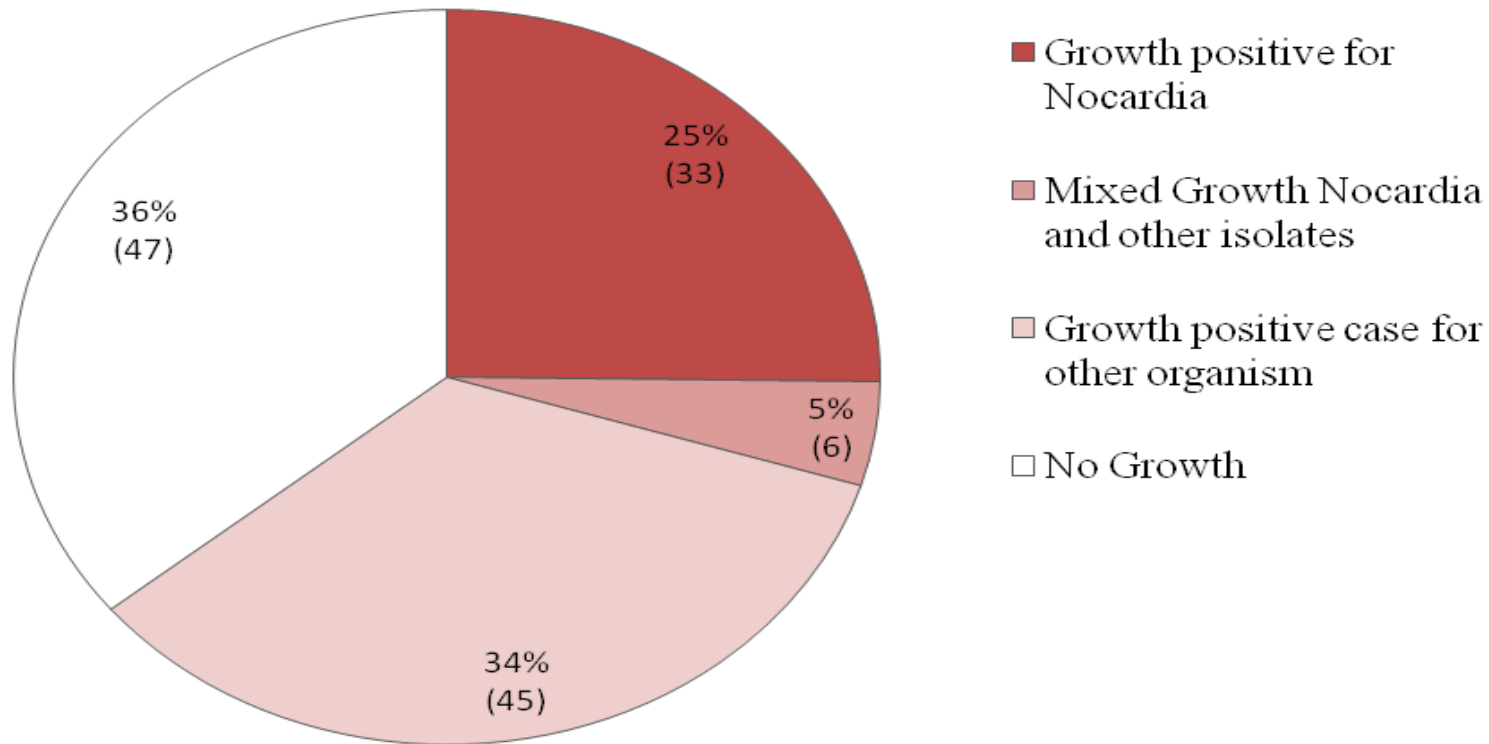


H/O surgery with emerging sinuses and healed marks around

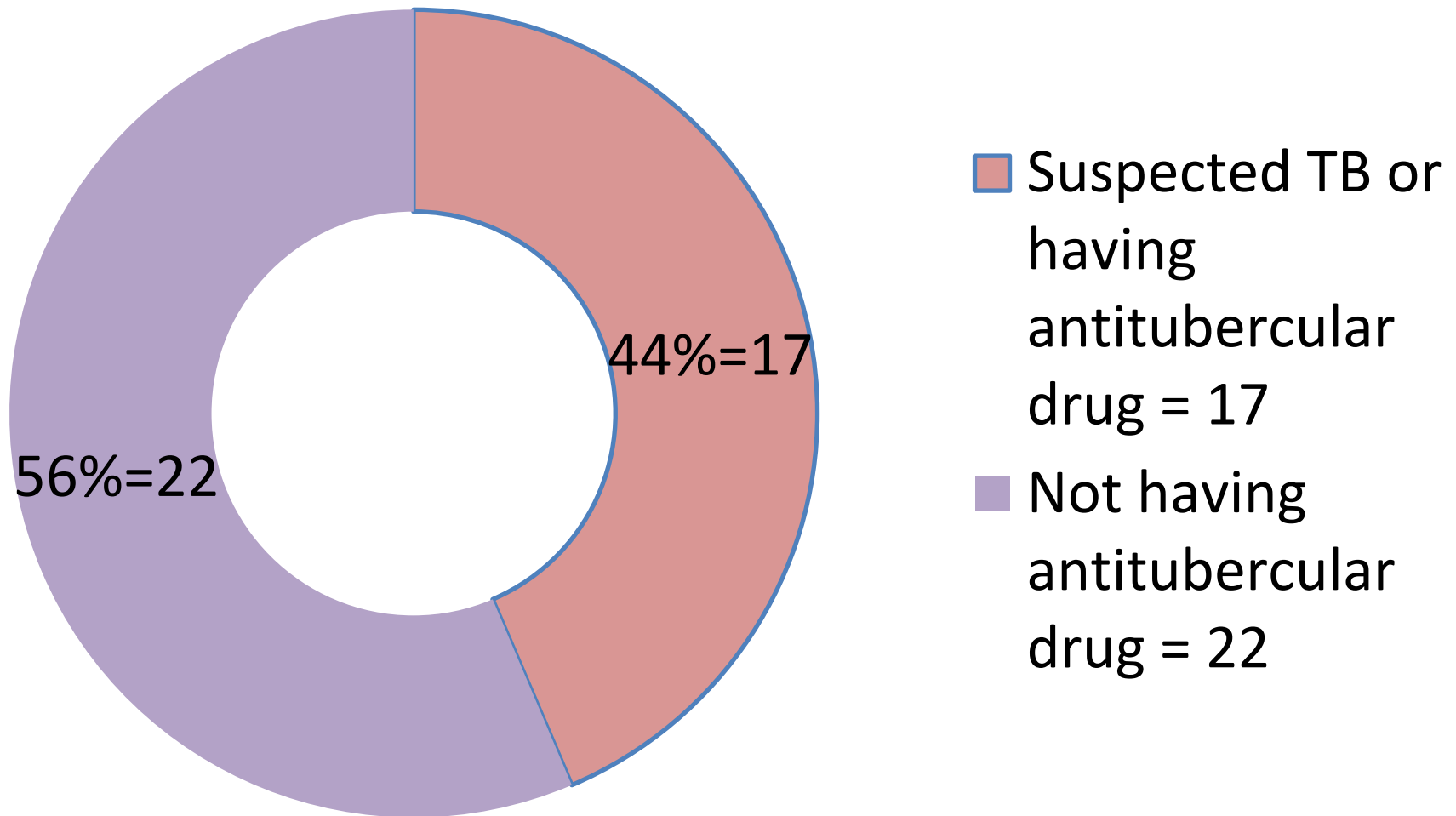


Results (2016 to 2020)

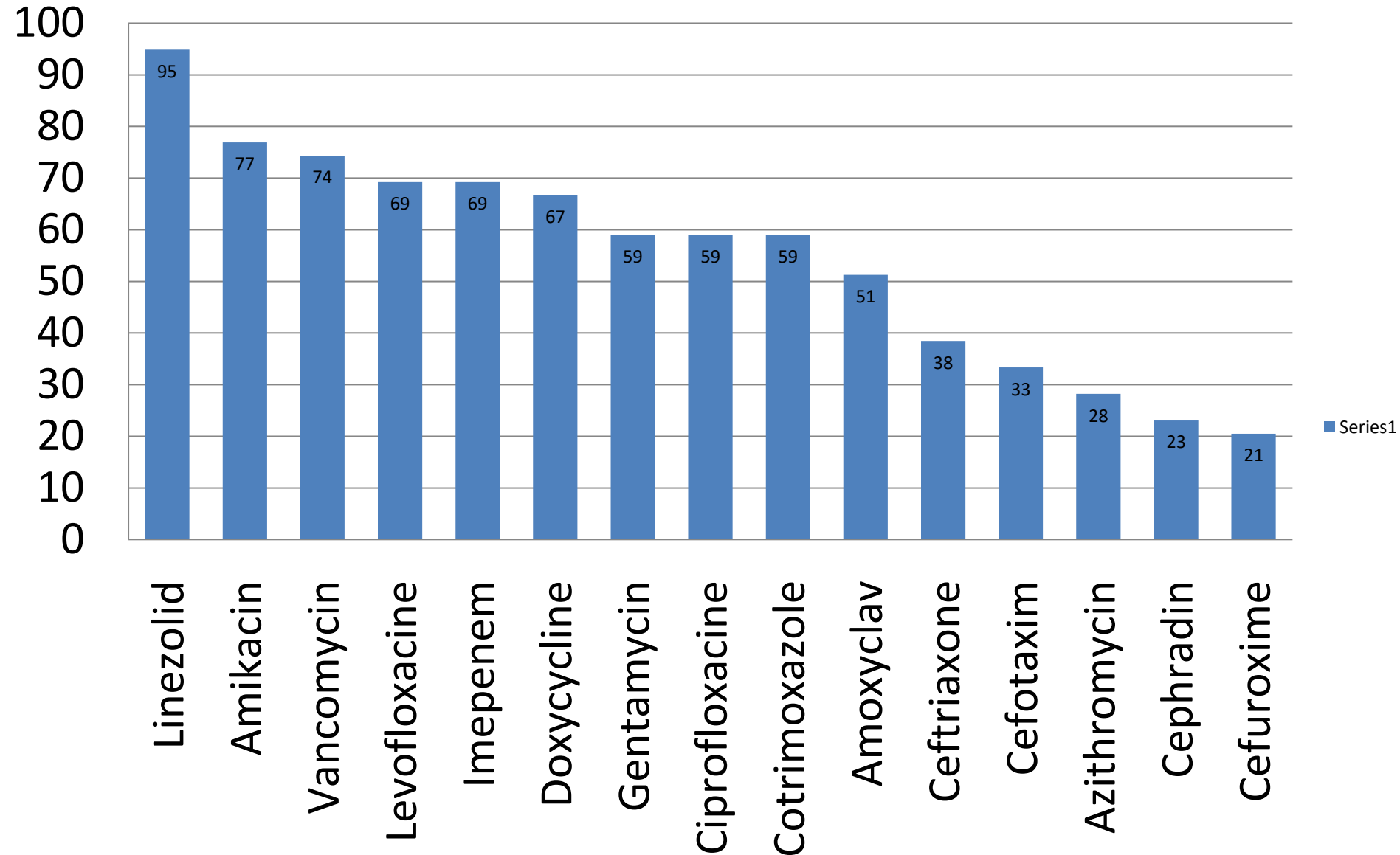
Among total referred cases (131), 39 (33+6) *Nocardia* spp.



Among total 39 Nocardiosis cases, 17 (44%) have been prescribed or taken anti-TB drugs



Sensitivity pattern of *Nocardia* Spp.



Identifying *Nocardia* spp.
-challenging but not impossible

Nothing is impossible,
the word itself says
'I'm possible'!

– *Audrey Hepburn*



Conclusions

- Non healing wounds following surgery or trauma should be explored for Nocardiosis
- Granulomatous lesion should also be ruled out for Nocardia
- Resistance to commonly used antimicrobials is on the rise

Take home message

- 1. Prevent the possible breach of sterilization protocol of laproscopic and surgical instruments.
 - a) GTA (**Guteraldehyde**) 2% for 30 mins isn't sufficient, P^H (3-4) needs to be assessed everyday (half life 20-28 days) or at least **8 hrs** soaking is needed.
 - b) OPA (**Orthophthaldehyde**) or Cidex for **30 mins**.
- 2. Use of 10% house bleach for floor/ surfaces(Na-hypochloride)
- 3. Use of autoclavable/disposable instrument.
- 4. Plasma sterilizer or Ethylene Oxide in between consecutive surgery or procedure.
- 5. Enzyme or Ultrasonic technology in device cleaning with autoclaved water.

Reported by `Umar (RA) said: I heard Messenger of Allah (peace be upon him) saying: "If you all depend on Allah with due reliance, He would certainly give you provision as He gives it to birds who go forth hungry in the morning and return with full belly at dusk". [Tirmidhi]

Sometimes, we think it is our careers that put food on our table, let us remember that all provisions come from Allah. Say Alhamdulillah

