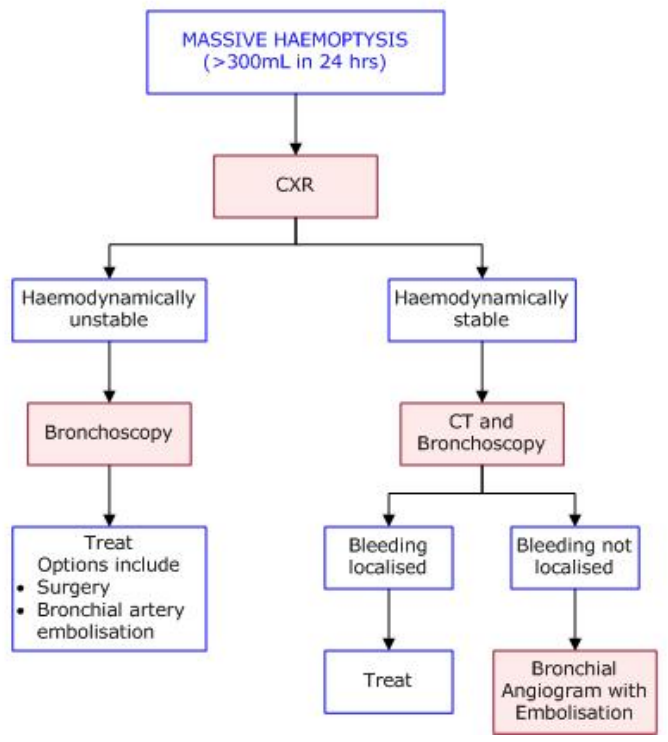
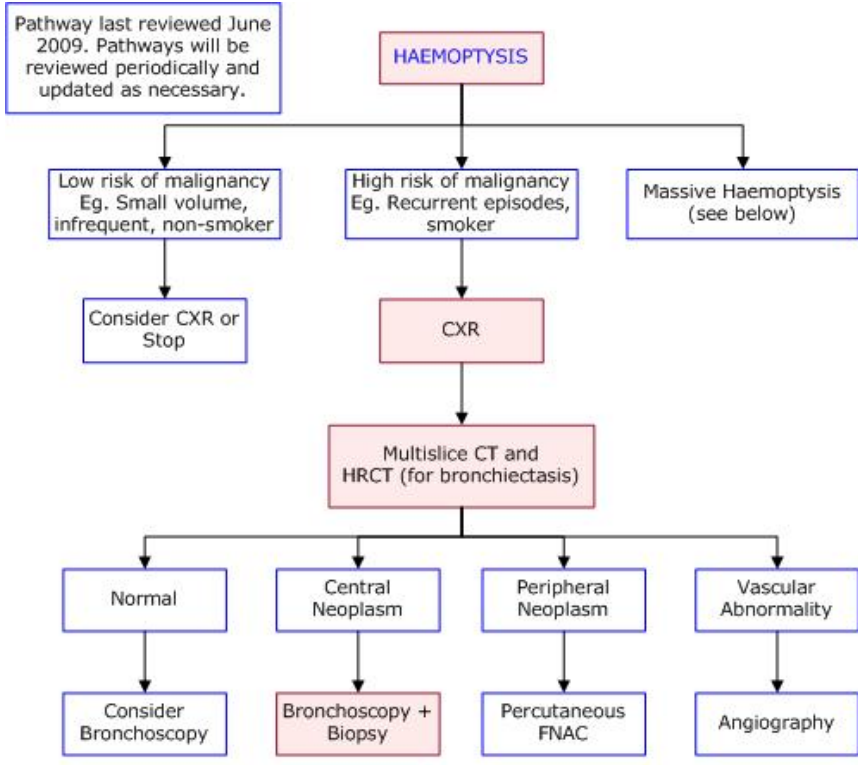




DIAGNOSTIC IMAGING PATHWAYS

www.imagingpathways.health.wa.gov.au



PLAIN CHEST RADIOGRAPHY

- May detect a cause of haemoptysis in 40-50% of cases. [1,10](#)
- Patients with negative CXR and two or more risk factors for malignancy (>50yrs old, >40 pack year smoking history) need to be further investigated. [2](#)
- Patients with fewer than two risk factors for malignancy can be followed by observation. [2](#)

HIGH RESOLUTION COMPUTED TOMOGRAPHY (HRCT)

- Investigation of choice for suspected bronchiectasis, which is the second most common cause of haemoptysis. [3](#)
- Thick slice helical CT is not effective as a screening modality for bronchiectasis.

BRONCHOSCOPY

- Allows biopsies to be taken for histology or brushings and washings for cytology and microbiology. [1-4](#)
- Provides the option of therapeutic intervention.
- Limitations: failure to visualise peripheral lesions. [3,5](#)
- Disadvantages: invasive procedure with a risk of complications.

COMPUTED TOMOGRAPHY

- Most sensitive diagnostic test with a positive yield of 67%. [1,5,6](#)
- Primary investigation in patients with normal or non-localising chest radiographs. [6,9](#)
- Initial Chest CT before bronchoscopy in patients in whom the chest radiograph is abnormal or suggestive of malignancy is cost effective in improving diagnostic yield from invasive diagnostic procedures and in some cases, eliminates the need for any further investigation. [3,6,7](#)
- In patients with non-massive haemoptysis, intravenous contrast is given if there are abnormalities seen on the CXR .
- Useful for:
 - Diagnosing peripheral airway disease, in particular, bronchiectasis, as well as radiographically occult parenchymal neoplasms. [3,6](#)
 - Staging of bronchogenic carcinoma. [8](#)
 - Guiding percutaneous needle biopsy.
 - Providing roadmap for both bronchial and transbronchial biopsy.
- Limitations: insensitive to early mucosal abnormalities. [3,5](#)

FLEXIBLE OR RIGID BRONCOSCOPY

- Urgent bronchoscopy is indicated in unstable patients with massive haemoptysis.
- Rigid bronchoscopy offers greater suctioning ability and maintenance of airway patency but flexible bronchoscopy may be more appropriate for peripheral lesions. [9,10](#)
- Precedes bronchial angiography and embolisation to locate the bleeding site (sensitivity 67%). [1](#)

BRONCHIAL ANGIOGRAPHY

- Indicated when bronchial embolisation is intended. [9](#)
- Angiographic signs of pulmonary haemorrhage include extravasation of contrast media, hypervascularisation, abnormal arborisation of bronchial arteries, systemic-pulmonary shunts and bronchial artery aneurysms.

BRONCHIAL ARTERY EMBOLISM

- Effective treatment adjunct to control bronchial bleeding and reduces the need for high-risk emergency lung resections (immediate control of bleeding in 75-93% of cases). [10-12](#)
- Aims to reduce the systemic arterial perfusion pressures to the fragile vessels within inflammatory tissue and to try to prevent the development and enlargement of non-bronchial systemic arterial collaterals. [9](#)
- Reserved for patients with life threatening haemoptysis.
- Helps avoid surgery in patients who are not good surgical candidates. [11](#)
- Limitations: [11,12](#)
 - 20% recurrence rate.
 - Potential complications include accidental embolisation of the spinal artery either by contrast material or the embolising particles causing ischaemic injury to the spinal cord.
 - 0-20% technical failure rate due to inability to cannulate the vessel, instability of the catheter tip, or visualisation of anterior spinal artery.

REFERENCES

1. Hirshberg B, Biran I, Glazer M, et al. **Hemoptysis: etiology, evaluation, and outcome in a tertiary referral hospital.** Chest 1997;112:440-44. (Level II/III evidence)
2. Poe RH, Israel RH, Marin MG, et al. **Utilization of fiberoptic bronchoscopy in patients with hemoptysis and a nonlocalizing chest roentgenogram.** Chest 1988;93(1):70-5. (Level II/III evidence)
3. McGuinness G, Beacher JR, Harkin TJ, et al. **Hemoptysis: Prospective high-resolution CT/bronchoscopic correlation.** Chest 1994;105:1155-62. (Level II/III evidence)

4. Lederle FA, Nichol KL, Parenti CM. **Bronchoscopy to evaluate hemoptysis in older men with nonsuspicious chest roentgenograms.** Chest 1989;95:1043-7. (Level III evidence)
5. Set PAK, Flower CDR, Smith IE, et al. **Hemoptysis: comparative study of the role of CT and fiberoptic bronchoscopy.** Radiology 1993;189:677-80. (Level II/III evidence)
6. Millar AB, Boothroyd AE, Edwards D, et al. **The role of computed tomography (CT) in the investigation of unexplained hemoptysis.** Respir Med 1992;86(1):39-44. (Level II/III evidence)
7. Laroche C, Fairbairn I, Moss H, et al. **Role of computed tomographic scanning of the thorax prior to bronchoscopy in the investigation of suspected lung cancer.** Thorax 2000;55:359-63. (Level II evidence). [Click here to view reference](#)
8. Nadich DP, Funt S, Ettenger NA, et al. **Hemoptysis: CT-bronchoscopic correlation in 58 cases.** Radiology 1990;177(2):357-62. (Level II/III evidence)
9. Marshall TJ, Flower CDR, Jackson JE. **The role of radiology in the investigation and management of patients with haemoptysis.** Clinical Radiology 1996;51:391-400. (Review article)
10. Jean-Bapiste E. **Clinical assessment and management of massive hemoptysis.** Crit Care Med 2000;28:1642-7. (Review article)
11. Swanson KL, Johnson CM, Prakash UBS, et al. **Bronchial Artery embolization: experience with 54 patients.** Chest 2002;121:789-95. (Level III evidence)
12. Mal H, Rullon I, Mellot F, et al. **Immediate and long-term results of bronchial artery embolisation for life threatening hemoptysis.** Chest 1999;115:996-1001. (Level III evidence)

Website

For more information go to www.imagingpathways.health.wa.gov.au

Copyright

© Copyright 2009, Department of Health Western Australia. All Rights Reserved.

This web site and its content has been prepared by The Department of Health, Western Australia. The information contained on this web site is protected by copyright.

Legal Notice

Please remember that this leaflet is intended as general information only. It is not definitive and The Department of Health, Western Australia can not accept any legal liability arising from its use. The information is kept as up to date and accurate as possible, but please be warned that it is always subject to change.

