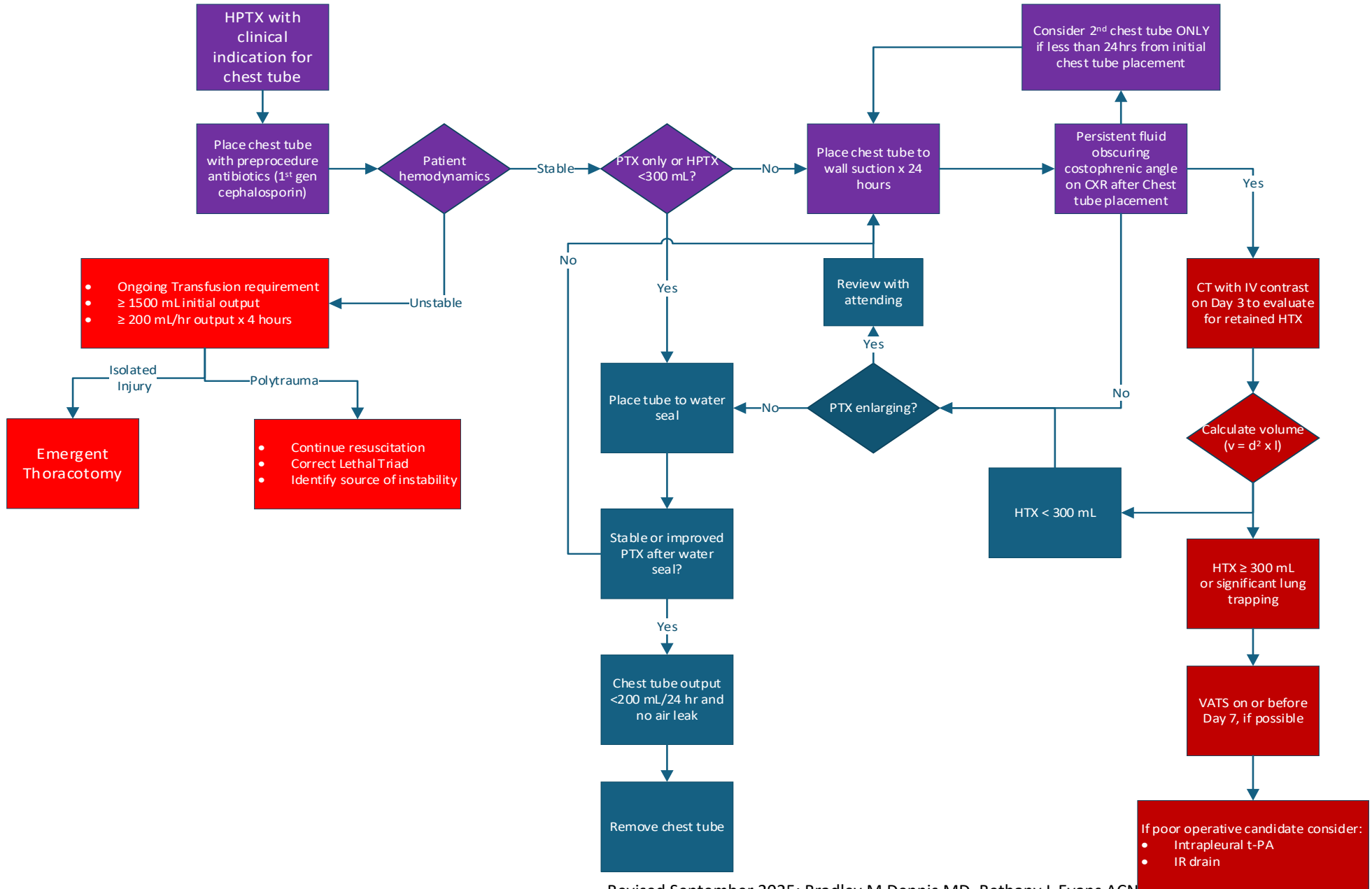


Hemopneumothorax Guidelines



Hemopneumothorax Guideline

- 1) Place chest tube if HPTX requires evacuation per chest tube protocol (1)
 - a) Pigtail or Large bore chest tube (14-32F) (2-4)
 - i) Large bore chest tube (20-32F) if chest tube need is emergent.
 - ii) Pigtail (14F) is effective for PTX and HTX
 - b) One dose of antibiotics starting just prior to placement (5-7)
 - i) 1st generation cephalosporin
 - ii) Order post-procedure CXR and daily CXR while tube in place
- 2) Determine need for water seal or wall suction
 - a) Patients with HTX $\geq$ 300mL should be initially placed to wall suction for 24 hours.
 - b) If the patient does not meet the above criteria (isolated PTX or HTX < 300 mL), the tube is placed to water seal at that time. (26)
 - c) Order post procedure CXR
- 3) Assess daily CXR for evidence of retained HTX and progress of PTX
 - a) Patients should progress to water seal based only on progress of PTX, even if residual HTX is present (26)
 - b) If PTX worsened, place to -20 cm H₂O wall suction, restart management process, and review with Trauma Attending. Consider repositioning or replacing chest tube.
 - c) If PTX is stable or improved:
 - i) If on wall suction, place chest tube to water seal and repeat CXR in 4 hours
 - ii) If on water seal, remove chest tube when output < 200 mL/24hr (22-25) and no air leak present.
- 4) Consider retained HTX if persistent fluid obscuring costophrenic angle on CXR after chest tube placement
 - a) **If within 24 hours**, consider placing 2nd chest tube.
 - b) Order a **contrasted chest CT on day 3** if HTX is still present on CXR (7)
 - i) If $\geq$ 300mL HTX (formula $v=d^2 \times l$) ¹ present on CT (8, 9, 10)
 - (1) VATS on or before day 7 (7-14)
 - (2) Consider intrapleural t-PA (11, 15-22) if poor operative candidate or other indications (t-PA is contraindicated in any patient with intrathoracic arterial bleeding/injury including pulmonary laceration and/or intercostal bleeding). Administration of TPA is not intended to prevent VATS in operative candidates. ²
 - (a) 24mg t-PA in 48mL NS (t-PA concentration 0.5mg/mL) injected in chest tube daily x 3 days (16, 19-21) using sterile technique.
 - (b) Clamp chest tube x 1 hour (20)
 - (c) Roll patient to ensure distribution throughout chest.
 - (d) Unclamp tube and allow drainage.
 - (3) Consider IR-guided chest tube if not an operative candidate and t-PA not likely to be effective (loculated collection remote from chest tube)
 - ii) If < 300 mL HTX present
 - (1) no additional intervention needed (1, 8)
 - (2) Follow chest tube management guidelines per section 3c above.

Hemopneumothorax Guideline

- 5) If HTX resolved on or before Day 3, follow chest tube management guidelines per section 3c above.

¹ **d** = greatest depth of hemothorax on a single CT image, **l** = greatest cephalad-caudad length of the hemothorax.

² To find the Trauma Retained Hemothorax order set in eStar you must type “hemothorax” in the order section, order set will then populate for you. It will not come up if you type t-PA or alteplase.

Hemopneumothorax Guideline

REFERENCES

1. Mowery NT, Gunter OL, Collier BR, et al. Practice management guidelines for management of hemothorax and occult pneumothorax. *J Trauma*. 2011 Feb;70(2):510-8.
2. Inaba K, Lustenberger T, Recinos G, et al. Does size matter? A prospective analysis of 28-32 versus 36-40 French chest tube size in trauma. *J Trauma Acute Care Surg*. 2012 Feb;72(2):422-7.
3. Bauman ZM, Kulvatunyou N, Joseph B, et al. Randomized Clinical Trial of 14-French (14F) Pigtail Catheters versus 28-32F Chest Tubes in the Management of Patients with Traumatic Hemothorax and Hemopneumothorax. *World J Surg*. 2021 Mar;45(3):880-6.
4. Kulvatunyou N, Bauman ZM, Edine SBZ, et al. The Small 14-French (Fr) Percutaneous Catheter vs. Large (28-32Fr) Open Chest Tube for Traumatic Hemothorax (P-CAT): A Multi-center Randomized Clinical Trial. *J Trauma Acute Care Surg*. 2021 Mar 16.
5. Luchette FA, Barrie PS, Oswanski MF, et al. Practice Management Guidelines for Prophylactic Antibiotic Use in Tube Thoracostomy for Traumatic Hemopneumothorax: the EAST Practice Management Guidelines Work Group. Eastern Association for Trauma. *J Trauma*. 2000 Apr;48(4):753-7.
6. Maxwell RA, Campbell DJ, Fabian TC, et al. Use of presumptive antibiotics
7. Topics following tube thoracostomy for traumatic hemopneumothorax in the prevention of empyema and pneumonia--a multi-center trial. *J Trauma*. 2004 Oct;57(4):742-8; discussion 8-9.
8. Velmahos GC, Demetriades D, Chan L, et al. Predicting the need for thoracoscopic evacuation of residual traumatic hemothorax: chest radiograph is insufficient. *J Trauma*. 1999 Jan;46(1):65-70.
9. DuBose J, Inaba K, Demetriades D, et al. Management of post-traumatic retained hemothorax: a prospective, observational, multicenter AAST study. *J Trauma Acute Care Surg*. 2012 Jan;72(1):11-22; discussion -4; quiz 316.
10. Mergo PJ, Helmberger T, Didovic J, Cernigliaro J, Ros PR, Staab EV. New formula for quantification fraction of pleural effusions from computed tomography. *J Thoracic Imaging*. 1999 Apr;14(2):122-5.
11. Oguzkaya F, Akcali Y, Bilgin M. Video thoracoscopy versus intrapleural streptokinase for management of post traumatic retained hemothorax: a retrospective study of 65 cases. *Injury*. 2005 Apr;36(4):526-9.
12. Boersma WG, SSgt JA, Smit HJ. Treatment of hemothorax. *Respir Med*. 2010 Nov;104(11):1583- 7.
13. Heniford BT, Carrillo EH, Spain DA, Sosa JL, Fulton RL, Richardson JD. The role of thoracoscopy in the management of retained thoracic collections after trauma. *Ann Thorac Surg*. 1997 Apr;63(4):940-3.
14. Meyer DM, Jessen ME, Wait MA, Estrera AS. Early evacuation of traumatic retained hemothoraces using thoracoscopy: a prospective, randomized trial. *Ann Thorac Surg*. 1997 Nov;64(5):1396-400; discussion 400-1.
15. Agarwal R, Aggarwal AN, Gupta D. Intrapleural fibrinolysis in clotted hemothorax. *Singapore Med J*. 2006 Nov;47(11):984-6.
16. Inci I, Ozcelik C, Ulku R, Tuna A, Eren N. Intrapleural fibrinolytic treatment of traumatic clotted hemothorax. *Chest*. 1998 Jul;114(1):160-5.

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17. Ben-Or S, Feins RH, Veeramachaneni NK, Haithcock BE. Effectiveness and risks associated with intrapleural alteplase by means of tube thoracostomy. *Ann Thorac Surg*. 2011 Mar;91(3):860-3; discussion 3-4.
18. Siles PJ, Drake RM, Helmer SD, Bjordahl PM, Haan JM. Evaluation of chest tube administration of tissue plasminogen activator to treat retained hemothorax. *Am J Surg*. 2014 Jun;207(6):960-3.
19. Constantinene B, Hobbs B, Cheatham M. Tissue Plasminogen Activator in Traumatic Hemothorax. Available at [Tissue plasminogen activator in traumatic hemothorax](#), Accessed October 21, 2025.
20. Skeete DA, Rutherford EJ, Schlidt SA, Abrams JE, Parker LA, Rich PB. Intrapleural tissue plasminogen activator for complicated pleural effusions. *J Trauma*. 2004 Dec;57(6):1178-83.
21. Thommi G, Nair CK, Aronow WS, Shehan C, Meyers P, McLeay M. Efficacy, and safety of intrapleural instillation of alteplase in the management of complicated pleural effusion or empyema. *Am J Ther*. 2007 Jul-Aug;14(4):341-5.
22. Hamblin SE, Furmanek DL. Intrapleural tissue plasminogen activator for the treatment of parapneumonic effusion. *Pharmacotherapy*. 2010 Aug;30(8):855-62.
23. Younes RN, Gross JL, Aguiar S, Haddad FJ, Deheinzelin D. When to remove a chest tube? A randomized study with subsequent prospective consecutive validation. *J Am Coll Surg*. 2002 Nov;195(5):658-62.
24. Parker, MH, Newcomb AB, Liu, C, Michel, C. Chest Tube Management Practices by Trauma Surgeons. *Journal of Surgical Research*. 2019 July: 225-230.
25. Halat, G, Negrin, L, Chrysou, K, Hokscho, B, Schmid, RA, Kocher, GJ. Treatment of air leak in polytrauma patients with blunt chest injury. *Injury Int J Care Injured*. 2017 48 1895-18
26. Yeates, E, Dennis, B, Xiao, D, et al. Suction versus Water Seal for Initial Treatment of Traumatic Pneumothorax (SEAL IT): A Pragmatic Cluster-Randomized Trial of Chest Tube Management.