Surgery and Microbiology

Tim Blackmore

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Wellington

General surgery and my practice

- Wound microbiology
- Surgical site infection prevention
- Wound care
- Can the sun go down on undrained pus?
- Approach to difficult inoperable collections

Wound micro

CLINICAL MICROBIOLOGY REVIEWS, Apr. 2001, p. 244–269 Vol. 14, No. 2
0893-8512/01/$04.00+0 DOI: 10.1128/CMR.14.2.244–269.2001

Wound Microbiology and Associated Approaches to Wound Management

P. G. BOWLER,[1]* B. I. DUERDEN,[2,3] AND D. G. ARMSTRONG[4,5]

- Poor clinical indications
  - Provided on form
  - Amongst team, swabs often taken by nurses at dressing changes
  - Sometimes from under VAC
- Difficult to standardise work up in lab
  - *S. aureus* and *S. pyogenes*
  - Pseudomonas and anaerobes.
  - Others
- Antibiotics vs wound care

"Consequently, to minimize the opportunity for wound infection and exclude microorganisms as a factor in delayed healing in noninfected wounds, a multidisciplinary approach to wound management, involving a continuous dialogue between laboratory and clinical staff, is vital"

DOB : **14/04/47** Sex: **Female**
Ethnicity : **NZ European**

Phone : 02041625972(M) 2992418(H)

Eligible for Publicly funded services?: Yes

Patient Opt off Laboratory Record?: No

Requester : **DR EDWARDS Andrew (13ARKY)**
Address : **Paraparaumu Medical Centre**
Paraparaumu

Priority: **Routine**
Pregnant: **No**
Fasting: **No**

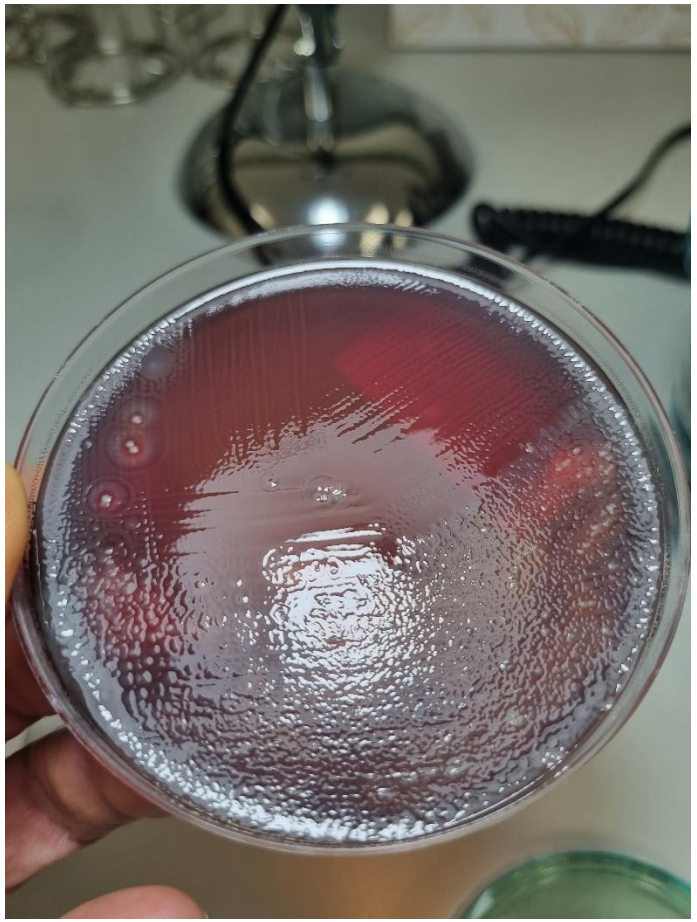
Patient Information :

Clinical details:

Testing requested:

Wound Culture

- Does the wound/ulcer have clinical signs of infection? **Yes**
- Surgical wound **Yes**
- Site sample taken from **distal end wound site R) groin**
- Current or planned antibiotic treatment: **Not given**



Priority: **Routine**

Fasting: **No**

Patient Information :

Clinical details:

Testing requested:

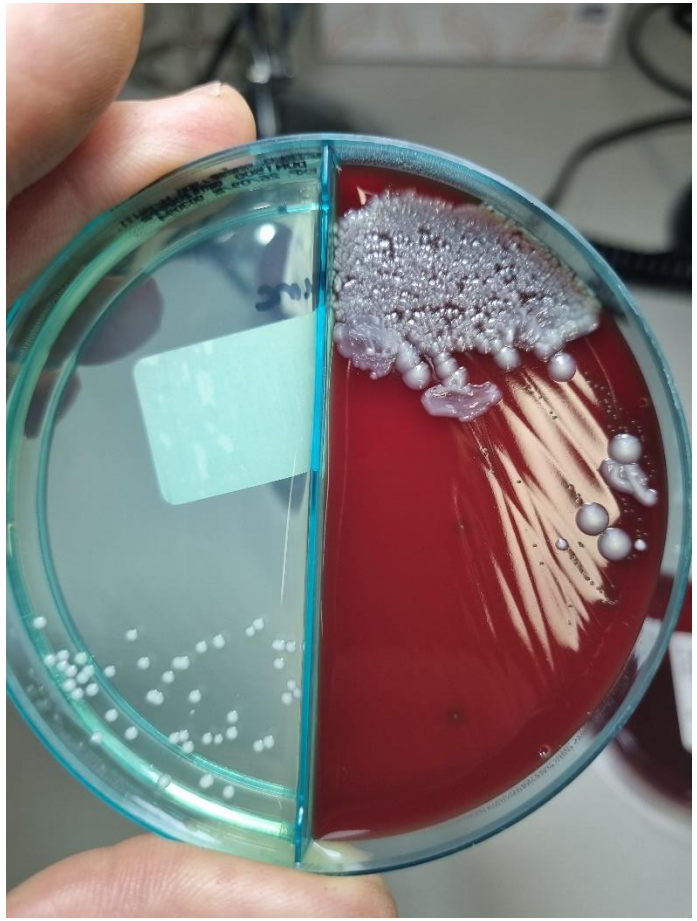
Wound Culture

- Does the wound/ulcer have clinical signs of infection? **Yes**
- Suspicion of MRSA **Yes**
- Wound contamination e.g. soil, water, foreign body (specify in clinical details) **Yes**
- Site sample taken from **left shin**
- Current or planned antibiotic treatment: **Fluclоxacillin**

Specimens to be collected (Tube, source)

Purple Swab (Bacterial Transwab), Wound

Peg tube inflamed site



The problems with reporting

- Naming an micro-organism often leads to prescribing
- The person signing off the result is often not the person seeing the wound
- Lab staff vary a lot in their assessment of “mixed flora” vs “predominant growth”

- In the end wound microbiology is not very useful
- Planning to shift to only reporting resistant bacteria
- Amoxi-clav or cephalexin and metronidazole

Infection Prevention

World J Surg (2019) 43:659–695
https://doi.org/10.1007/s00268-018-4844-y

SCIENTIFIC REVIEW

Guidelines for Perioperative Care in Elective Colorectal Surgery: Enhanced Recovery After Surgery (ERAS®) Society Recommendations: 2018

- Ongoing debate about oral antibiotics and bowel prep

Recommendation grade:

Intravenous antibiotic prophylaxis: Strong

Oral antibiotic decontamination: Weak

Chlorhexidine–alcohol-based skin preparation: Strong

Advanced measures for skin decontamination: Weak

Patients undergoing resections receiving MBP: Oral and intravenous prophylaxis: Weak

OPEN ACCESS Freely available online

PLOS | ONE

Reduction of Surgical Site Infections after Implementation of a Bundle of Care

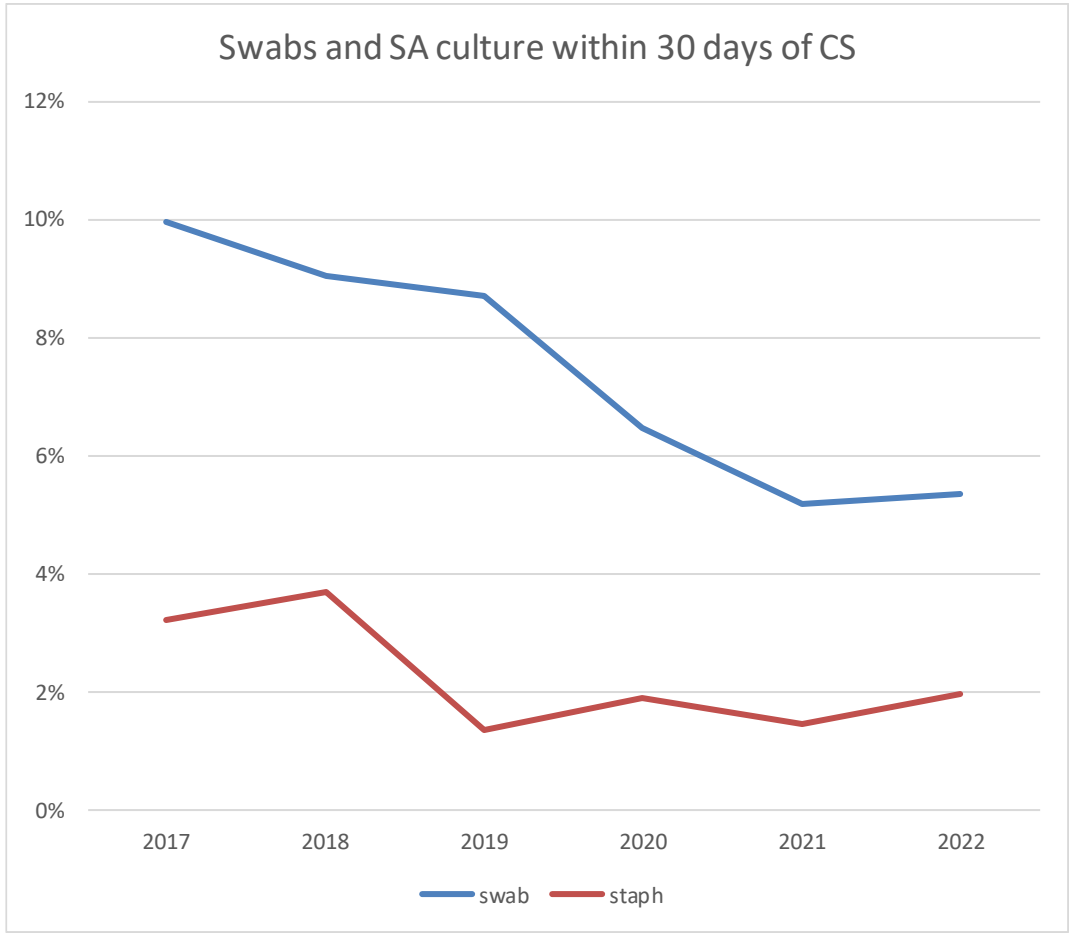
Rogier M. P. H. Crolla[1], Lijckle van der Laan[1], Eelco J. Veen[1], Yvonne Hendriks[2], Caroline van Schendel[3], Jan Kluytmans[2,4]*

1 Department of surgery, Amphia Hospital, Breda, The Netherlands, **2** Laboratory for Microbiology and Infection Control, Amphia Hospital, Breda, The Netherlands, **3** Operating Theatre, Amphia Hospital, Breda, The Netherlands, **4** Department of Medical Microbiology and Infection Control, VU University Medical Center, Amsterdam, The Netherlands

- Elements of the bundle:
  - perioperative antibiotic prophylaxis,
  - hair removal before surgery,
  - perioperative normothermia
  - discipline in the operating room
    - Measured by number of door openings
      - reducing changes of the team for coffee breaks,
      - making sure all equipment was present before the surgical procedure started
      - not entering the operating room for social talks during the surgical procedure

Preventing CS wound infections

- Collection of swab surrogate for superficial infection
- Growth of *S. aureus* associated with infection
- Attention to wound closure
- Low clipping
- Dry skin when dressing applied
- Attention paid to dressing application
- Leave dressing undisturbed for as long as possible



Can the sun be allowed to set on undrained pus?

Multicentre study of non-surgical management of diverticulitis with abscess formation

D. P. V. Lambrichts[1,4], H. E. Bolkenstein[6], D. C. H. E. van der Does[1], D. Dieleman[1],
R. M. P. H. Crolla[7], J. W. T. Dekker[8], P. van Duijvendijk[9], M. F. Gerhards[5], S. W. Nienhuijs[10]
A
V

BJS 2019; **106**: 458–466

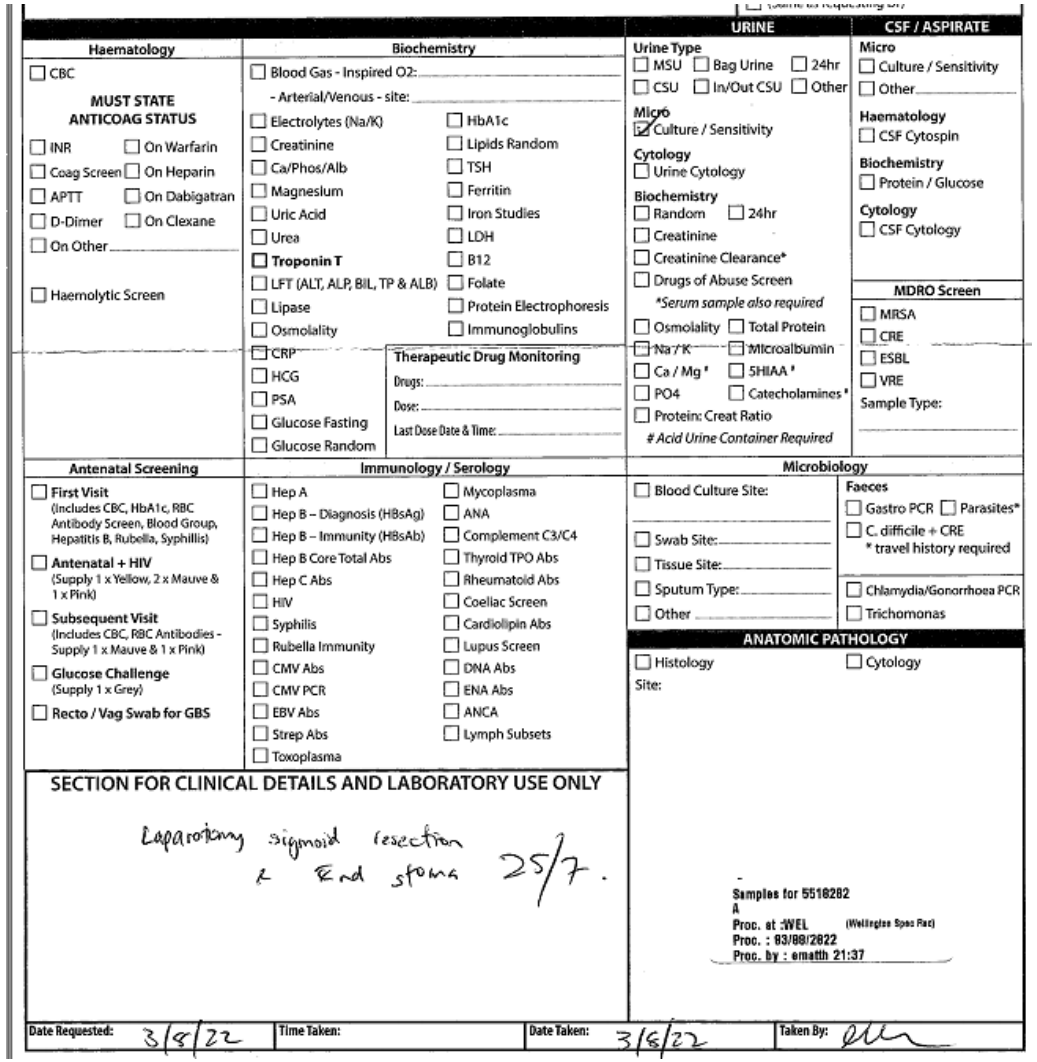
	Total cohort (*n* = 447)				Hinchey Ib (*n* = 215)			Hinchey II* (*n* = 232)		
	Total (*n* = 447)	No PCD (*n* = 332)	PCD (*n* = 115)	*P*‡	No PCD (*n* = 197)	PCD (*n* = 18)	*P*	No PCD (*n* = 135)	PCD (*n* = 97)	*P*‡
Short-term outcomes										
Treatment failure	120 (26·8)	79 (23·8)	41 (35·7)	0·013	44 (22·3)	6 (33)	0·359§	35 (25·9)	35 (36)	0·149
Complications†	25 (5·6)	13 (3·9)	12 (10·4)	0·009	8 (4·2)	0 (0)	0·908§	5 (3·7)	12 (12)	0·032§
Clinical deterioration/ disease progression	95 (21·3)	59 (17·8)	36 (31·3)	0·002	30 (15·2)	6 (33)	0·091§	29 (21·5)	30 (31)	0·147
Readmission	71 (15·9)	49 (14·8)	22 (19·1)	0·253	27 (13·7)	5 (28)	0·178§	22 (16·3)	17 (18)	0·714
Persistent diverticulitis	63 (14·1)	42 (12·7)	21 (18·3)	0·130	23 (11·7)	5 (28)	0·100§	19 (14·1)	16 (16)	0·583
Emergency surgery (sigmoid resection)	40 (8·9)	24 (7·2)	16 (13·9)	0·030	10 (5·1)	1 (6)	0·693§	14 (10·4)	15 (15)	0·117
Death	5 (1·1)	3 (0·9)	2 (1·7)	0·607§	3 (1·5)	0 (0)	1·000§	0 (0)	2 (2)	0·332§
Long-term outcomes										
Complications†	74 (16·6)	46 (13·9)	28 (24·3)	0·009§	25 (12·7)	7 (39)	0·016§	21 (15·6)	21 (22)	0·245
Overall recurrence	122 (27·3)	93 (28·0)	29 (25·2)	0·474¶	54 (27·4)	7 (39)	0·623¶	39 (28·9)	22 (23)	0·349¶
Sigmoid resection	124 (27·7)	87 (26·2)	37 (32·2)	0·07¶	57 (28·9)	6 (33)	0·474¶	30 (22·2)	31 (32)	0·046¶
Death	28 (6·3)	16 (4·8)	12 (10·4)	0·048¶	8 (4·1)	2 (11)	0·263¶	8 (5·9)	10 (10)	0·270¶

46 yr Maori man

Extensive tophaceous gout
Long term prednisone
Perforated sigmoid colon July
Resected with colostomy and pelvic drain
Pelvic collection

25 July

15 Aug



Haematology
- ☐ CBC
- MUST STATE ANTICOAG STATUS
- ☐ INR ☐ On Warfarin
- ☐ Coag Screen ☐ On Heparin
- ☐ APTT ☐ On Dabigatran
- ☐ D-Dimer ☐ On Clexane
- ☐ On Other
- ☐ Haemolytic Screen

Biochemistry
- ☐ Blood Gas - Inspired O2:
- - Arterial/Venous - site:
- ☐ Electrolytes (Na/K)
- ☐ Creatinine
- ☐ Ca/Phos/Alb
- ☐ Magnesium
- ☐ Uric Acid
- ☐ Urea
- ☐ **Troponin T**
- ☐ LFT (ALT, ALP, BIL, TP & ALB)
- ☐ Lipase
- ☐ Osmolality
- ☐ HbA1c
- ☐ Lipids Random
- ☐ TSH
- ☐ Ferritin
- ☐ Iron Studies
- ☐ LDH
- ☐ B12
- ☐ Folate
- ☐ Protein Electrophoresis
- ☐ Immunoglobulins
- ☐ CRP
- ☐ HCG
- ☐ PSA
- ☐ Glucose Fasting
- ☐ Glucose Random

Therapeutic Drug Monitoring
- Drugs:
- Dose:
- Last Dose Date & Time:

URINE

Urine Type
- ☐ MSU ☐ Bag Urine ☐ 24hr
- ☐ CSU ☐ In/Out CSU ☐ Other

Micro
- ☑ Culture / Sensitivity

Cytology
- ☐ Urine Cytology

Biochemistry
- ☐ Random ☐ 24hr
- ☐ Creatinine
- ☐ Creatinine Clearance*
- ☐ Drugs of Abuse Screen
- *Serum sample also required
- ☐ Osmolality ☐ Total Protein
- ☐ Na / K ☐ Microalbumin
- ☐ Ca / Mg # ☐ 5HIAA #
- ☐ PO4 ☐ Catecholamines #
- ☐ Protein: Creat Ratio
- # Acid Urine Container Required

CSF / ASPIRATE

Micro
- ☐ Culture / Sensitivity
- ☐ Other

Haematology
- ☐ CSF Cytospin

Biochemistry
- ☐ Protein / Glucose

Cytology
- ☐ CSF Cytology

MDRO Screen
- ☐ MRSA
- ☐ CRE
- ☐ ESBL
- ☐ VRE
- Sample Type:

Antenatal Screening
- ☐ **First Visit** (Includes CBC, HbA1c, RBC Antibody Screen, Blood Group, Hepatitis B, Rubella, Syphillis)
- ☐ **Antenatal + HIV** (Supply 1 x Yellow, 2 x Mauve & 1 x Pink)
- ☐ **Subsequent Visit** (Includes CBC, RBC Antibodies - Supply 1 x Mauve & 1 x Pink)
- ☐ **Glucose Challenge** (Supply 1 x Grey)
- ☐ **Recto / Vag Swab for GBS**

Immunology / Serology
- ☐ Hep A
- ☐ Hep B – Diagnosis (HBsAg)
- ☐ Hep B – Immunity (HBsAb)
- ☐ Hep B Core Total Abs
- ☐ Hep C Abs
- ☐ HIV
- ☐ Syphilis
- ☐ Rubella Immunity
- ☐ CMV Abs
- ☐ CMV PCR
- ☐ EBV Abs
- ☐ Strep Abs
- ☐ Toxoplasma
- ☐ Mycoplasma
- ☐ ANA
- ☐ Complement C3/C4
- ☐ Thyroid TPO Abs
- ☐ Rheumatoid Abs
- ☐ Coeliac Screen
- ☐ Cardiolipin Abs
- ☐ Lupus Screen
- ☐ DNA Abs
- ☐ ENA Abs
- ☐ ANCA
- ☐ Lymph Subsets

Microbiology
- ☐ Blood Culture Site:
- ☐ Swab Site:
- ☐ Tissue Site:
- ☐ Sputum Type:
- ☐ Other

Faeces
- ☐ Gastro PCR ☐ Parasites*
- ☐ C. difficile + CRE
- * travel history required
- ☐ Chlamydia/Gonorrhoea PCR
- ☐ Trichomonas

ANATOMIC PATHOLOGY
- ☐ Histology ☐ Cytology
- Site:

SECTION FOR CLINICAL DETAILS AND LABORATORY USE ONLY

Laparotomy sigmoid resection & End stoma 25/7.

Samples for 5518282
A
Proc. at :WEL (Wellington Spec Rec)
Proc. : 03/08/2022
Proc. by : emaith 21:37

Date Requested: 3/8/22	Time Taken:	Date Taken: 3/8/22	Taken By:

Results

Aspirates

ASPIRATES

SITE
ASPIRATE : LAPAROTOMY SIGMOID RESECTION & END STOMA

GRAM STAIN
Large numbers of leucocytes seen.
Mixed flora: no predominant morphotype

CULTURE
Heavy growth of mixed skin and enteric flora

Validated by WGM, MLSci

MDRO screens on faeces negative

- Treated with ceftriaxone and metronidazole initially
- Stepped down to oral amoxicillin-clavulanate

Cascade of antibiotic choices

- Flucloxacillin or cephazolin superficial infection
  - Beware MRSA in Pasifika, Maori, some Asian populations
- Ceftriaxone +metronidazole or amoxy-clav mixed or deep infections
  - Boost AC with amoxicillin unless < 70kg
  - Beware ESBL, particularly in Asian populations
  - ampC producers eg Serratia, Enterobacter, Kleb aerogenes
- Step up to Meropenem
- Pip-tazo only for niche infections now

Antibiotic gaps/drivers

- Ceftriaxone
  - Some anaerobes, MRSA, enterococcus, pseudomonas, ampC producers, candida
- Ceftazidime
  - Same as ceftriaxone, but covers pseudomonas
- Meropenem
  - MRSA, enterococcus, candida

My approach to complicated intra abdominal infections

- Screen for MDRO/review old microbiology particularly if frequent hospital attender
- Keep narrow for as long as possible
- Long acting antibiotics to minimise nursing and patient disruption
- Step up and down with one change at a time
    - Amoxi-clav or ceftriaxone and metronidazole
        - Cefepime
            - Meropenem
                - Either add amoxicillin or fluconazole

My approach continued

- Very rare for inpatients to become septic so usually safe to stop antibiotics but often need to restart
- Decide on marker of infection for that patient
  - CRP
  - Fever
  - General wellbeing
- Check imaging/drainage before assuming antibiotic failure
- Beware C. diff
- Work with surgeon and patient to own antibiotic choices and share the fear