# 64–Detector Row CT Evaluation of Nonbronchial Systemic Arteries in Life Threatening Hemoptysis

**Presenting Author: Dr. lyappan Ponnuswamy** Co-Authors: Prof. M. Prabakaran, Prof. N. Kailasanathan, Prof. K. Malathy

ID: CHSPO0120 **BARNARD INSTITUTE OF RADIOLOGY, MADRAS MEDICAL COLLEGE, CHENNAI - 600003** 



## **PATHOLOGIC PROCESSES CAUSING HEMOPTYSIS**



**IRIA 2010** 





Thick Walled **Tuberculous Cavity** 



**TB** Sequele Destroyed Left Lung

### **CT PROTOCOL FOR STUDY**



Scanogram showing position of Locator Box Shows the scanned region



Automatic Triggering at 100 HU used Scan from C6 to L2 level



Circular ROI – (Region of Interest) is placed over Descending Aorta

64 Detector CT – Philips Brilliance 64 KVp (Peak KV) = 120 kVp Tube Current = 370 mA Slice Thickness = 1mm Slice Interval = 0.5mm <u>Case Selection : Life threatening</u> Hemoptysis Exclusion Criteria : Contrast Allergy, **Unstable Patients** Total of 28 Patients in Study group

**Study Materials and Methods** 

### **INDIRECT SIGNS OF NON BRONCHIAL** SYSTEMIC ARTERIAL SUPPLY



**Basal Pleural Thickening indicates** 

likely Inferior Phrenic supply



Prominent

**Pleural Thickening** more than 3mm **Pleural Enhancement** 





Parenchymal lesion having broad contact with pleura

OBJECTIVE: To retrospectively evaluate nonbronchial systemic arteries at 64-detector row helical computed tomography (CT) compared with conventional angiography in patients undergoing endovascular treatment of hemoptysis.

METHODS: Sixty-four- detector row helical CT and conventional angiography of the thorax were performed in 28 patients (25 men, 3 women; age range, 18–65 years; mean age, 40 years) with life threatening hemoptysis. CT images were analyzed for visibility, traceability of nonbronchial systemic arteries from their origin at the aorta or aortic branches and were compared with conventional angiography findings.

RESULTS: Nonbronchial arterial supply was noted in 12 patients on the right side(43%) and 14 patients on the left side(50%). 23 nonbronchial systemic arteries were noted on Right side and 41 on Left side. Internal Mammary artery (29%) was found to be the most common non bronchial systemic artery on the left side and Intercostal arteries (34%) were found to be the most common nonbronchial systemic artry on the right side. Subclavian, costocervical trunk, thyrocervical acromiothoracic, lateral thoracic, pericardiophrenic, inferior phrenic, gastric and hepatic arteries were the other nonbronchial systemic arteries detected. Pleural thickening more than 3mm was found to be a good predictor of nonbronchial systemic supply. Internal mammary artery diameter greater than 3mm and Inferior phrenic artery diameter more than 2mm were sensitive indicators for nonbronchial systemic supply.

CONCLUSION: MDCT accurately depicts the origin, size and course of non bronchial systemic arteries in cases of life threatening hemoptysis and serves as a road map for percutaneous transcatheter embolization.



**Prominent Right Internal Mammary** artery supplying **Right Upper Lobe Cavity** 



Left Lateral Thoracic Artery noted to be Hypertrophied supplying left apical pleural thickening







Hypertrophic and Tortuous Right 4<sup>th</sup> Intercostal Artery supplying **Right Upper lobe lesion** 





**Hypertrophied Right Internal** Mammary Artery associated with right upper lobe cavity and pleural thickening > 3mm





**Branch of Left Internal Mammary** Artery noted to be hypertrophied and tortuous supplying a lesion in Upper lobe



**Left Inferior Phrenic Artery** hypertrohied > 2mm supplying left basal lesion

**Branch of Left Gastric Artery** supplying a left basal lesion. Note severe pleural thickening on left side



**Dilated Left Inferior Phrenic** artery in Left Lower lobe Bronchiectasis



Intercostal artery causing recurrent hemoptysis

Multiple branches from Hypertrophied **Right Intercostal Artery associated** with a peripheral lung parenchymal lesion

**Branch from Left Subclavian Artery** which is hypertrophied noted in the thickened left apical pleura



Phrenic Branch of Left Hepatic Artery is hypertrophied and supplies a left basal lesion

Hypertrophied Right Pericardio Phrenic Artery noted with right basal lesion. Risk of non target embolisation is high

**Distribution of Types of Non Bronchial Systemic Arteries in Life Threatening Hemoptysis** Note: Multiplicity of Pathologic Intercostal arteries was not taken into account

**Branches of Right Intercostal Artery** supplying a thick walled cavity with Aspergilloma

**3D SSD Image Showing Multiple Dilated and Tortuous Right Upper Intercostal Arteries** 

#### **References:**

(1) Young Cheol Yoon et al; Hemoptysis: Bronchial and Nonbronchial Systemic Arteries at 16-Detector Row CT; Radiology 2005: 234:292-298 (2) Martine Remy-Jardin et al; Bronchial and Nonbronchial Systemic Arteries at Multi-Detector Row CT Angiography: Comparison with Conventional Angiography; Radiology 2004; 233:741–749 (3) John F. Bruzzi et al; Multi–Detector Row CT of Hemoptysis; RadioGraphics 2006; 26:3–22 (4) Woong Yoon et al; Bronchial and Nonbronchial Systemic Artery Embolization for Lifethreatening Hemoptysis: A Comprehensive Review; RadioGraphics 2002; 22:1395–1409 (5) Uflacker et al. Bronchial artery embolization in the management of hemoptysis: technical aspects and long-term results. Radiology 1985; 157:637-644