

# **Protocols and Service Guidelines**

## Important Numbers

Places		Faculty	Pager	Telephone
TBICU	69631	Hemmila	3976	62002
TBACU	69638	Maggio	15155	79693
5A	66537/66538	Napolitano	15324	53831
5B	66551/66552	Park	15781	62739
5C	66567/66587	Sihler	15701	53280
5D	66581/66587	Wahl	7563	35308
ED	66660	Wang	0597	63996
Survival Flight	66035	Secretary-Wahl, Wang, Hemmila		69666
Transfer Center	43289	Secretary-Sihler		69690
Consent Line	65087	Secretary-Park, Brunsvold		63662
OR Main Desk	68470	Secretary-Napolitano		54775
OR Scheduling	68521			
OR 27	69648	<b>Support Staff</b>		
Chief Call Room	62005	Britt Elder-Tennyson, RN	3399	63994
Clinic (Clerk)	69665	Jill Jakubus, PA	14770	39003
Clinic Nurses	69669	Michelle Kelm, PA	12832	54328
NTE Clinic Nurse	61740	Margaret Gordon, RN	30053	69669
Skin Bank/Lab		Sue Henning, RT	9653	65420
FAX	69657	Lori Jordan, RD	1867	75823
Copier Code	9690	Becky Noel, MSW	9721	69653
		Mary Dimo, Pharm D	2984	68210
		Pharmacy Dosing Svc	9270	
		Leora Bowden, MSW	4209	69652
		Tony Ratliff, MSW	4196	69652
		Chris Wagner, BSN, CFRN	6561	69658
		Amanda Corwin, BSN	9854	39340
		PT	2012	
		Weekend PT	0769	
Ellen Higgins(abscess)	B5451	OT-Terry Conlin	4120	67160
		OT-Tonya Darr	5922	67160
		OT-On Call Pager	9629	
		SWAT		66032

## **Weekly Schedule**

### **Mondays**

7:30 NTE Rounds (cafeteria)  
8:00 Multidisciplinary Rounds (MAMBA), TBICU  
11:30 Teaching Conference, TBE Conference Room  
12:45 TBE Clinic, Taubman Center-Level 2, Reception Area F

### **Tuesdays**

7:30-8:30am Trauma Conference, Ford Auditorium  
7:30am OR  
8:30am TBE Team Meeting, Ford Auditorium  
12:00 noon Fellow Critical Care Presentations/Journal Club

### **Wednesdays**

7:30 OR  
8:00-8:30 Wound Rounds, TBICU  
8:30 Burn Clinic, Taubman Center-Level 2, Reception Area F  
12:00 noon Critical Care Core Curriculum

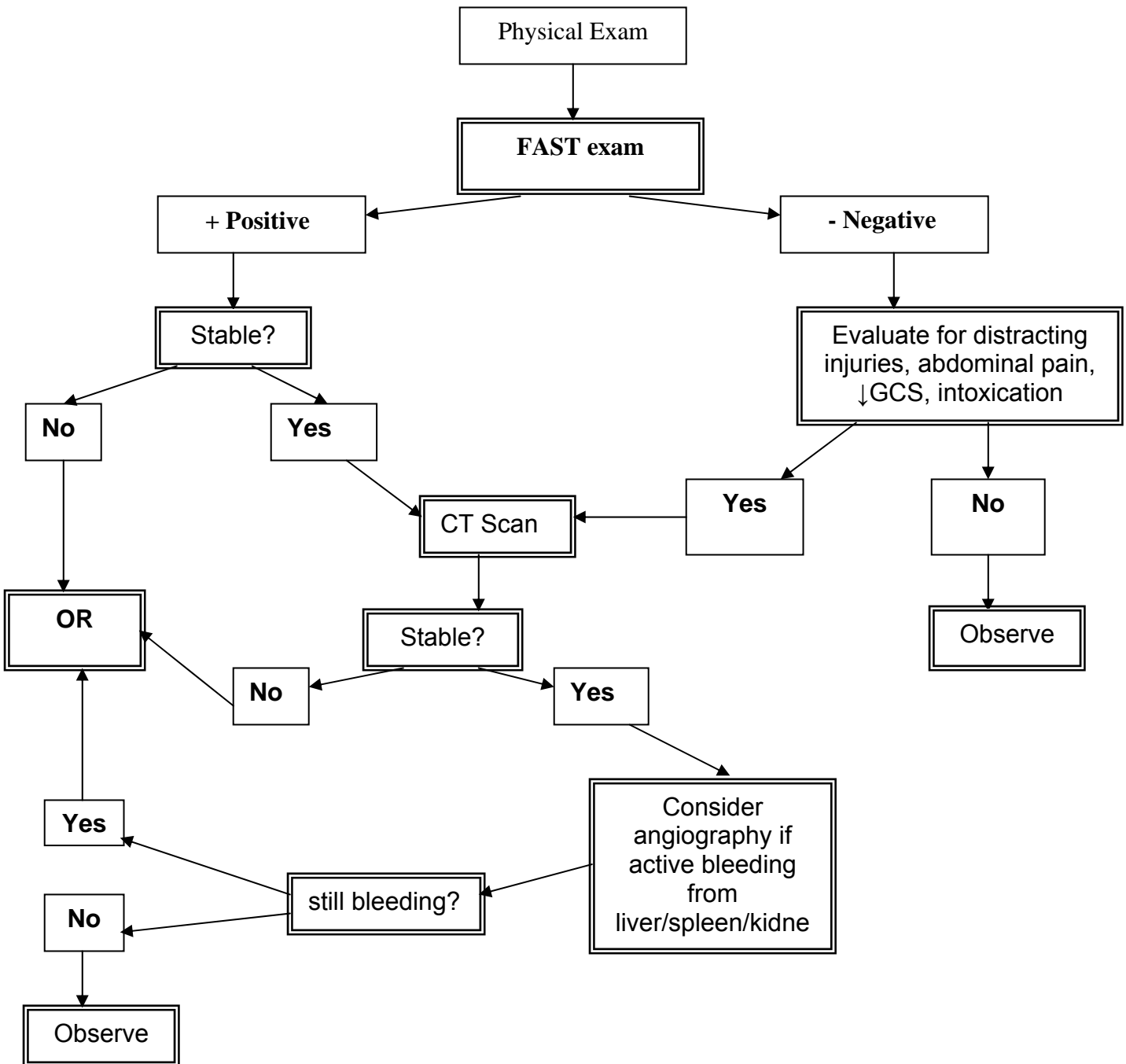
### **Thursdays**

7:00-8:00 Death and Complications Conference or Grand Rounds  
Ford Auditorium  
8:00-9:00 Resident Teaching Conference, Ford Auditorium  
8:30 OR

### **Fridays**

7:30 OR  
8:30-9:00 Wound Rounds, TBICU  
1:00 TBE Clinic, Taubman Center-Level 2, Reception Area F

## Adult Blunt Abdominal Trauma Algorithm



# BLUNT SOLID ORGAN INJURY GUIDELINES

## Blunt Liver Injury

CT findings of active contrast extravasation or liver AIS  $\geq 3$  with large hemoperitoneum:

Fluid resuscitation on IV warmers and external warming device.  
Angiographic embolization unless floridly unstable.  
Exploration for massive instability or concern over other organ injury.

Day 2-3 after admission for liver AIS  $\geq 4$ :  
HIDA scan to rule out bile leak.  
If positive, laparoscopic washout with drain placement.  
If negative, repeat only as indicated.

Consider CT for ongoing fevers after embolization or major injury.

Consider ERCP if bile drain output remains  $>200$  cc/day after a week.

## Blunt Spleen Injury

CT findings of active contrast extravasation or spleen AIS grade 4-5 with large hemoperitoneum:

Fluid resuscitation on IV warmers and external warming device.

Consider all of these patients for angiographic embolization unless:  
Ongoing hypotension despite fluid resuscitation (not tachycardia).  
Need for exploration for other injuries.

After embolization or operative splenectomy administer:  
Hemophilus influenzae vaccine  
Meningococcus vaccine  
Pneumococcus vaccine

## Bed rest and Monitoring for Solid Organ Injuries:

For all blunt solid organ injury patients, except those s/p splenectomy or nephrectomy, follow bed rest algorithm:

AIS solid organ score  $- 1 =$  days of bed rest, up to a maximum of 3 days of bed rest  
(If embolized, bed rest for 24 hours only.)

Start Lovenox (if no other contraindication) same day as bed rest restrictions end.

For patients with solid organ injuries of AIS 3 or greater:

Check Hb/Hct q8 hours for 24 hours.  
Admit to either stepdown (no vent, SG or pressors) or ICU status for 24 hours of hemodynamic monitoring.  
If patient has sudden change in hemodynamics or Hb/Hct then repeat CT/angio.

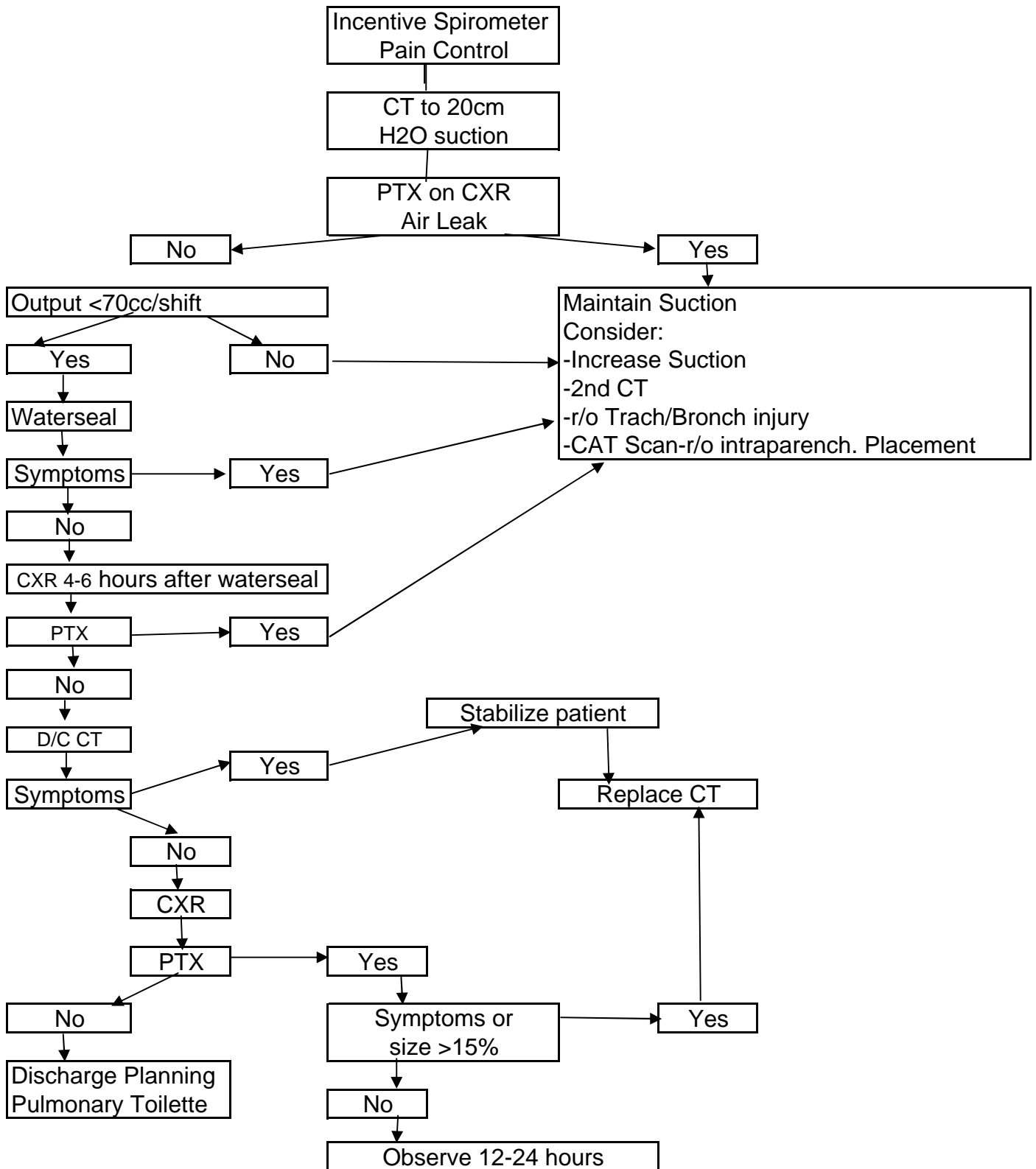
## **BLUNT THORACIC AORTIC INJURY (BTAI) PROTOCOL**

- I. For patients with very suspicious chest radiograph with hypertension OR diagnosis of BTAI on helical chest CT or angiogram:  
Start Antihypertension regimen:
  - A. Infuse esmolol bolus then maintenance rate for a goal BP (syst) 100-120 mmHg, heart rate < 100
  - B. Add second agent such as Nitroprusside if BP (syst) still elevated despite esmolol
- II. Treat ongoing life-threatening hemorrhage from other injuries prior to treatment of BTAI (unless patient actively bleeding from aorta).
- III. Treat coagulopathy if present.
- IV. Once diagnosis of BTAI established consult Cardiothoracic surgery and evaluate the following to determine early or delayed repair.

Reasons for delayed repair:

- A. PaO<sub>2</sub>/FiO<sub>2</sub> ratio less than 150
  - B. CNS injuries which should be delayed:
    1. massive contusion
    2. evidence of shift on Head CT
    3. large areas of intracerebral blood
    4. high ICP (consistently >20)
    5. need for systemic heparinization for full bypass felt to be contraindicated by Neurosurgery.
  - C. Ongoing major transfusion requirement or coagulopathy
  - D. Massive, open, contaminated wounds or burn where likelihood of wound sepsis is high.
- V. If patient to be delayed for longer than 48 hours:
    - A. Continue beta-blocker therapy, convert to long-acting agent (labetalol or atenolol)
    - B. Add secondary long acting antihypertensives as necessary
    - C. BP (syst) may be liberalized at 7 days to 150-160 mmHg
    - D. Physical therapy may begin at day 5
  - VI. Any additional concerns or problems should be discussed at the attending level between the TBE and Cardiothoracic surgeons.

## Tube Thoracostomy Protocol



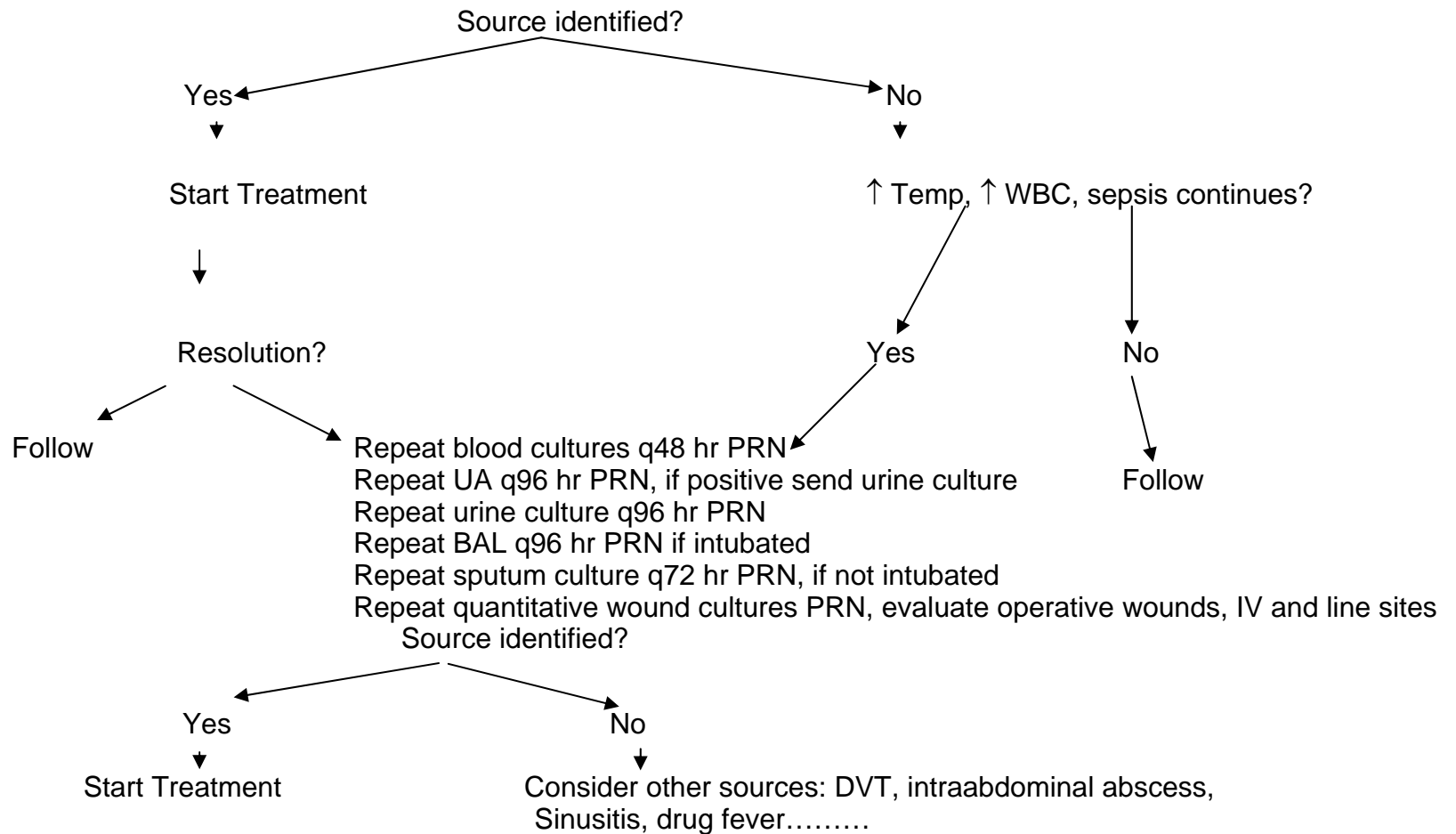
## Chest Tube Pulling Protocol

- A. Make sure chest tube is ready to be pulled out.
  - 1. No air leak with coughing or mechanical breath.
  - 2. Successful water seal trial.
  - 3. No pneumothorax on CXR taken 4-6 hrs after chest tube placed to water seal.
  
- B. Preparation
  - 1. Remove dressing covering chest tube entry site.
  - 2. Undue or cut holding stitch.
  - 3. If a purse string suture is in place make sure it is able to be tied down after tube is removed. Not all chest tubes are placed with a purse string suture. If the patient's chest wall is appropriately thick and the chest tube has been tunneled properly a purse string suture may not be necessary.
  - 4. Obtain piece of petroleum gauze or xeroform and sterile 4x4.
  - 5. If patient is spontaneously breathing, instruct them to take a breath in and blow it out while you pull chest tube or ask them to hum while you are pulling out tube. If you pull tube while they are actively inhaling they will suck air in the pleural space and you will have recreated the pneumothorax.
  - 6. For patients on the mechanical ventilator you want to time your pulling so you are on the inspiratory phase of positive pressure phase of the ventilator cycle.
  - 7. Clamp chest tube with a Kelly clamp prior to pulling.
  
- C. Pulling chest tube
  - 1. Make sure purse string suture has one loose throw in it and is ready to tie.
  - 2. Have nurse or assistant hold gauze and 4x4 over superior aspect of chest tube entry site.
  - 3. Pull chest tube quickly and forcefully with appropriate timing.
  - 4. Tie down purse string suture.
  - 5. Release pressure on the gauze dressing and tape in place.
  - 6. Obtain post pulling CXR and chest results as soon as film is done.
  
- D. Dispose of chest tube and pleur-evac.
  - 1. Tie pleur-evac line in a knot so fluid will not drain out.
  - 2. Place entire apparatus in red biohazard disposal bag.
  
- E. Remove stitches.
  - 1. Chest tube stitches left behind after pulling chest tube should be removed within 48 hours.

# Culture Protocol

Admission for possible sepsis;  
Inpatient with ↑ temp, ↑ WBC, or sepsis

Examine patient for obvious source of infection  
Blood cultures x 2  
Urinalysis and urine culture  
Sputum gram stain (BAL if intubated) and culture  
Quantitative wound biopsy if large open wound/burn  
Evaluate IV and line sites, operative wounds



# **Diagnosis and Treatment of Pneumonia**

## **Intubated Patients:**

- A. Identify patient with suspected pneumonia (need 3 of 5 criteria)
  1. new or changing infiltrate on CXR
  2. increasing WBC
  3. hypoxia
  4. fever
  5. increasing sputum production
  
- B. Perform quantitative BAL
  1. Send sputum culture prior to BAL
  2. Lavage with 20 cc of nonbacteriostatic saline on each side
  3. Send specimen for Gram stain and quantitative culture
  4. If >4 days on the ventilator, or patient has been hospitalized, start Vancomycin, Tobramycin and Zosyn empirically. Narrow when cultures available. If <4 days on the ventilator, consider single coverage for aspiration-type organisms (Unasyn, Zosyn, Kefzol).
  
- C. Culture results
  1. if  $10^4$  or greater than then continue antibiotic coverage based on sensitivities
    - a) Treat for 8 days total with the correct antibiotics
    - b) If MRSA, resistant Acinetobacter or resistant Pseudomonas, re-BAL at 6 days. If still  $> 10^4$  then finish 15 day course.
  2. if less than  $10^4$  then discontinue antibiotic therapy
  3. repeat quantitative BAL as needed
  4. If patient has recurrent pneumonia with same organism, treat for 15 days.

## **Extubated Patients (without tracheostomy):**

- A. Identify patient with suspected pneumonia (need 3 of 5 criteria)
  1. new or changing infiltrate on CXR
  2. increasing WBC
  3. hypoxia
  4. fever
  5. increasing sputum production
  
- B. Send sputum gram stain and culture; follow antibiotic guidelines as above for the specific organisms and duration of therapy
  
- C. Start on empiric single agent if pneumonia strongly suspected and cultures pending

#### IV. Sepsis Resuscitation Bundle

##### Steroid Protocol for Sepsis

- In patients with **septic shock** requiring vasopressors:

If one hour passes and the patient requires pressers to maintain SBP >90 mmHg, despite adequate fluid resuscitation, begin steroids.  
Hydrocortisone 50mg IVBP q6<sup>o</sup>.  
Wean over the next week.

- F. Gastrointestinal bleeding within 6 weeks of infusion, unless corrective surgery performed
- G. Trauma considered to increase the risk of bleeding

**3. Known hypercoagulable condition**

- A. Resistance to activated protein C
- B. Hereditary deficiency of protein C, protein S, or antithrombin III
- C. Presence of anticardiolipin antibody, antiphospholipid antibody, lupus anticoagulant or homocysteinemia
- D. Recently documented (within 3 months of infusion) or highly suspected deep-vein thrombosis or pulmonary embolism

**4. Do not resuscitate order in chart**

**5. Moribund state in which death is perceived to be inevitable**

**6. Use of any of the following medications or treatment regimens:**

- A. Unfractionated heparin to treat an active thrombotic event within 8 hours before infusion
- B. Low molecular weight heparin at higher doses than those recommended for prophylaxis with 12 hours before infusion
- C. Warfarin if used within 7 days of before infusion and if the prothrombin time exceeds the upper limit of normal
- D. Aspirin use at a dose of more than 650 mg per day, or use of other platelet inhibitors, within 3 days before infusion
- E. Thrombolytic therapy within 3 days before infusion (use other than catheter clearance)
- F. Glycoprotein IIb/IIIa antagonists used within 7 days before infusion
- G. Antithrombin III at a dose of more than 10,000 units within 12 hours of infusion

**7. Presence of an epidural catheter**

**8. Known hypersensitivity to drotrecogin alfa (activated) (Xigris ®; recombinant human Activated Protein C) or any component of the preparation**

**WARNINGS AND PRECAUTIONS**

- 1. Pregnant or breast feeding
- 2. Chronic renal failure requiring hemodialysis or peritoneal dialysis
- 3. Presence of cirrhosis with a potential for bleeding
- 4. Any other condition in which bleeding constitutes a significant hazard or would be particularly difficult to manage
- 5. Immediately stop the infusion if any clinically important bleeding occurs; once adequate hemostasis has been achieved, initiation of the infusion may be considered
- 6. Drotrecogin alfa (activated) (Xigris ®) infusion should be discontinued 2 hours prior to undergoing an invasive surgical procedure or procedure with an inherent risk of bleeding; once adequate hemostasis has been achieved, initiation of the infusion may be considered 12 hours after major invasive procedures or surgery, or may be restarted immediately after uncomplicated less invasive procedures

**ALL OF THE FOLLOWING MUST BE FULFILLED FOR THE PATIENT TO BE ELIGIBLE TO RECEIVE DROTRECOGIN ALFA (ACTIVATED) (XIGRIS ®):**

- The patient meets ALL inclusion criteria
- The patient does NOT meet any of the exclusion criteria
- The patient has been evaluated by an ICU attending physician or ICU fellow
- The appropriate UMHC drotrecogin alfa (activated) (Xigris ®) order form has been properly filled out

The appropriate UMHC drotrecogin alfa (activated) (Xigris ®) order form has been signed by an ICU attending physician or an ICU fellow has taken a verbal or telephone order from an attending physician  
The attending physician must sign, date and time the order within 24 hours

- F. Gastrointestinal bleeding within 6 weeks of infusion, unless corrective surgery performed
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## NURSE MONITORING PROTOCOL FOR PATIENTS ON XIGRIS ®

1. Vital Signs q 1 hr. (includes pulse, respiration, and blood pressure)
2. Neurologic checks q 2 hrs. (includes pupils, LOC, and extremity strength)
3. Labs: CBCp, PT, and INR; Baseline and then q 12 hrs.
  - Contact MD for drop in Hgb.2 g/dl for 2 consecutive determinations
  - Contact MD for INR>3
4. Guiac all stools.
5. Note NG aspirate for blood.
6. Assess for any signs of increased bleeding (in wounds, puncture sites, CTs, drains, etc.)
7. Minimize puncture sites; Avoid IM/SQ injections.
8. If any signs/symptoms of bleeding are noted, stop Xigris drip immediately and notify M.D. \* **The decision to restart belongs to the attending physician that originally ordered the drug, or the attending physician currently on the service that originally approved and prescribed the drug.**
9. Stop infusion of Xigris 2 hrs. before any invasive procedure. If the procedure is minor, and there were no complications associated with bleeding, infusion may be restarted after procedure is finished. For major procedures, infusion may be restarted after 12 hours. \* **The decision to restart belongs to the attending physician that originally ordered the drug, or the attending physician currently on the service that originally approved and prescribed the drug.**
10. If infusion is given per peripheral IV route, observe for signs of extravasation and stop infusion if occurs.

## **Central Line Change Protocol**

1. Track the age of any central line placed.
2. If no signs of line infection or sepsis (normal WBC, no fever, skin site clean) keep the line as needed, but remove as soon as line not needed.
  - a) For trauma or general surgery patients, no routine line changes are necessary
  - b) For burn patients change lines every 5 days.
3. All line changes include a hat, mask, sterile gown and gloves with a wide sterile field. Wash site and hands with chlorhexidine.
4. Replace all lines placed in the ED, OR or OSH.
5. Use chlorhexidine to prep skin for all line placements
6. If line change is deemed necessary as part of a fever work-up, send two sets of peripheral blood cultures (label each set as to the source) and send the tip for quantitative culture.

# University of Michigan Trauma Burn Center

## Daily Wake-Up Protocol

- A. Nursing, respiratory therapy, and physicians will collaborate on a daily basis for the application and evaluation of the sedation holiday.
- B. The process for daily wake-up applies to all patients *unless determined to be clinically inappropriate by the collaborative team*.
- C. Daily interruption of sedation for neurosurgery patients is to be coordinated with the neurosurgery team.
- D. Timing of the daily wake-up will be determined as appropriate for shift resources, and when applicable, in correlation with sleep protocols. Patients most likely to meet weaning parameters for expected extubation should be prioritized to the sedation holiday from 5am-7am.

### Process for Daily Wake-Up:

- 1. Stop continuous sedative infusions (Ativan, Midazolam, Propofol) and withhold additional prn dosing during this time.**
- 2. If a patient is on a paralytic agent, this must be stopped and the patient assessed prior to discontinuation of the sedative infusion.**
- 3. Decrease continuous opioid infusions by 50%.**
- 4. Nursing assessment to determine endpoint of the sedation holiday is to include:**

- Patient's ability to communicate, follow commands, return to baseline or improved level of responsiveness
- RASS (sedation score) of 0 or greater
- Pain score on 50% dose of opioid infusion
- Intolerance to sedation cessation: unsafe behavior, unstable VS/neuro status, respiratory impairment

**\*\*Physician assessment of the patient during sedation interruption should be included if the patient is safe to continue interruption of sedation until physician evaluation can be completed.**

### **5. Reestablishing sedation**

- A. Titrate opioid infusion to the lowest effective dose for patient comfort if pain control is insufficient at 50% opioid infusion rate.
- B. Reassess pain after intervention.
- C. If needed, restart sedative infusion at 50% of the initial rate, and titrate to the lowest effective dose for patient comfort, but no less than RASS -2.
- D. When approaching extubation, and prior to discontinuation of the sedative infusion, active orders are to include benzodiazepine dosing prn for withdrawal symptoms.

E. Consider Haldol for patient agitation in place of further benzodiazepine administration. (Caution use of Haldol in TBI patients. Also, consider the use of a bedside sitter.)

**Recommended Haldol dosing:**

- Mild agitation: 0.5-2mg IVP/IM
- Moderate agitation: 2-5mg IVP/IM
- Severe agitation: 10mg IVP/IM
- Starting dose for elderly: 2mg IVP/IM

\*\*\*May repeat bolus doses every 20-30 minutes until agitation decreases, then

give 25-50% of the maximum dose every 6 hours.

**6. Pain management is to include a scheduled oral opioid (oxycodone) dose**

**post-extubation if the patient has been on a continuous opioid infusion and is**

**able to tolerate oral medications.**

**7. If no contraindications, consider scheduled dosing of a non-opioid analgesic**

**(acetaminophen or ibuprofen). Consider contraindications such as spine or**

**major pelvic injuries or GI bleeding.**

**8. Documentation**

- Centricity flowsheet
- Daily wake-up attempt is to be recorded on the charge nurse daily sheet and nursing Kardex for communication.