

# Saving Life and Limbs with Amputations

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# It's a matter of life and limb

- Numerous studies related to mortality and loss of limb
- Increase strain and stress on a body that is not operating at full capacity
- Studies related loss of one limb and then the contra-lateral limb in a short period of time

# Triage of Patients with Ulcers on Feet

- Unstable CAD or CHF
- Decompensated COPD
- Uncontrolled DM (BS > 300, HbA1C ≥ 9)
- Patient on insulin pump
- Hemodynamic instability
- Patients requiring *sepsis workup*
- Patients with *mental status* changes
- Patients with active HemOnc diagnosis
- Patients in active alcohol or opioid withdrawal
- Dialysis Patients

# Co-Morbidities

- Renal Disease
- Cardiovascular Conditions
- PVD
- Immuno-Comprimised
- Non-complainece?
- Labs

# Amputation Levels

- Can not classify all amputations
- Have to look at the level of infection or ulcer
- Post-op function of the foot and leg should be taken into consideration
- Key is to **PREVENT** future amputations

# Surgical Technique

- Pre-operative planning ( incisions, drains, dressings, and packing)
- Infected cases- DPC, Pulse Lavage, Versa Jet
- Carefully handling of soft tissue (Skin)
- Hemostasis important
- Don't burn bone
- Remove as much tendon as possible (Important in infection)

# Post Operative Considerations

- Large space or significant amount of bleeding? Use a drain
- Do not put excessive tension on the skin when closing (Be aggressive on bone resection)
- PVD patients, do not use excessive compression
- Medical considerations (check labs)

# Some Things to Ponder

- No research has been done on distal amputations leading to more proximal amputations
- Risk of another surgery
- Activities of Daily living delayed
- Should we be more aggressive

# Amputations at Louis Stokes from 2002-2007

- 284 patients, with a dx. of diabetes or pvd
- 244 patients underwent either a digital amputation and/or ray resection
- 45 patients had subsequent TMA/Lisfrancs  
18%
- 34 patients had midfoot or more proximal  
14%

# More Interesting Facts

- 39 patients underwent TMA/Lisfranc 16 patients then underwent a more proximal amputation 41%

# Look at the Causes

- PVD, not worked up properly before surgery
- Not aggressive enough initially with the infections
- Wound dehiscence?

# On To The Show

- Gas Gangrene
- Poorly Controlled Diabetics
- Significant co-morbidities

# Case #1 Mr. W - Day 1 - 10/20/07



# Case #1 Mr. W - Day 1 - 10/20/07

## Podiatry consulted to ED

- 50 y/o male never before seen at this facility with Hx of DM, HTN, HIV (CD4 244, 09/06) with c/o 1 mo. Hx of right foot/ankle pain, swelling and drainage
- Admits to pain in foot, chills, sweats, x 4-5 days, 15 lb. wgt loss; denies n, v, sob
- Has been wrapping foot in plastic bag to contain drainage
- Reports ulcer on foot x 4-5 mo. treated with topical meds and oral antibiotic at various times.
- Began on hallux - closed intermittently, present problem began 2 weeks ago

# Case #1 Mr. W - Day 1 - 10/20/07

## Examination

- Vital Signs: T 96.8, R 16, P 100, BP 149/76
- Thrush, membranes dry otherwise normal exam
- Extr: Palpable pedal pulses, hallux /2<sup>nd</sup> digit necrotic with pus filled bulla on dorsum of foot with friable tissue surrounding, malodorous, foot and ankle edematous, erythematous extending to lower leg

# Case #1 Mr. W - Day 1 - 10/20/07

## Laboratory Evaluation

● WBC	20.73	● Neutrophil %	89.3
● RBC	3.82	● Lymphs %	19.9
● Hb	9.2	● Monocytes%	13.8
● Hct	29.2	● Eosinophil%	2.6
● PLT	346	● Basophil%	1.5
		● IMM Granulo	0.3%

# Case #1 Mr. W - Day 1 - 10/20/07

## Laboratory Evaluation

● <b>Glucose</b>	373	● Protein	8.0
● Na	129	● SGOT	26
● Cl	94	● SGPT	23
● HCO <sub>3</sub>	27.0	● T. Bili	0.6
● <b>Cr</b>	2.2*	● Ca	7.9
● <b>BUN</b>	101	● INR	1.11
● K	4.6	● PTT	28.2
● <b>Albumin</b>	1.8	● <b>CRP</b>	18.0
● Alk. Phos.	95	● <b>Nares/MRSA PCR +</b>	
● D. Bili	0.1	● <b>Blood cultures pending</b>	

(baseline 1.5, 08/07)

# Initial Presentation



# Initial X-rays

Soft tissue emphysema



Now lets plan the incision

# Case #1 Mr. W - Day 1 - 10/20/07

## Laboratory Evaluation

- Wound Gram Stain:
  - Many Gram neg. rods
  - Many Gram pos. cocci in clusters and chains
  - Culture and Sensitivities pending

# Case #1 Mr. W – Day 2 – 10/21/07

- **One day post admission**

- Vitals: T 98.6, P 90, R 20, BP 120/69
- WBC: 13.72
- Cr: 1.8
- BUN: 69
- Hb: 7.7
- Hct 24.3
- Membranes moist
- Viral load pending
- Ordered iron studies/stool hemoccult – GI consult if pos.
- Ordered transfusion of PRBC's
- Nutrition consult

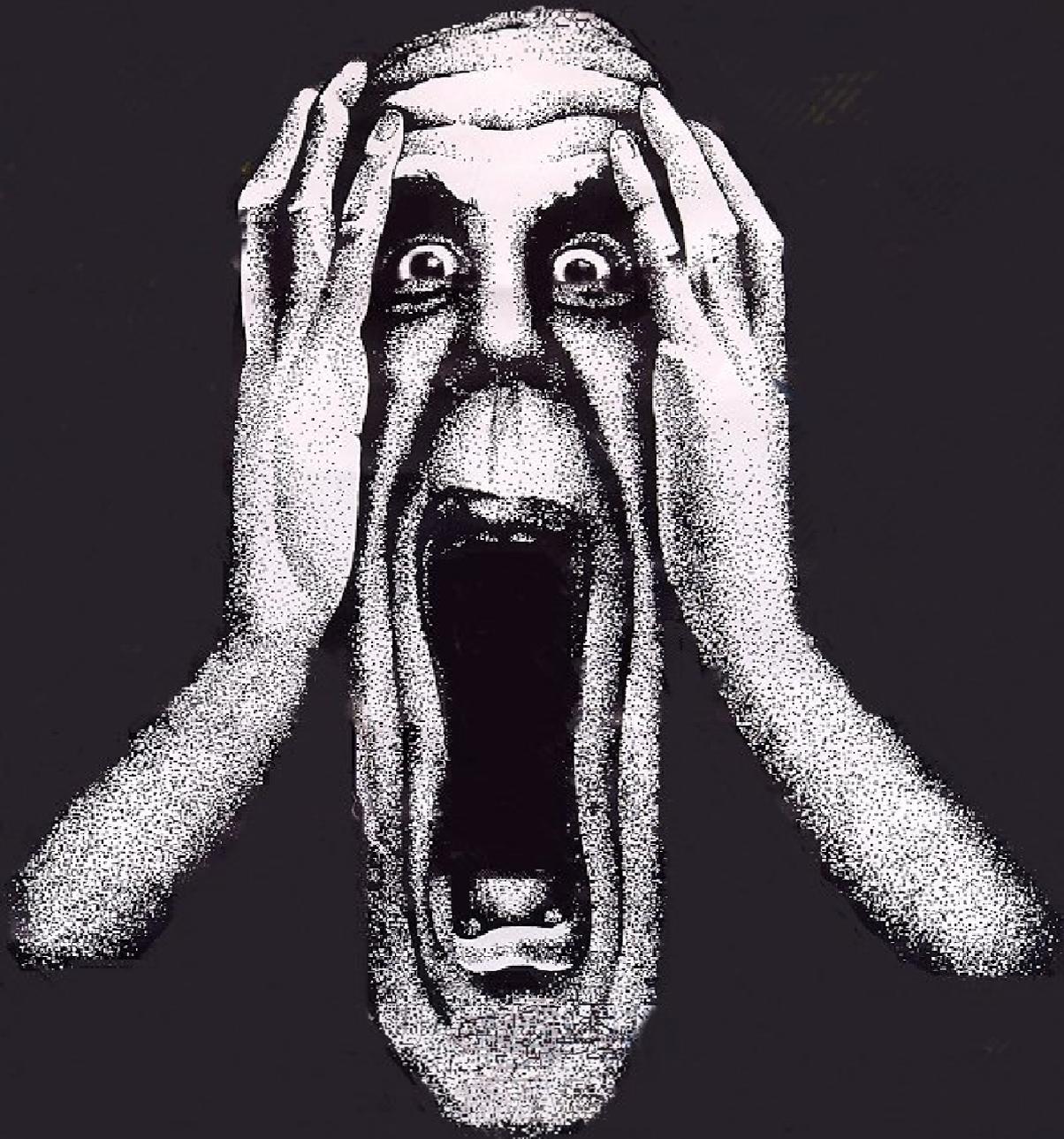
# Trials and Tribulations

- Staph. Aureus, Peptostrep., Bacteriodes
- Wound Dehiscence
- Patients refusal to go on HIV medications
- Tissue became necrotic



- Lisfranc's to Chopart's
- Small area of dehiscence took month's to heal
- Plan for the unexpected





# Case #1 Mr. W

Date	Prealbumin
10/22/07	6
10/29/07	9
11/3/07	8
11/7/07	13
1/09/08	28
2/6/08	24
3/17/08	24
4/23/08	27 (Albumin 2.8)

# Case #2 Mr. N - Day 1 – 01/07/08

## Podiatry consulted to ED

- 55 y/o hx of DM presents with right foot bleeding, malodor, discoloration x 1 wk
- No pain, “foot turned dark and starting leaking”
- Non compliant with diet, does not check glucose, does not see PCP or podiatrist regularly
- Alert and oriented, ambulatory
- Prior hx of digital amputations left foot
- Hx of heart condition, ETOH and tobacco abuse
- Patient unsure of his meds.

# Case #2 Mr. N - Day 1 – 01/07/08

## Examination

- Vitals: T98.5, P109, R 20, BP 114/74
- Heart, lungs, abdomen all grossly normal
- Amputation of left 3, 4 digits noted with multiple dorsal scars
- Darkened, dead skin and erythema noted from gangrenous right 5<sup>th</sup> digit proximal and medial to dorsal base of 2<sup>nd</sup> metatarsal and medially into arch. Erythema noted on entire foot extending to ankle
- Strong malodor
- No palpable pedal pulses; dopplerable, biphasic



# Case #2 Mr. N - Day 1 - 01/07/08

## Radiographic Evaluation



# Case #2 Mr. N - Day 1 - 01/07/08

## Radiographic Evaluation



# Case #2 Mr. N - Day 1 - 01/07/08

## Laboratory Evaluation

● <b>WBC</b>	<b>33.36</b>	● Neutrophil %	85.7
● Hb	13.7	● Lymphs %	19.9
● Hct	40.6	● <b>Monocytes%</b>	<b>13.8</b>
● PLT	344	● Eosinophil%	2.6
		● Basophil%	1.5
		● IMM Gran.%	0.3%

# Case #2 Mr. N - Day 1 - 01/07/08

## Laboratory Evaluation

● Glucose	427	● D. Bili	0.1
● Na	125	● Protein	8.0
● Cl	88	● SGOT	26
● HCO <sub>3</sub>	20.0	● SGPT	23
● Cr	3.4	● T. Bili	0.6
● BUN	55	● Ca	8.8
● K	4.3	● INR	0.98
● Albumin	1.8	● PTT	28.2
● Alk. Phos.	95	● <b>CRP</b>	<b>18.0</b>
● HbA1C	8		

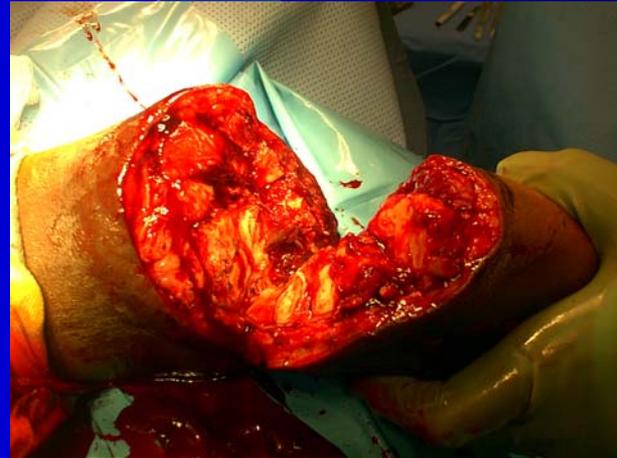
# Case #2 Mr. N - Day 1 -

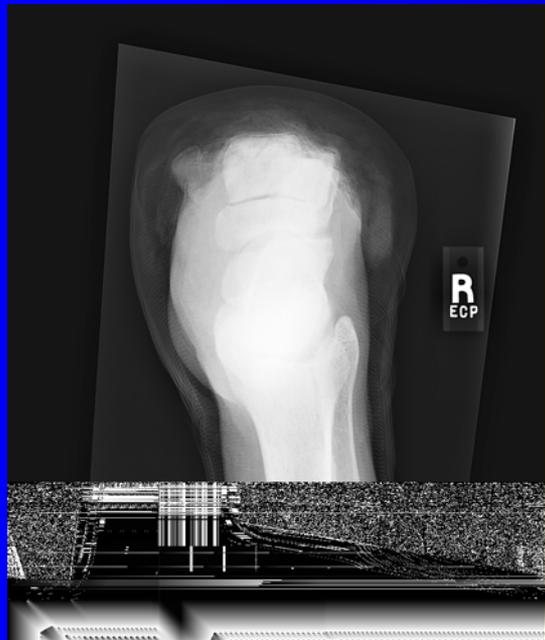
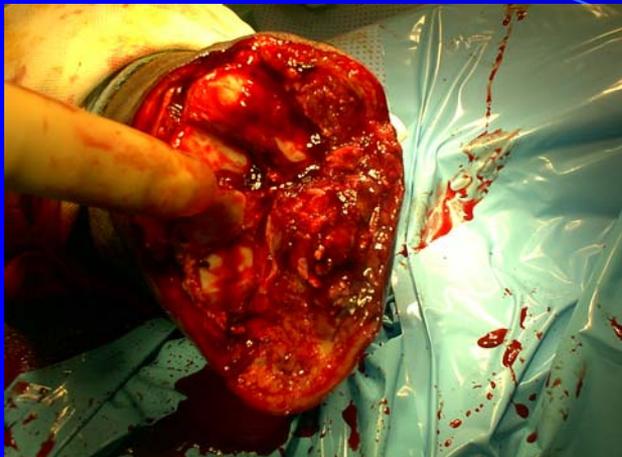
01/07/08

## Plan

- **DM , Type II with gas gangrene right foot**
- Admit to Medicine Service
- IV pip/tazo 2.25 grams IVPB q6h (infuse over 30 minutes)  
and vanc 1 gram q24h (infuse over 60 minutes)
- Podiatry Consult
  - Surgical I&D tonight
- Regular insulin as per sliding scale
- **Acute renal failure**
- IV hydration
- Accurate I&O's
- **Daily labs**
- **DVT prophylaxis when surgical team approves**

# The Case

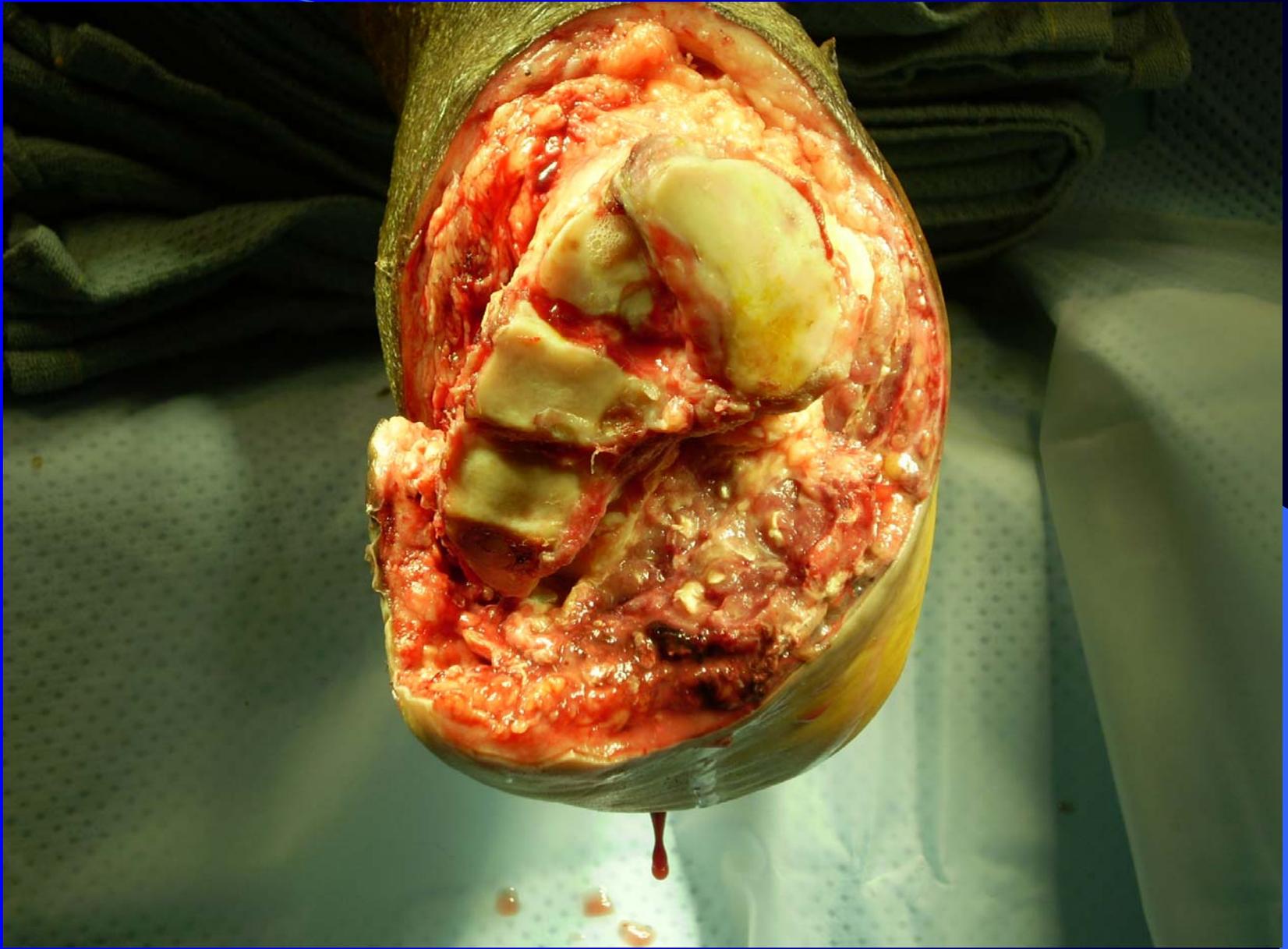


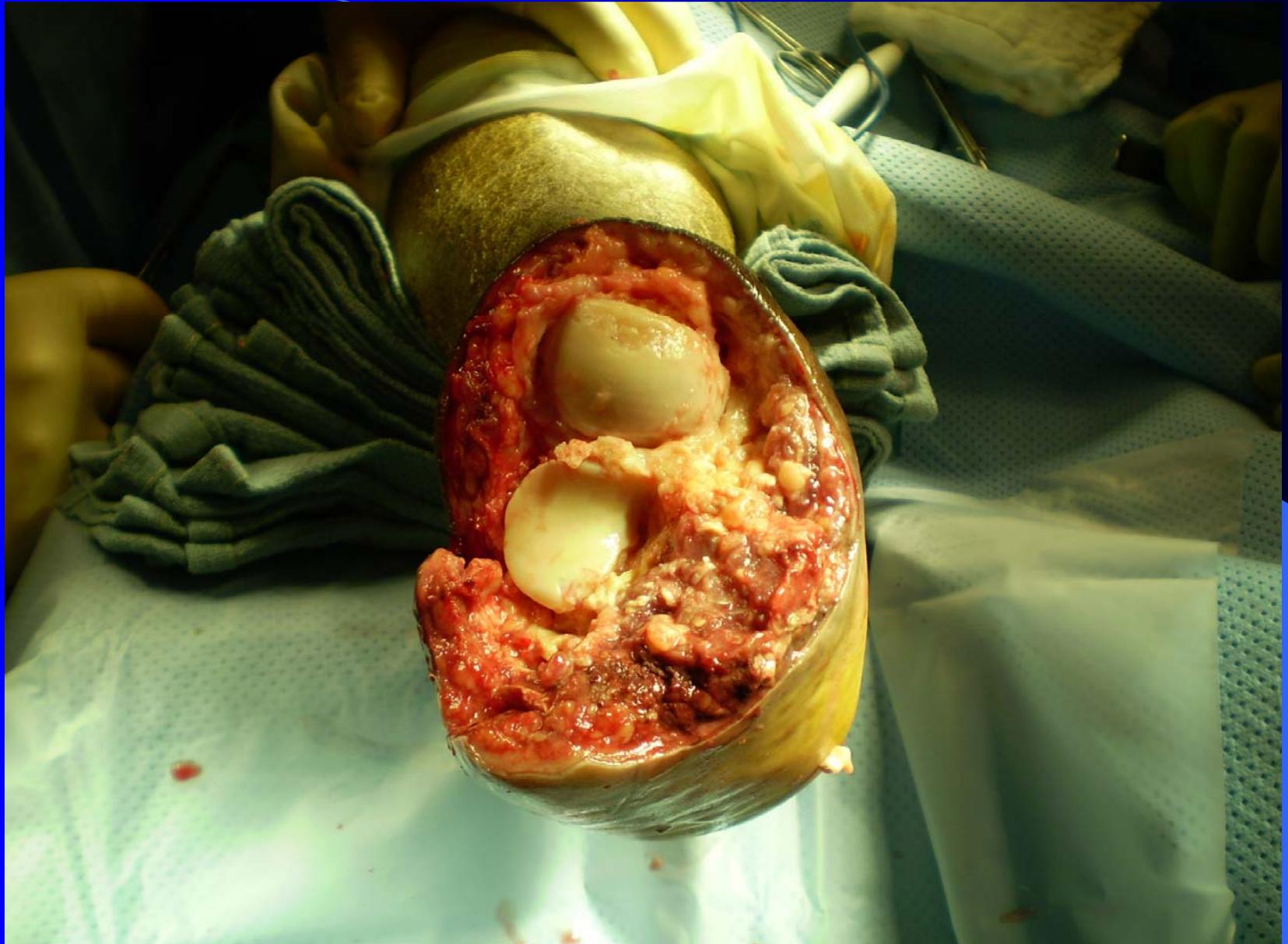


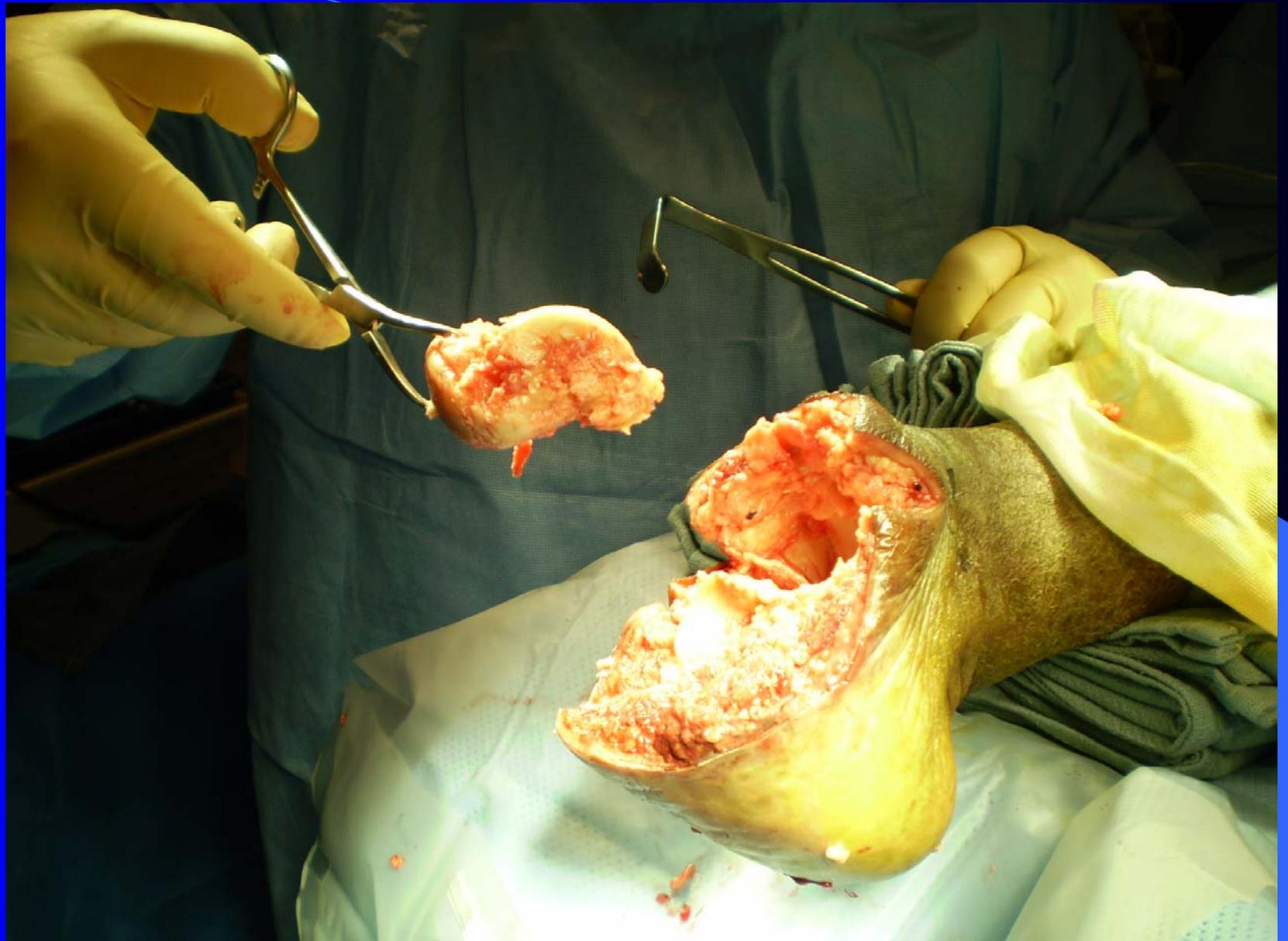
# Case #2 Mr. N - Day 3 - 01/09/08

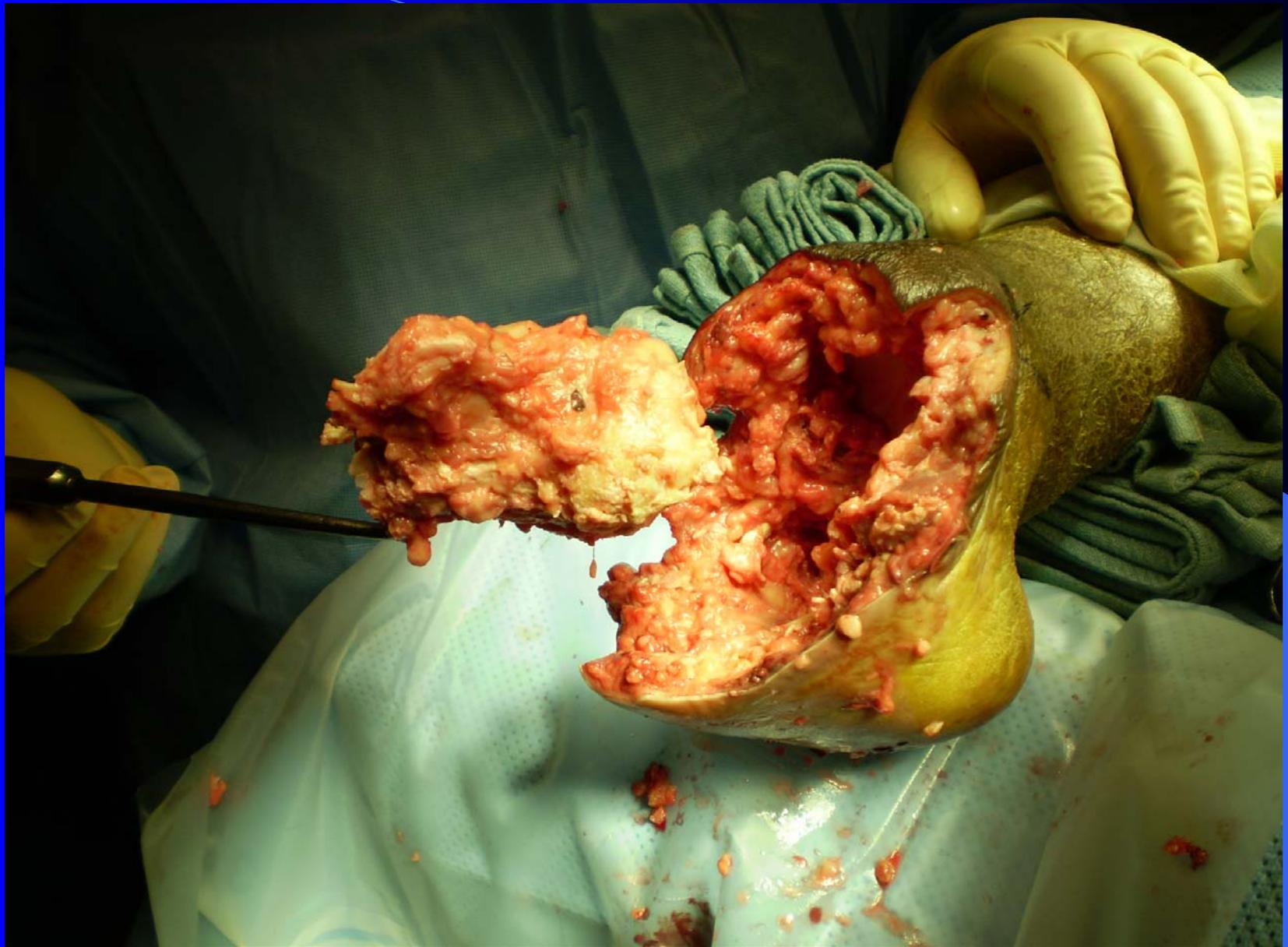
VITALS: T 98.5, P 86, R 18, BP 168/94

- **WBC: 20.85**
- Hgb: 12.4
- Hct: 36.8
- Platelets: 365
- PMN%: 80.3
- Na: 130
- HCO<sub>3</sub>: 23
- K: 3.9
- **Cr: 1.8**
- BUN: 51
- Glucose: 311









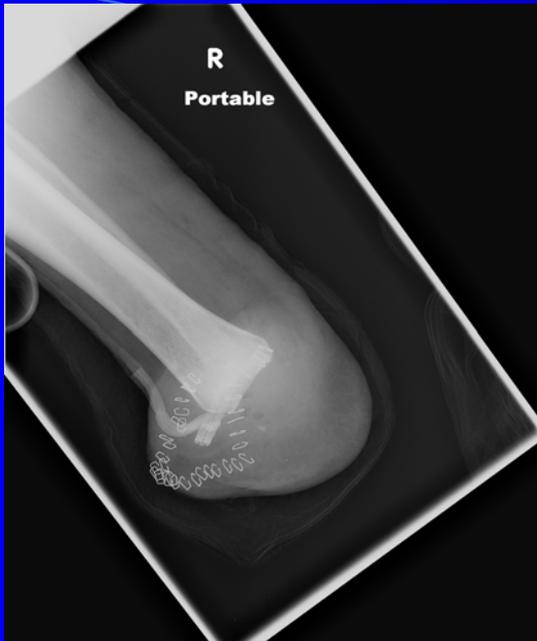




# Case #2 Mr. N - Day 4 - 01/10/08

**VITALS: T 98.1, P 88, R 12, BP 144/82**

- WBC: 10.59
- Hgb: 12.2
- Hct: 37.2
- Platelets: 364
- PMN%: 72.9
- Na: 133
- HCO<sub>3</sub>: 23
- K: 3.7
- Cr: 1.1
- BUN: 26
- Glucose: 181



# Case #3 Mr. G - Day 1 –

04/28/08

## Podiatry consulted to ED

- 52 y/o HTN, DM new to VAMC presents to ED with foul smelling, erythematous, edematous, warm left hallux with purulent discharge
- Denies N, V, F, C, SOB, cough, night sweats, chest pain, dysuria, or abdominal pain
- Vague headaches and blurry vision since off meds

# Case #3 Mr. G - Day 1 – 04/28/08

## History

- DM x 10 yrs – most recently on oral med
- Lost insurance - no meds x 2 1/2 mo.
- Glucose in 400-500 range x several mo.
- BP 200-220's systolically x several mo.
- 1 week ago devel. blister plantar hallux with ruptured; tx'd with H<sub>2</sub>O<sub>2</sub>; came to ED when erythema and edema progressed beyond toe to lower leg which became swollen and painful
- Numbness and tingling in fingers and toes baseline
- Moderate to heavy ETOH use, no tobacco

# Case #3 Mr. G - Day 1 –

04/28/08

## Examination

- Vitals: T 98.5, P 109, R 20, BP 224/116
- Tachycardia, 3/6 early systolic murmur
- ECG: sinus tach, + LVH with repolarization changes but no acute injury pattern.
- Extr:
  - foul smelling, erythematous, edematous, warm left hallux with purulent discharge; with denuded skin on the lateral aspect and the eponychial area which probe to bone; erythema midfoot distally
  - DP pulses weakly palpable
  - left leg edematous and tight almost to knee, tender from mid-calf distally

# Patient M.G.

## Be Prepared for the Unexpected



# Case #3 Mr. G - Day 1 – 04/28/08

## Examination



**Case #3 Mr. G - Day 1 –  
04/28/08  
Examination**



# Case #3 Mr. G - Day 1 – 04/28/08

## Laboratory

- WBC: 14.54
  - Neutrophils: 76%
- Hgb: 11.1
- Hct: 32.9
- Platelets: 279
- INR: 0.99
- PTT: 35.1
- Nares screen – MRSA + by PCR

# Case #3 Mr. G - Day 1 –

04/28/08

## Laboratory

- Na: 129
- Cl: 89
- K: 4.0
- HCo3: 26
- Cr: 1.2
- BUN: 9
- Glucose: 494
- Ca: 8.9
- Mg: 1.9
- PO4: 3.6
- Albumin: 2.9
- Alk Phos: 117
- D Bili: 0.2
- Protein: 7.1
- SGOT: 14
- SGPT: 11
- T Bili: 1.1

# Case #3 Mr. G - Day 1 – 04/28/08

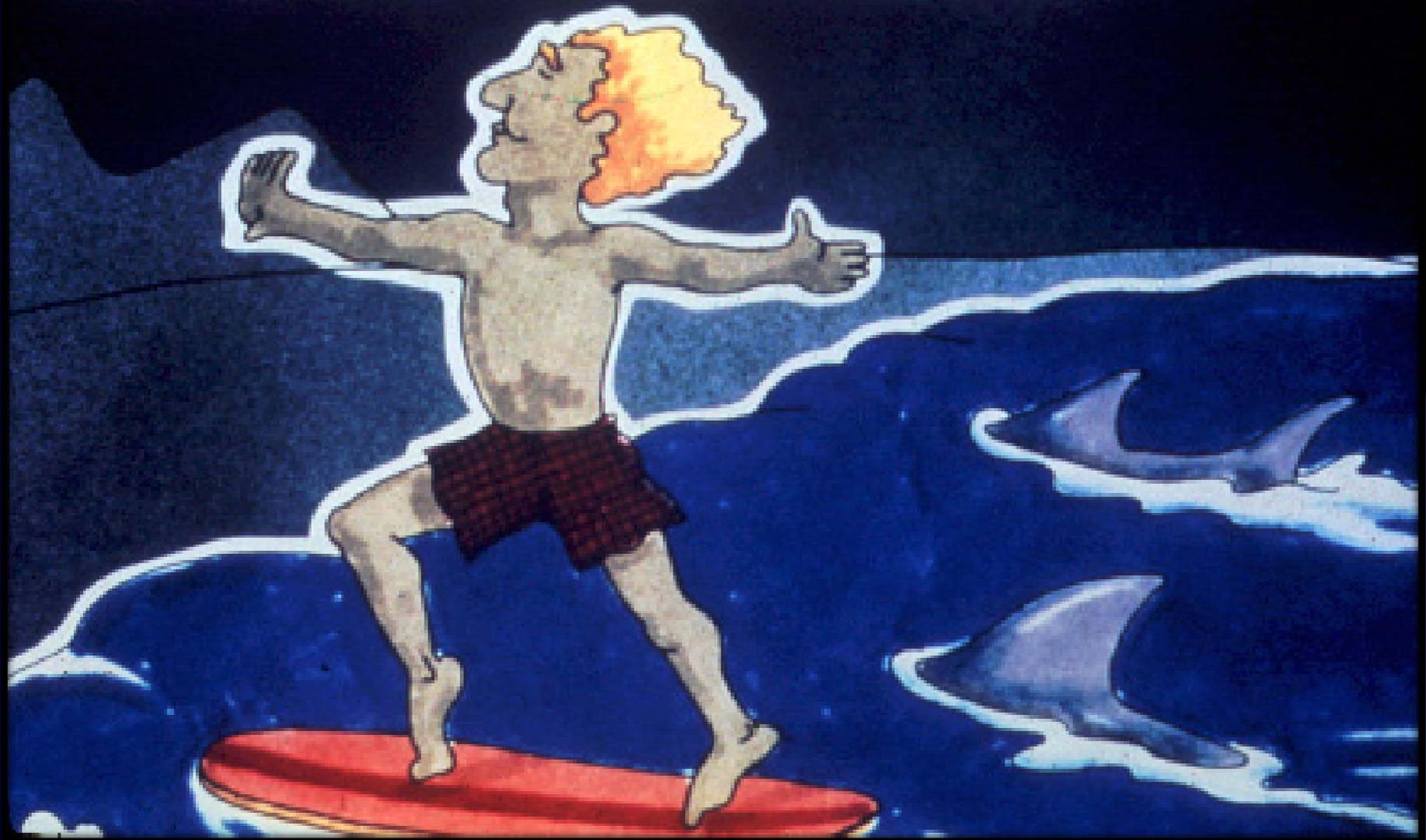
## Laboratory

- Wound culture pending
  - Gram stain: Gram+ cocci
- Blood cultures pending

# The Case



**Optimism indicates that the situation has not been clearly understood.**

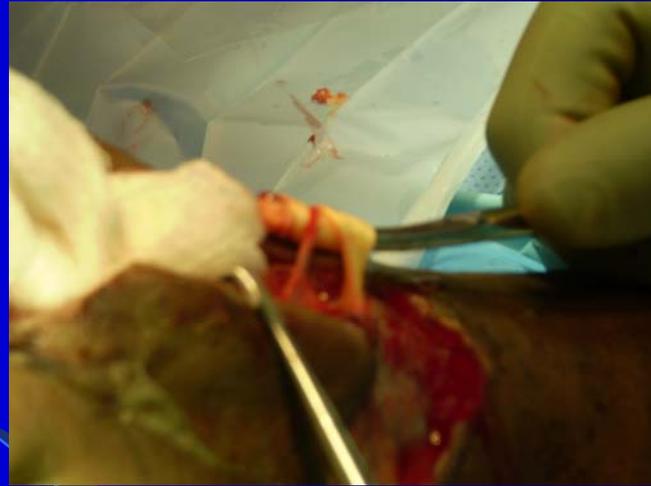


# Case #3 Mr. G – Day 7 – 05/04/08

- Vitals: T 97.4, P 83, R 18, BP 188/101
- WBC: 12.51
- HGB: 8.8
- HCT: 26.5
- Platelets: 353
- Cr 6.9
- BUN 20
- K 4.1
- Glucose: 107
- Surgery tomorrow for DPC of previous surgery and wound vac to dorsum of foot.

Acute Renal Failure

# The Unexpected



# Follow Up



# Case #3 Mr. G – Day 47 – 06/14/08

- Pt presents to ED – he fell off a chair and hurt his shoulder and his left foot
  - Gangrenous 4<sup>th</sup> toe
  - Malodorous left foot
  - Dehisced distal incisions
- Pt admitted and taken to surgery 2 days later

# Case #3 Mr. G – Day 53 – 06/20/08

- Patient taken to surgery for DPC
- He continues to c/o shoulder pain
  - Orthopedics aspirates left shoulder - pus
  - Orthopedics takes patient back to surgery for arthroscopic I&D of shoulder
- Renal function is slowly improving and pt is dialyzed as needed
- Patient is eventually discharged to be followed as out patient

# More Unexpected





# Wound Complications and Treatment







Thank You