Short Cases
Cross Canada Rounds

By: Wallace Wee

June 20, 2019

Purpose

- Learn from three interesting cases seen while on consults

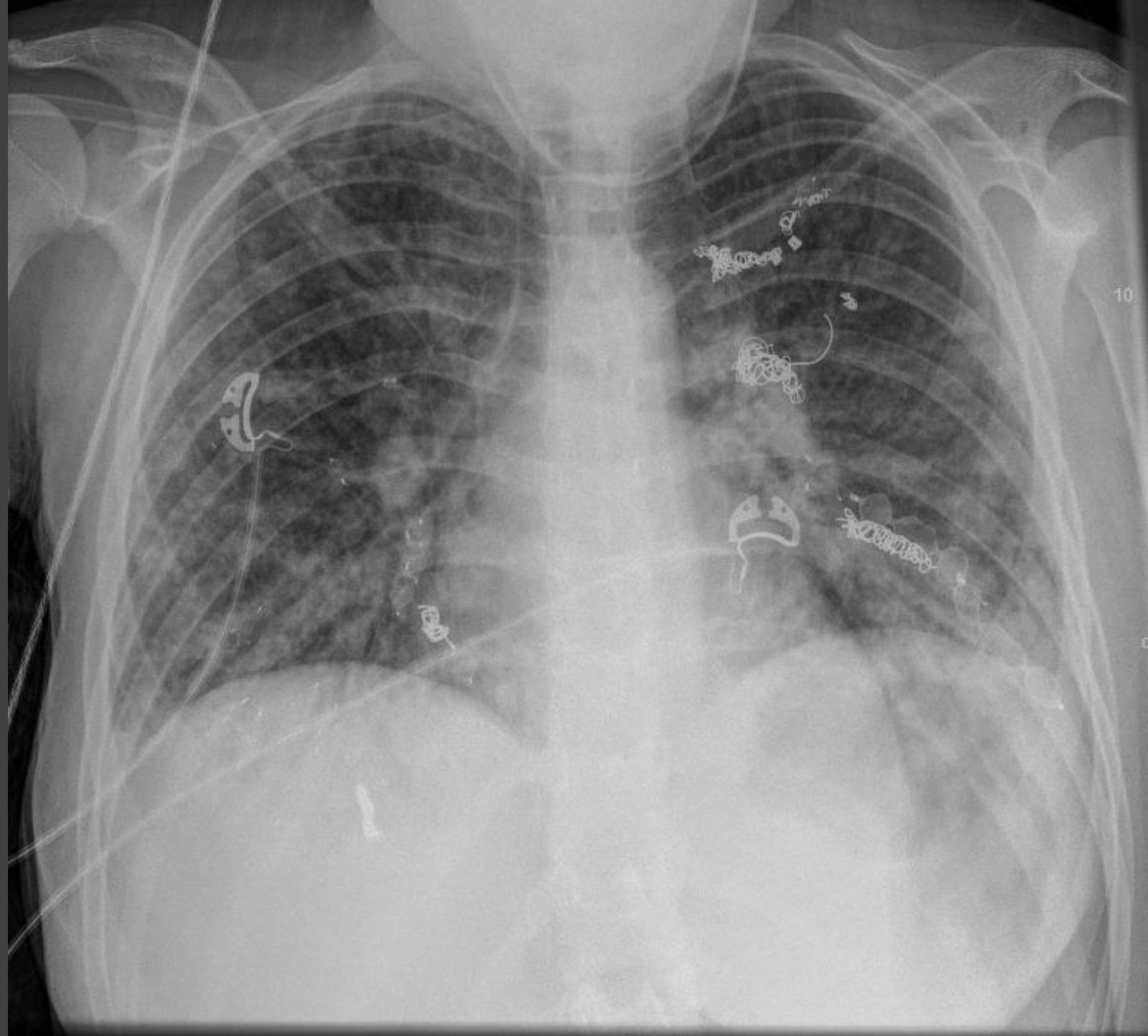
Act 1

A story of 3 old men

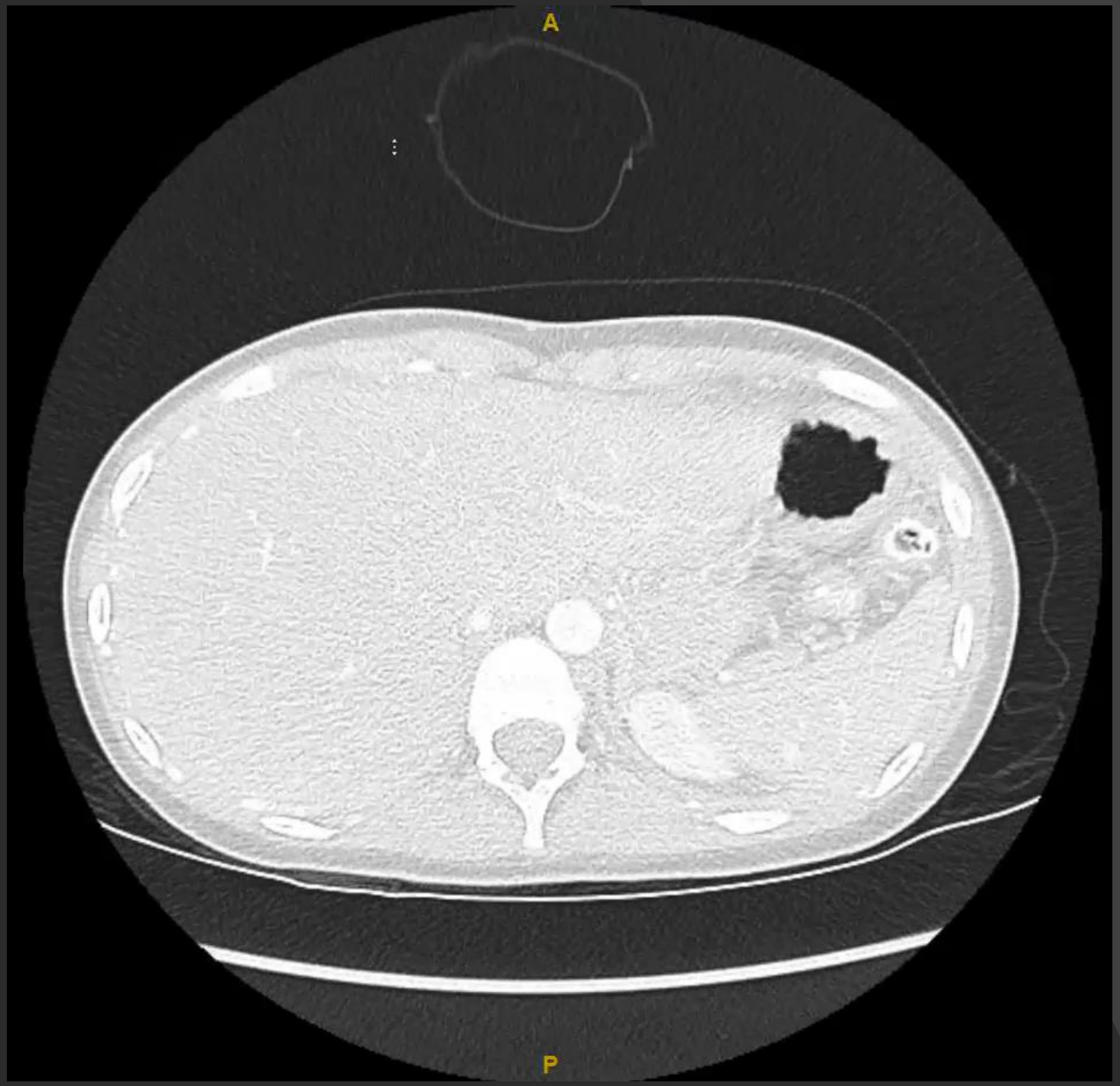
Clinical Scenario

- You are called to the Emergency for a patient who is cyanotic, has chest pain and an abnormal CXR

Chest X Ray



Chest CT



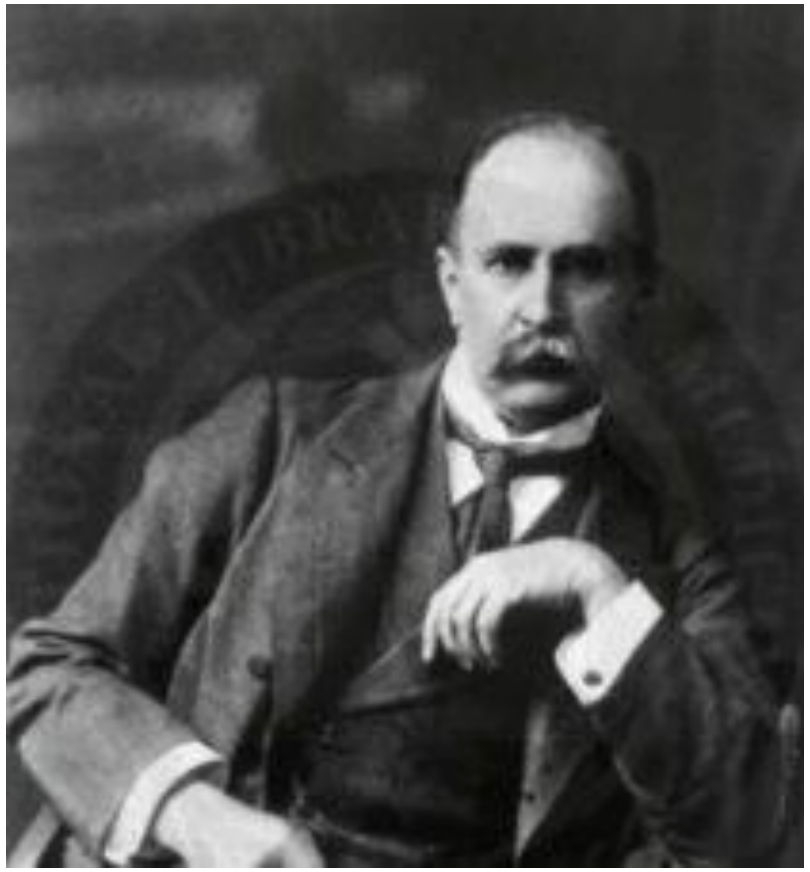
History

- 12 yo F with HHT1, ENG gene mutation
- Multiple pAVM and embolizations
- Baseline oxygen requirements
- Presenting today with respiratory distress
- Noted to have recent embolization 3 days prior

Bloodwork

- WBC: 10.02 (H)
- RBC: 7.80 (H)
- **HGB: 215 (CH)**
- **HCT: 0.670 (H)**
- PLT: 69 (L)
- MCV: 85.9
- MCH: 27.6
- MCHC: 321
- RDWCV: 17.5 (H)
- RDWSD: 55.0 (H)
- NRBC: 0.0
- Immature Platelet Fraction: 9.2 (H)

- INR: 1.2
- PTT: 31
- Fibrinogen: 7.3 (H)
- D-DIMER: 1.75 (H)

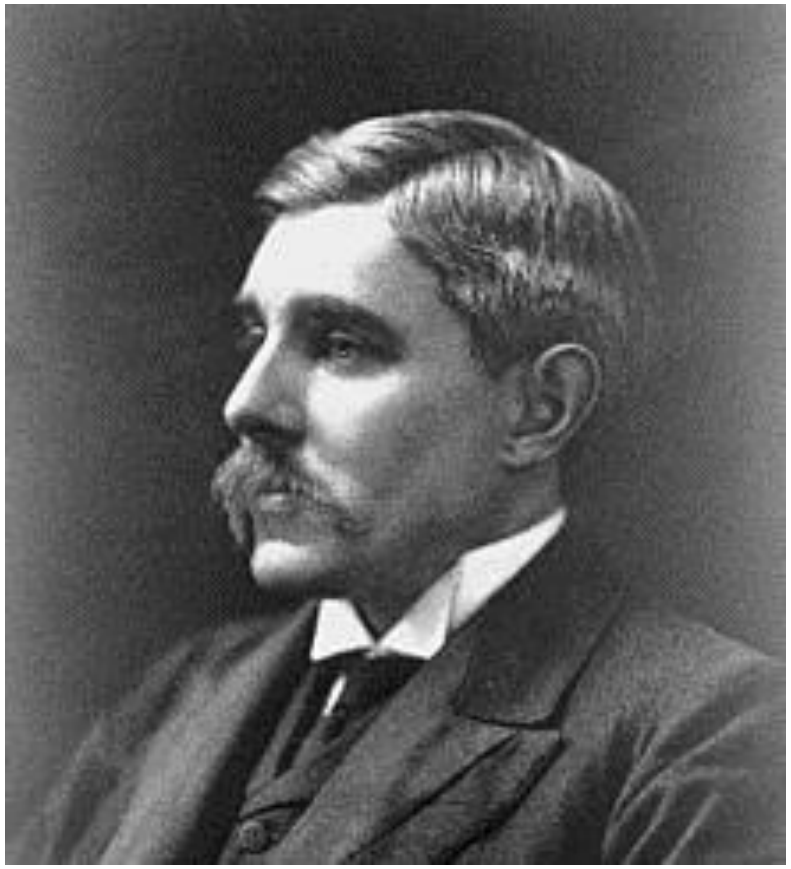


HEREDITARY EPISTAXIS.

To the Editor of THE LANCET.

SIR,—The following history of an hereditary tendency to epistaxis, you may, perhaps, deem sufficiently remarkable to merit insertion in THE LANCET :—

Mrs. L——, a native of Lincolnshire, was, during all her early life and up to the period of her marriage, the subject of frequent and violent epistaxis. She had four children, two of whom (a male and a female) likewise had habitual and severe epistaxis. The male, Mr. L——, died of this disease; the female, Mrs. C——, had six female children, of whom three suffered from epistaxis during all the earlier period of their lives. One of them, who is my informant, Mrs. K——, has



Year	Milestones in history of HHT
1864	First description of HHT by Sutton in a man with a vascular malformation and recurrent epistaxis
1896	Rendu recognized combination of hereditary nature of telangiectasia and epistaxis
1901	Osler described familial nature and published a syndrome in textbook
1907	Weber emphasized the association between hereditary telangiectasia and haemorrhage
1909	Hanes coined the term 'Hereditary Hemorrhagic Telangiectasia'

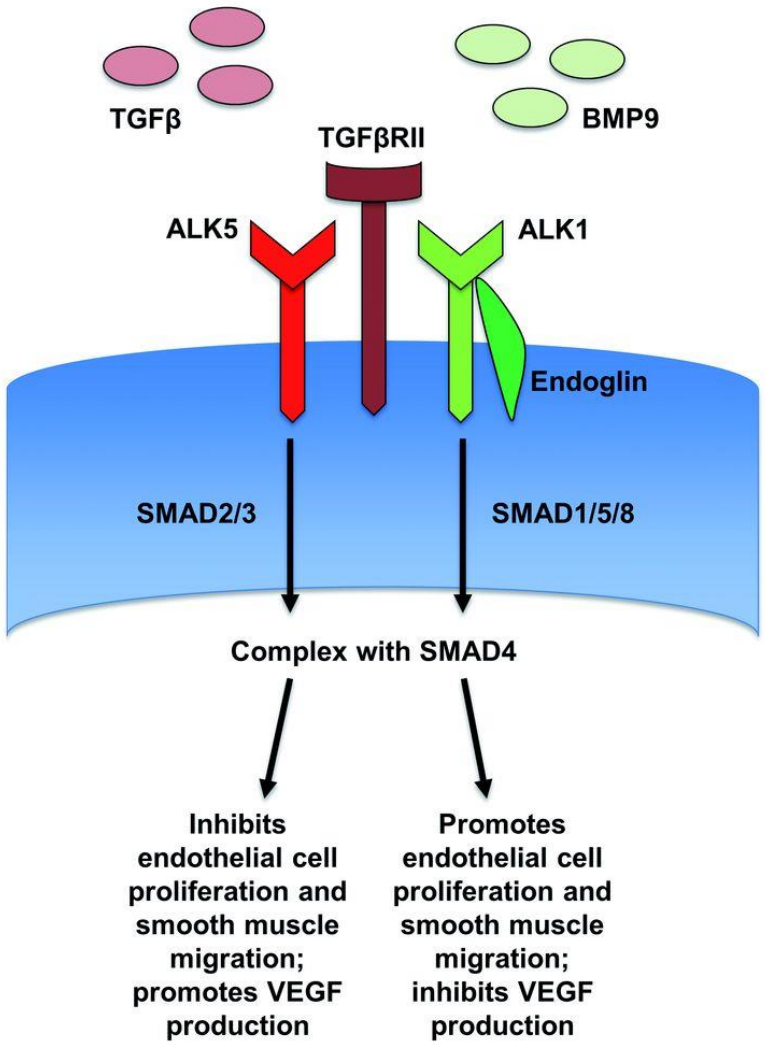
Historically

Diagnostic Criteria

Table 2 Curaçao Criteria for clinical diagnosis of hereditary haemorrhagic telangiectasia (HHT)

Criteria	Description
Epistaxis	Spontaneous and recurrent
Telangiectases	Multiple, at characteristic sites: lips, oral cavity, fingers, nose
Visceral lesions	Gastrointestinal telangiectasia, pulmonary, hepatic, cerebral or spinal arteriovenous malformations
Family history	A first-degree relative with HHT according to these criteria

Pathophysiology



Mutation in *ENG*, *ACVRL1/ALK1*, or *BMP9/GDF2*

↓Endoglin, ↓ALK1, or ↓BMP9 leads to reduced signaling through ALK1 and increased signaling through ALK5

↑VEGF leads to increased endothelial proliferation (exacerbated by stress or hypoxia)

Arteriovenous malformations
Telangiectasias
Manifestations of HHT

doi:10.3324/haematol.2018.193003

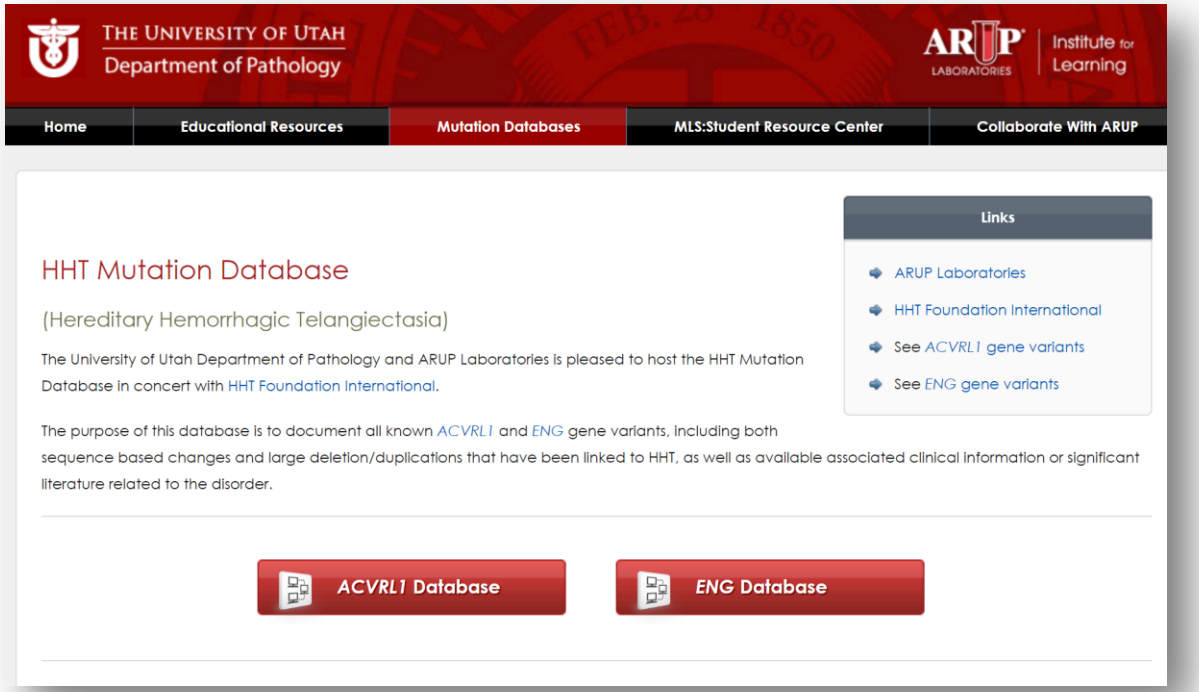
Genetics

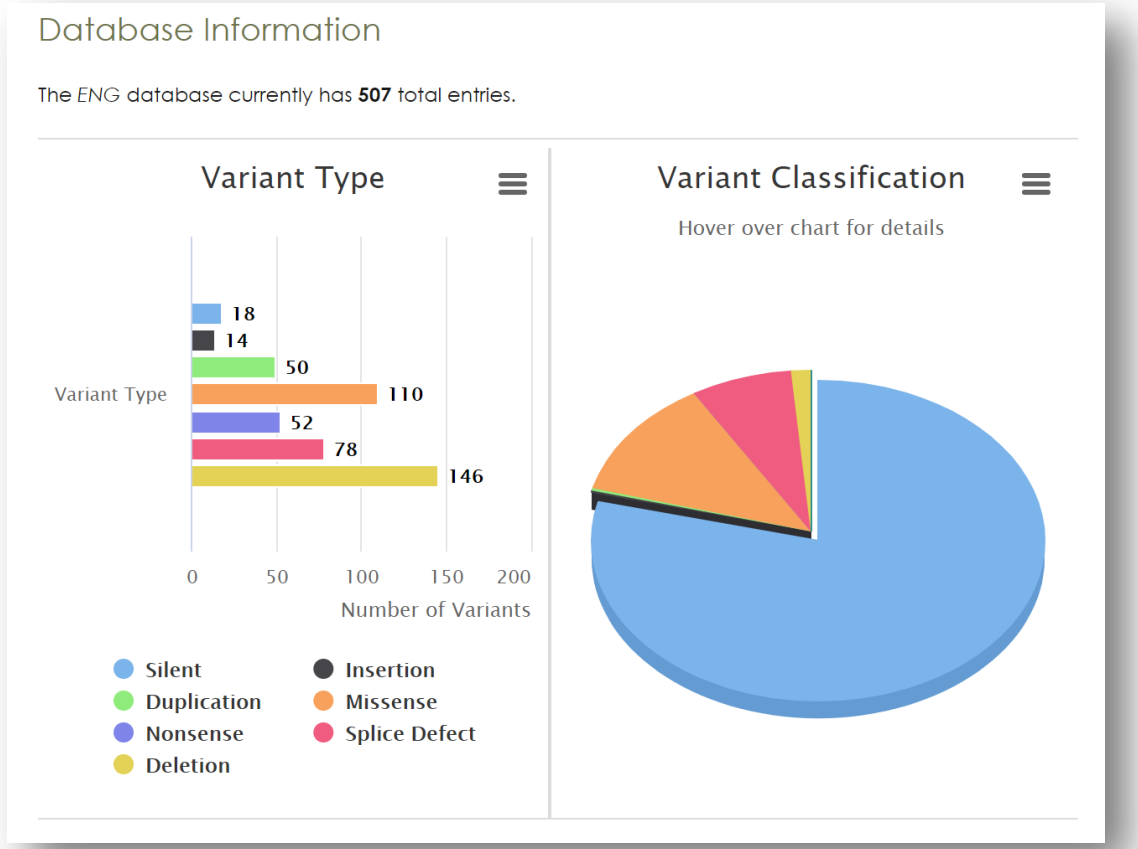
- Autosomal Dominant Disease but with variable penetrance and expression
- Most common genes affected

Gene	Classification	Product	OMIM
ENG	HHT1	Endoglin	187300
ACVRL1	HHT2	Activin Receptor-like Kinase 1	600376
SMAD4	Juvenile Polyposis/HHT overlap syndrome (JPHT)		175050

Diagnosis – Genetics

http://arup.utah.edu/database/HHT/





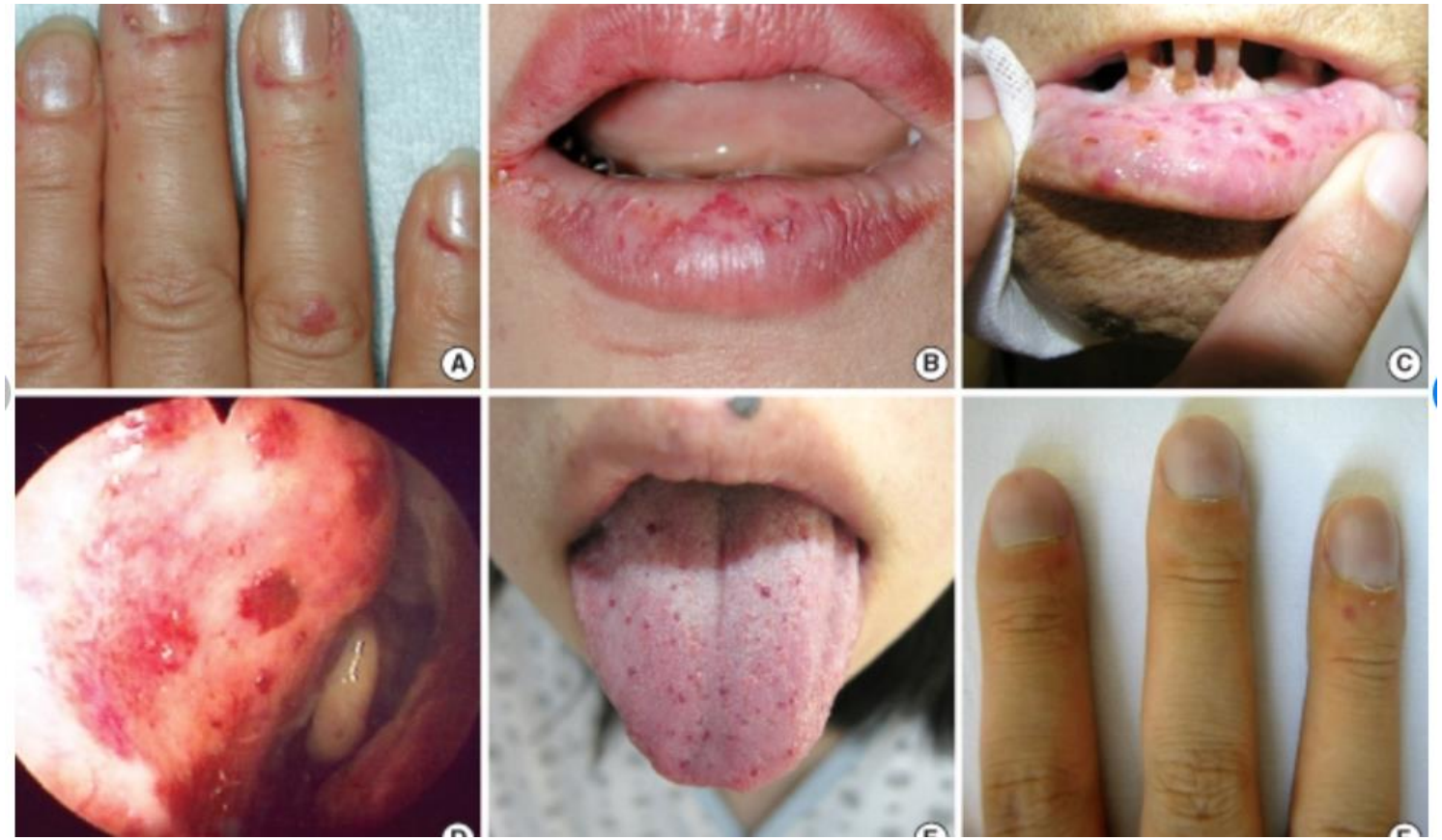
Diagnosis - Caveats

International guidelines for the diagnosis and management of hereditary haemorrhagic telangiectasia

M E Faughnan,[1,2] V A Palda,[3] G Garcia-Tsao,[4] U W Geisthoff,[5,6] J McDonald,[7] D D Proctor,[8] J Spears,[9] D H Brown,[10] E Buscarini,[11] M S Chesnutt,[12] V Cottin,[13] A Ganguly,[14] J R Gossage,[15] A E Guttmacher,[16] R H Hyland,[1] S J Kennedy,[17] J Korzenik,[18] J J Mager,[19] A P Ozanne,[20] J F Piccirillo,[21] D Picus,[22] H Plauchu,[23] M E M Porteous,[24] R E Pyeritz,[25] D A Ross,[26] C Sabba,[27] K Swanson,[28] P Terry,[29] M C Wallace,[30] C J J Westermann,[19] R I White,[31] L H Young,[32] R Zarrabeitia[33]

Applicability of the Curaçao Criteria for the Diagnosis of Hereditary Hemorrhagic Telangiectasia in the Pediatric Population

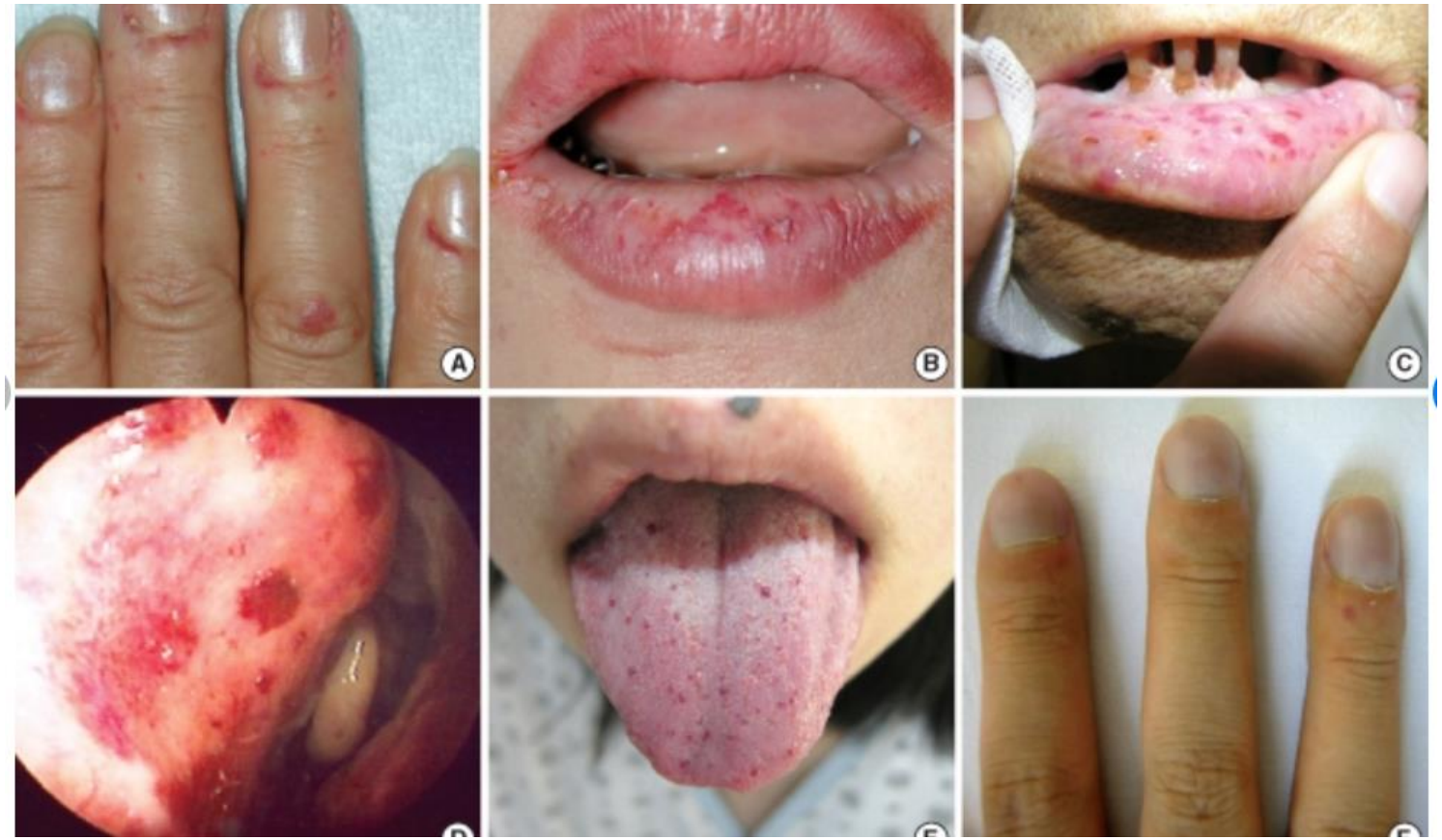
Kristy S. Pahl, MD[1], Arkopal Choudhury, MStat[2], Katie Wusik, LGC[3], Adrienne Hammill, MD, PhD[4,5], Andrew White, MD[6], Katharine Henderson, MS[7], Jeffrey Pollak, MD[7], and Raj S. Kasthuri, MD[8]



Clinical Manifestations

- Epistaxis
- Telangiectasias
- Pulmonary Arterial-Venous Malformations (AVM)
- Thromboembolism
- Gastrointestinal bleeding
- Hepatic AVM
- Cerebral AVM

DOI: 10.3346/jkms.2009.24.1.69



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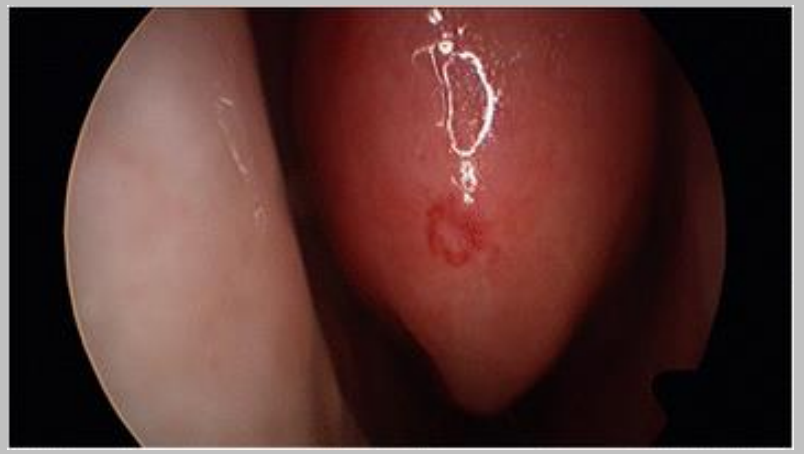
Epistaxis

- Most common symptom
- Can cause iron deficiency anemia
- Multifactorial triggers



Epistaxis in hereditary hemorrhagic telangiectasia: an evidence based review of surgical management

Christopher J. Chin, Brian W. Rotenberg and Ian J. Witterick

Journal of Otolaryngology - Head & Neck Surgery 2016 **45**:3
https://doi.org/10.1186/s40463-016-0116-8
Received: 24 August 2015 | **Accepted:** 5 January 2016 | **Published:** 12 January 2016

Epistaxis

Conservative medical management

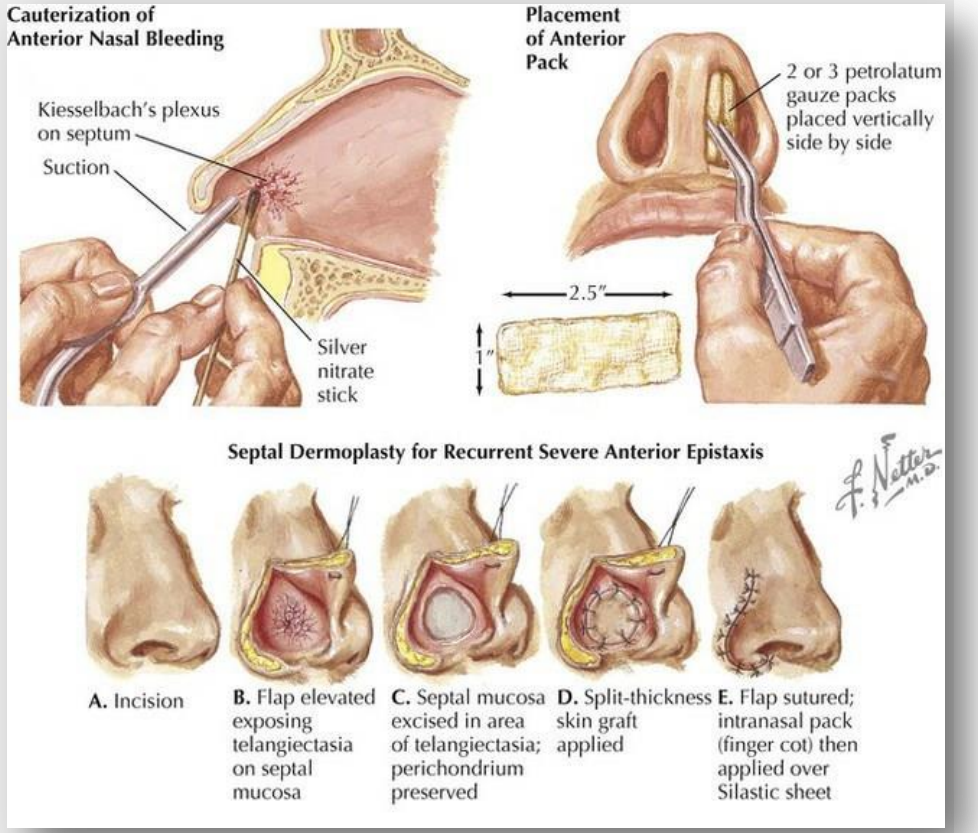
Procedural/Surgical

DOI: 10.1002/alr.21287

Netter’s Anatomy

Epistaxis

- Conservative medical management
- Procedural/Surgical



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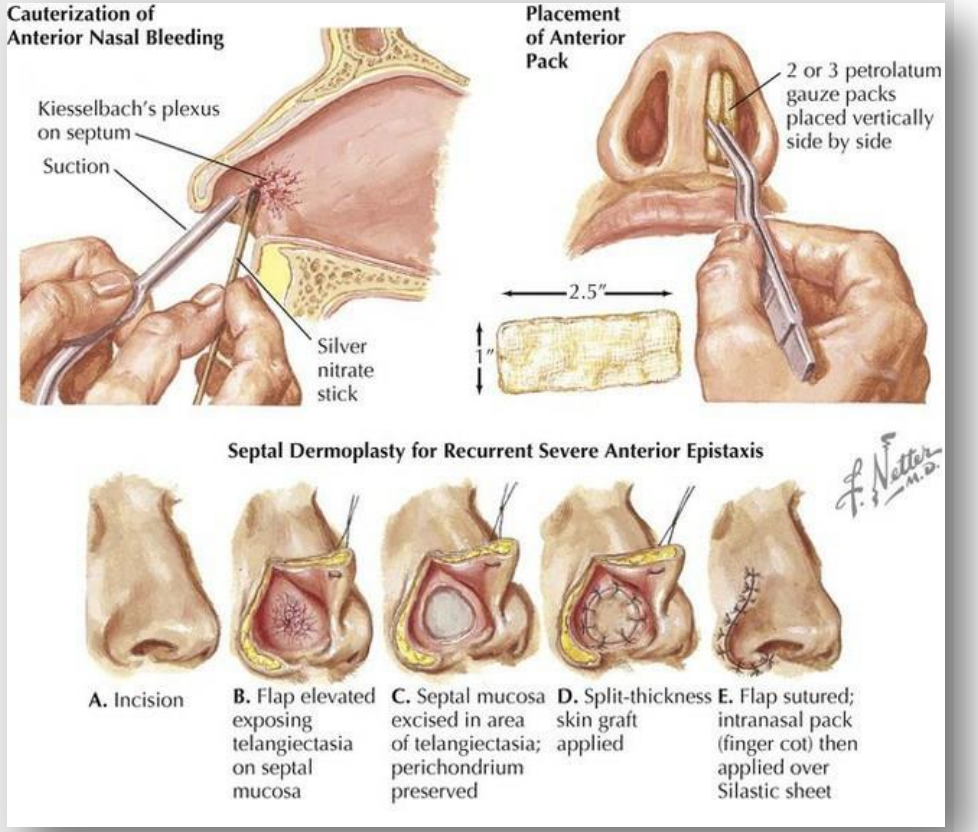

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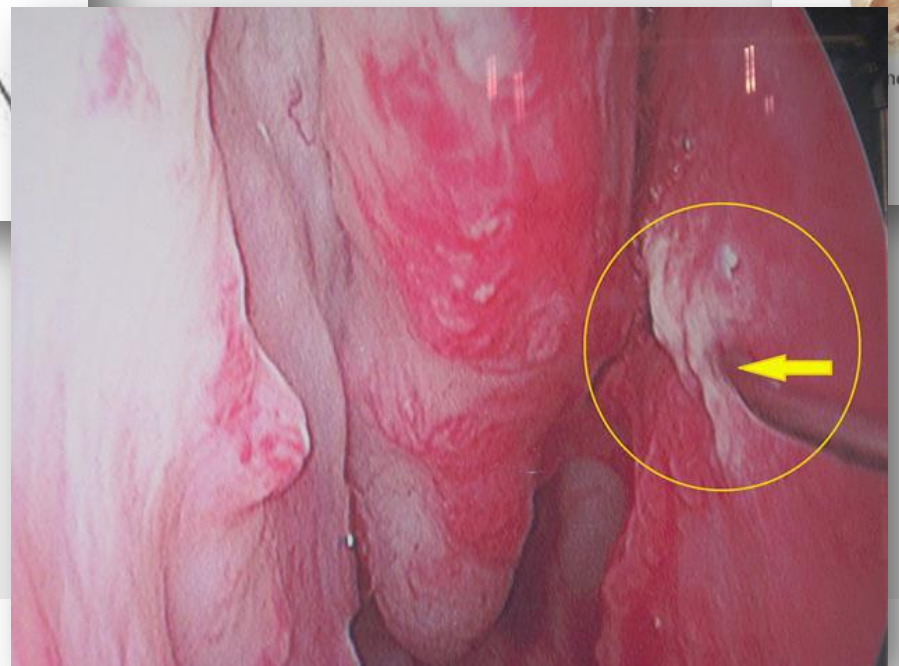

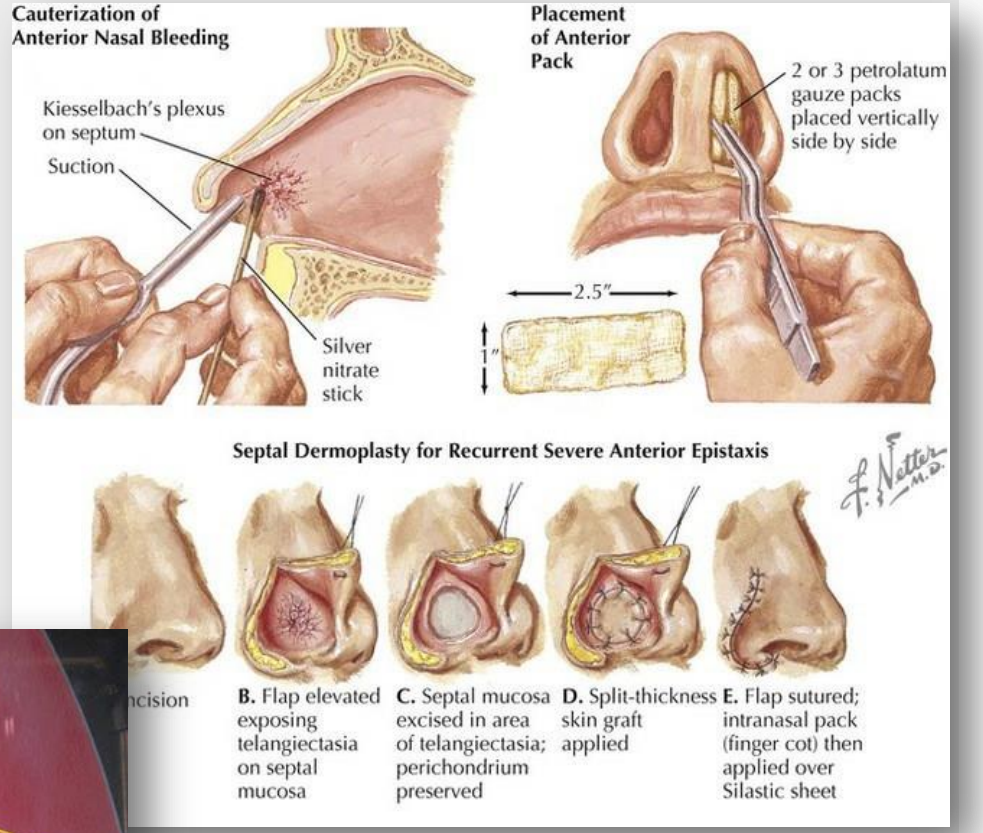

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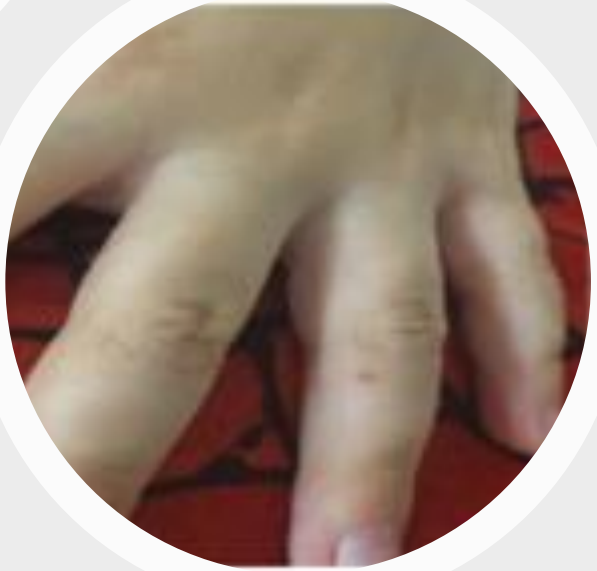
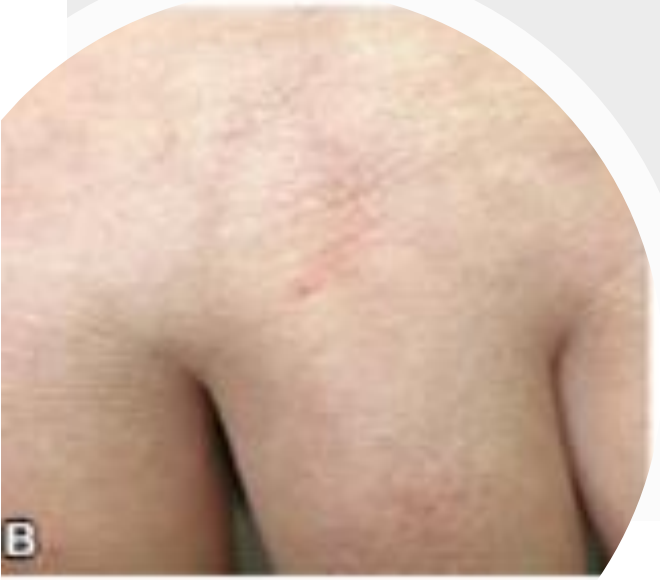




Telangiectasias

- Present later in life
- Sites:
  - Lips, tongue, buccal mucosa, and fingertips

https://doi.org/10.1016/j.jaad.2018.11.014

Localization and age distribution of telangiectases in children and adolescents with hereditary hemorrhagic telangiectasia: A retrospective cohort study

Cristian D. Gonzalez, MD,[a] Sarah D. Cipriano, MD, MPH, MS,[b] Christina A. Topham, BS,[c] David A. Stevenson, MD,[d] Kevin J. Whitehead, MD,[e,f] Sheryll Vanderhooft, MD,[c] Angela P. Presson, PhD,[g] and Jamie McDonald, MS[h,i]

Salt Lake City, Utah, and Stanford, California

Table III. Location and prevalence of mucocutaneous telangiectases in pediatric HHT

Location	Patients with telangiectasia,* n (%) (n = 64)	Total telangiectases,† n (%) (n = 319)
Cutaneous	61 (95)	233 (73)
Ears	3 (5)	4 (1)
Face	15 (23)	21 (7)
Neck	2 (3)	2 (0.6)
Arm	18 (28)	29 (9)
Elbow and forearm	12 (19)	21 (7)
Wrist	7 (11)	8 (2.5)
Hands	40 (63)	105 (33)
Palmar aspect of the hand	25 (39)	48 (15)
Dorsal aspect of the hand	25 (39)	57 (18)
Fingers	36 (56)	71 (22)
First digit	12 (19)	13 (4)
Second digit	19 (30)	26 (8)
Third digit	12 (19)	17 (5)
Fourth digit	9 (14)	10 (3)
Fifth digit	5 (8)	5 (2)
Back	1 (2)	1 (0)
Oral	32 (50)	86 (27)
Lips	26 (41)	48 (15)
Upper lip	15 (23)	17 (5)
Lower lip	19 (30)	31 (10)
Buccal mucosa	1 (2)	1 (0)
Palate	3 (5)	3 (1)
Tongue	12 (19)	34 (11)

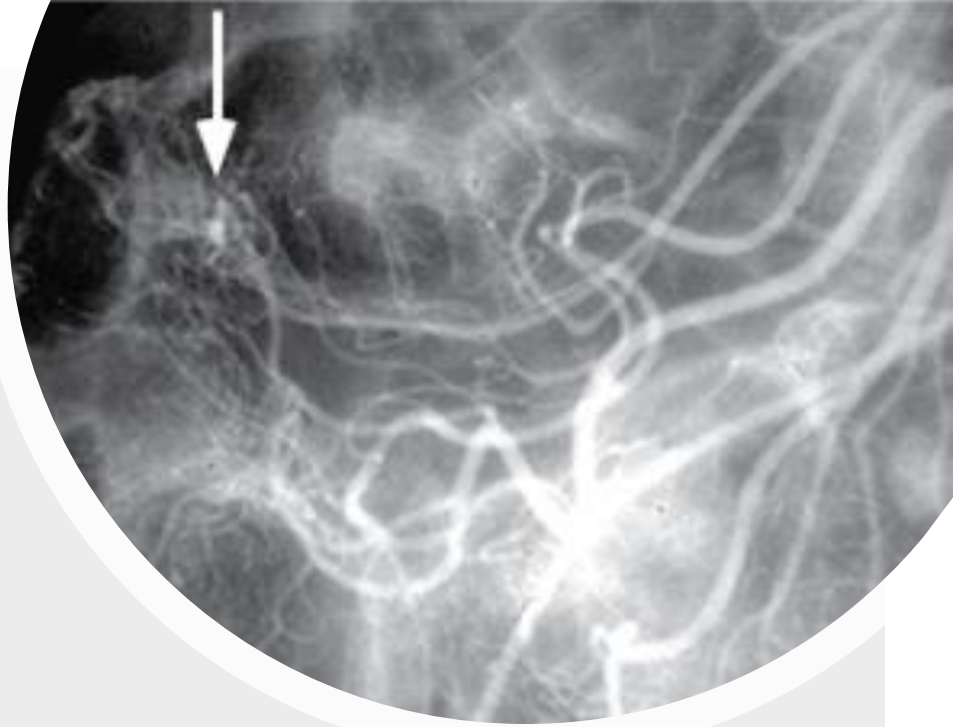
HHT, Hereditary hemorrhagic telangiectasia.

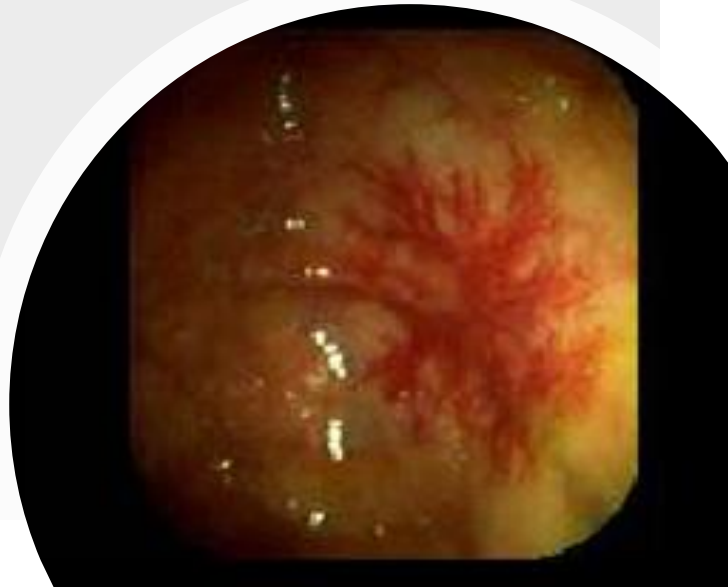
*Summaries at the patient level (includes patients with at least 1 telangiectasia [n = 64]). Percentages calculated by dividing by the total number of patients with telangiectases (n = 64).

†Summaries at the telangiectasis level. Percentages calculated by dividing by the total number of telangiectases (n = 319).

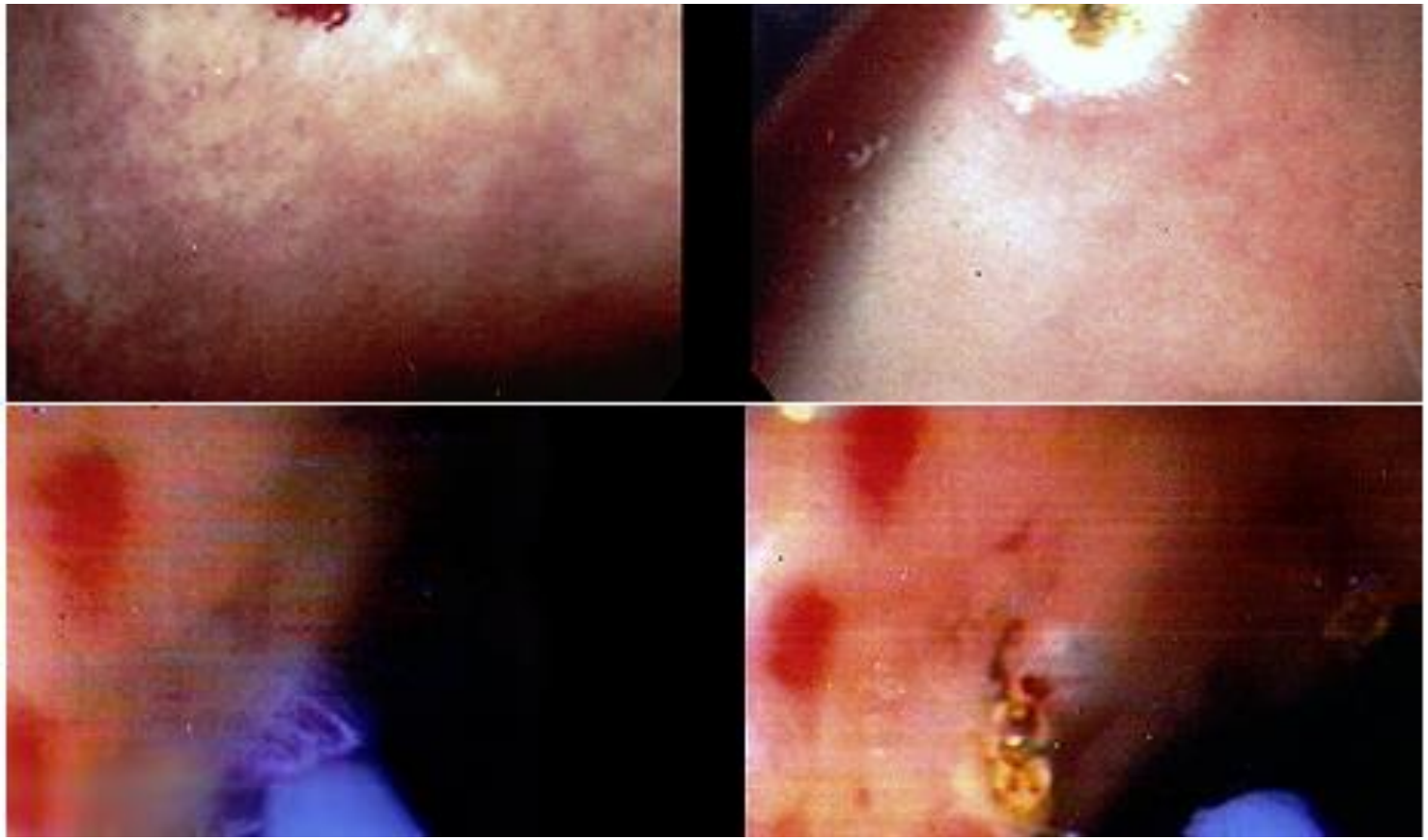
Gastrointestinal Bleeding

- Frequency: 1/3 of HHT patients
- Typically in patients > 40 years old
- Sites: stomach and duodenum > colon
- Investigation: Endoscopy
- Management: Ablation





Uptodate, HHT



Gastrointestinal Bleeding

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- Typically in patients > 40 years old
- Sites: stomach and duodenum > colon
- Investigation: Endoscopy
- Management: Ablation

Uptodate, HHT Management

Hepatic Involvement

- Frequency: ~2/3 of HHT patients
- Clinical Symptoms: silent
- Screening: Not recommended unless symptoms present
- Investigations:
  - Imaging, no liver biopsy
- Treatment:
  - Liver transplant if liver failure

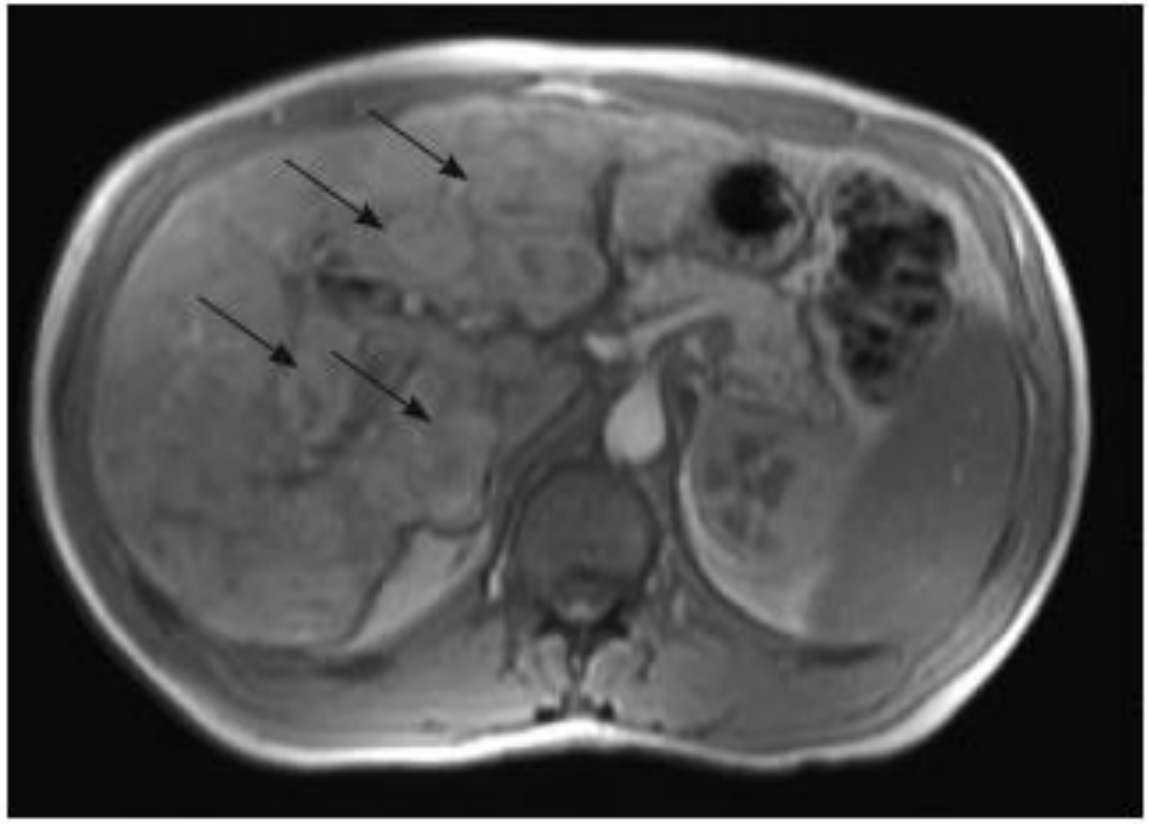
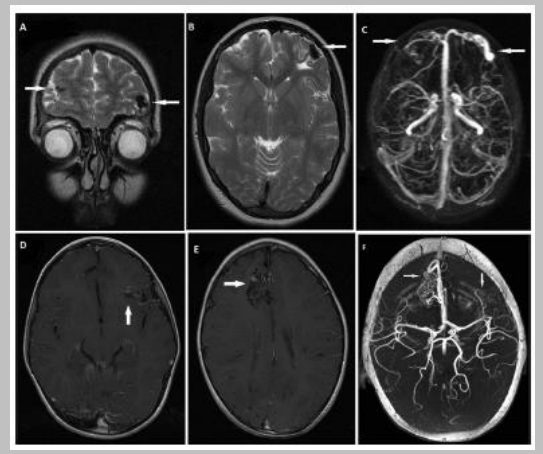


Figure 4. Magnetic resonance imaging of the liver showing multiple hepatic nodules *(arrows)* in an asymptomatic patient.

DOI: 10.1007/s10620-011-1585-2, PMID: 20879701

Cerebral AV Shunts

- Types:
  - classical nidal AVMs,
  - micro AVMs (nidus <1 cm),
  - high-flow arteriovenous fistulae
  - Telangiectasias
- Spinal AVF suggestive of HHT
- Frequency: 10% of HHT patients
- Presentations: cerebral hemorrhage, seizures, ischemia, macrocephaly, hydrocephalus
- Treatment embolization, radiotherapy, surgery



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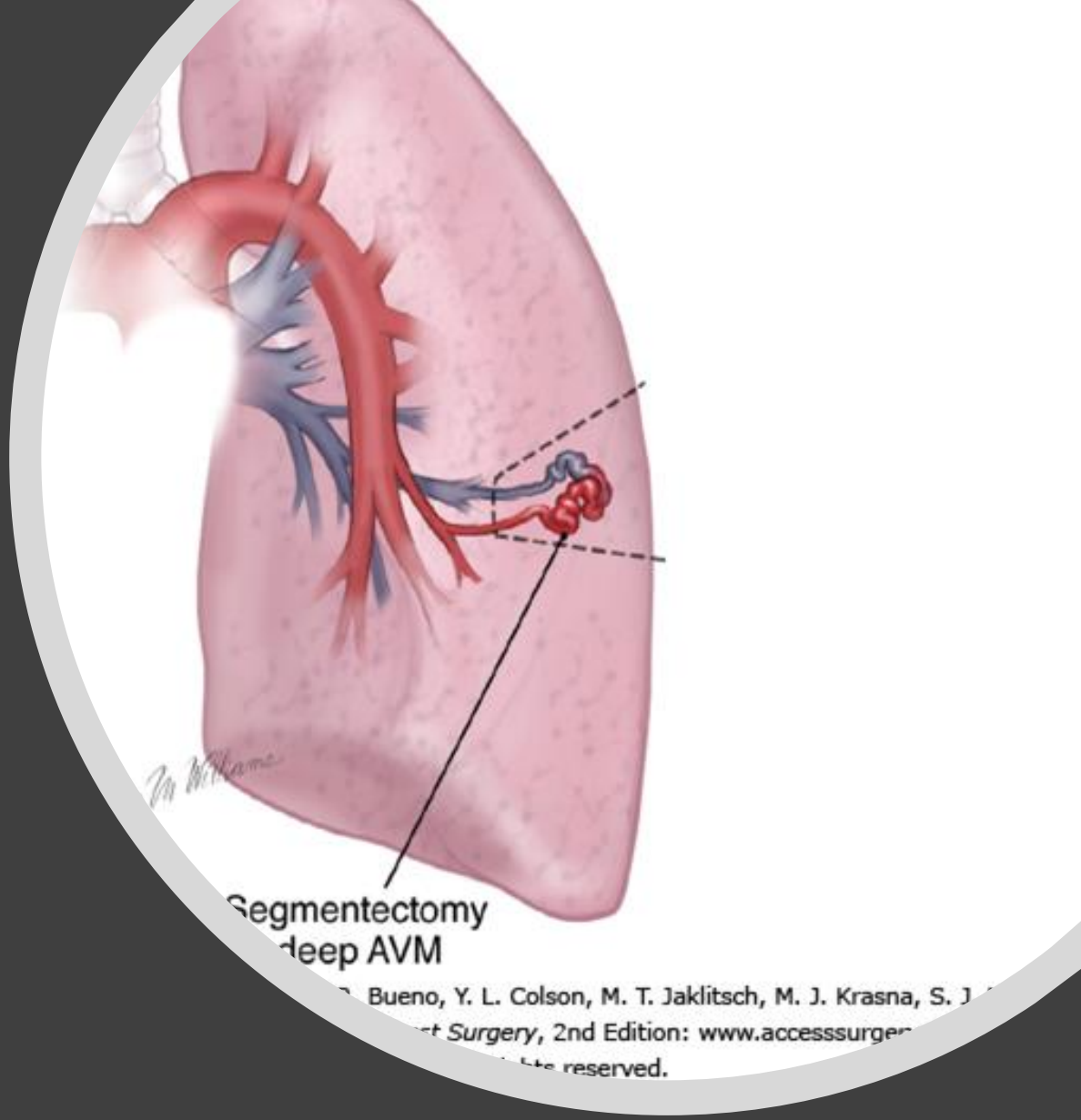
Paola Giordano, MD[1], Gennaro M. Lenato, PhD[2], Patrizia Suppressa, MD[2], Patrizia Lastella, MD[2], Franca Dicuonzo, MD[3], Luigi Chiumarulo, MD[3], Maria Sangerardi, MD[1], Paola Piccarreta, MD[1], Raffaella Valerio, MD[2], Arnaldo Scardapane, MD[4], Giuseppe Marano, MD[4], Nicoletta Resta, PhD[5], Nicola Quaranta, MD[6], and Carlo Sabbà, MD[2,7]

Pulmonary AVM

Pulmonary AVM

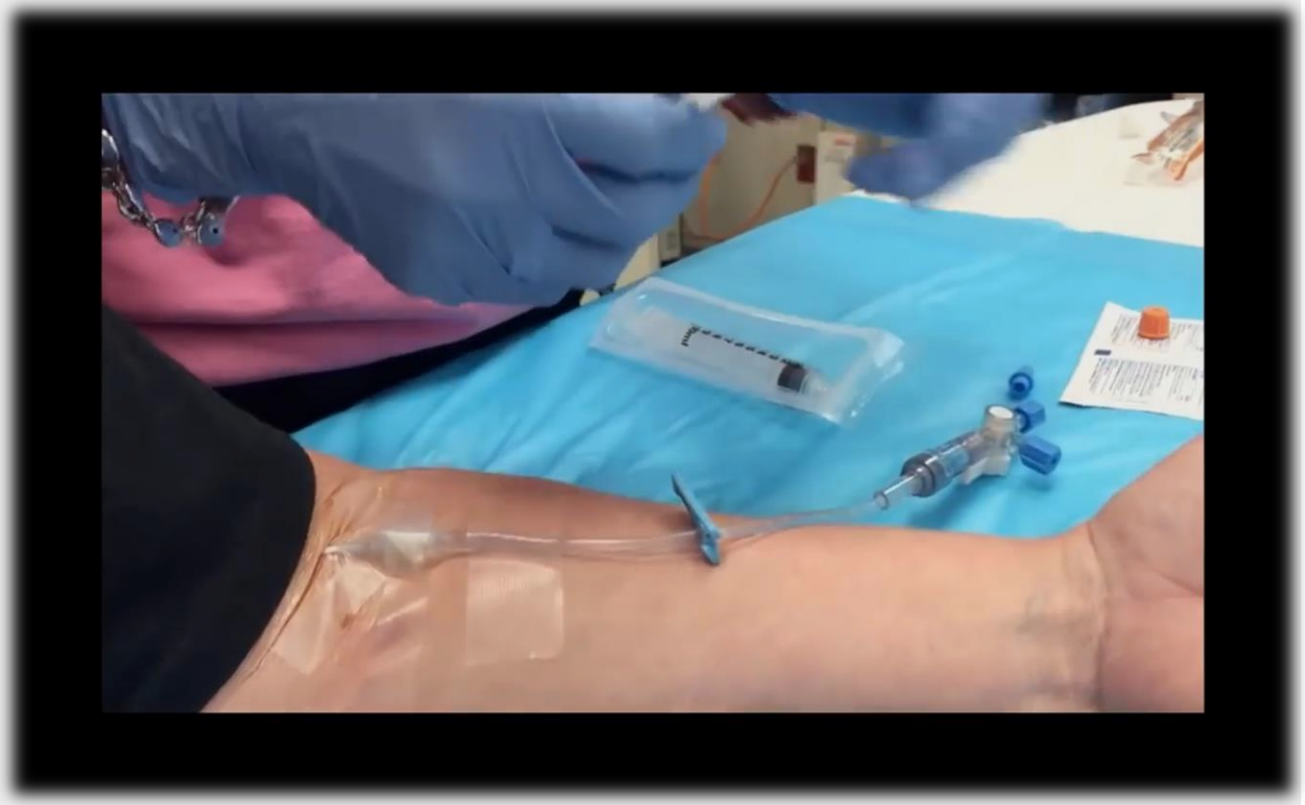
- Frequency: 15-30% of HHT pt
- Sequelae:
  - Hypoxemia
  - Polycythemia
  - Infection risk -> brain abscess
  - Embolism risk -> cerebrovascular events
  - Hemothorax
  - Hemoptysis
  - Migraines



PMID: 20879701

Pulmonary AVM

- Investigations:
  - Bubble ECHO
  - Chest computed Tomography



https://www.youtube.com/watch?v=sYM1HYFpyXA, PMID: 20879701

Pulmonary AVM

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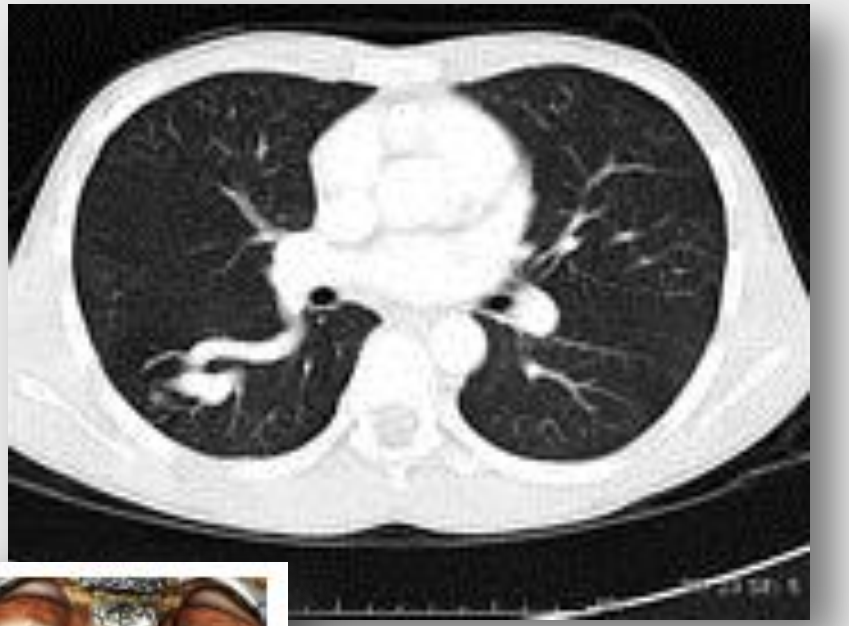

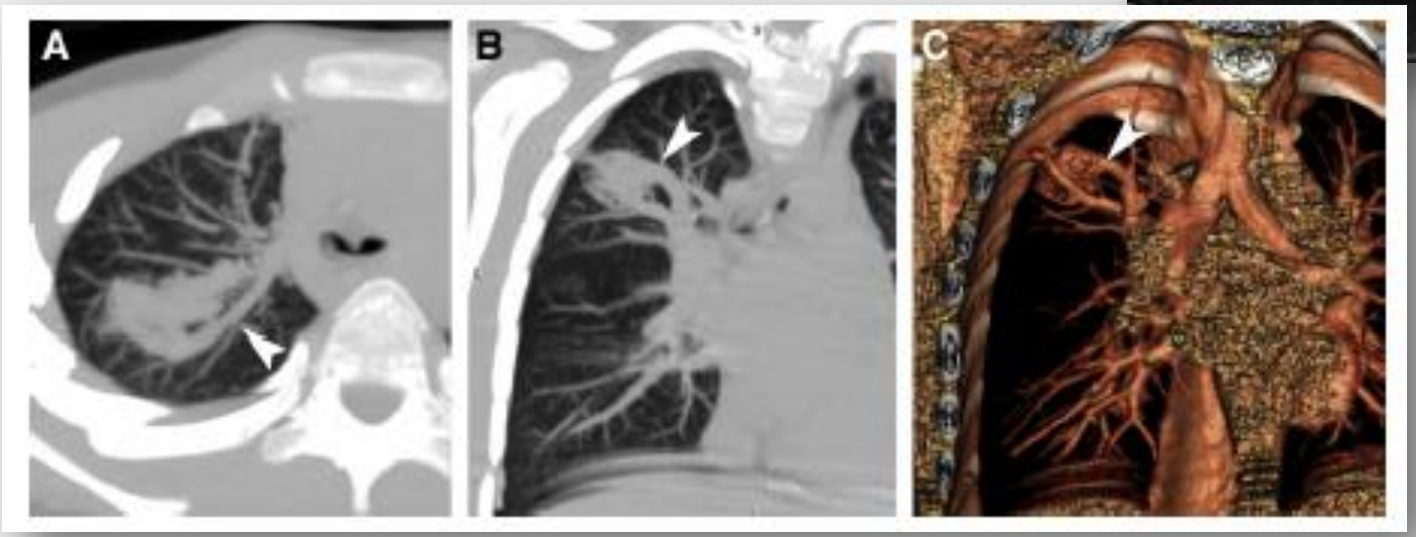

Radiopedia, J Pediatr 2013;163:179-86

CLINICALLY SUSPECTED PULMONARY ARTERIOVENOUS MALFORMATION (PAVM)

Expert Panel on Vascular Imaging: Michael Hanley, MD[1]; Osmanuddin Ahmed, MD[2]; Ankur Chandra, MD[3]; Kenneth L. Gage, MD, PhD[4]; Marie D. Gerhard-Herman, MD[5]; Michael Ginsburg, MD[6]; Heather L. Gornik, MD[7]; Pamela T. Johnson, MD[8]; Isabel B. Oliva, MD[9]; Thomas Ptak, MD, PhD[10]; Michael L. Steigner, MD[11]; Richard Strax, MD[12]; Frank J. Rybicki, MD, PhD[13]; Karin E. Dill, MD.[14]

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Received: 8 September 2016 | Accepted: 15 February 2017

DOI 10.1002/ppul.23686

ORIGINAL ARTICLE: OUTCOMES

WILEY

Asymptomatic pulmonary arteriovenous malformations in children with hereditary hemorrhagic telangiectasia

Ashley M. Gefen MD[1,2] | Andrew J. White MD[3]

CLINICALLY SUSPECTED PULMONARY ARTERIOVENOUS MALFORMATION (PAVM)

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Asymptomatic pulmonary arteriovenous malformations in children with hereditary hemorrhagic telangiectasia

Ashley M. Gefen MD[1,2] | Andrew J. White MD[3]

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Growth of Pulmonary Arteriovenous Malformations in Pediatric Patients with Hereditary Hemorrhagic Telangiectasia

Anina Ratjen, BSc[1], Jacky Au, BSc[2], Susan Carpenter, BScN[1], Philip John, MD[3], and Felix Ratjen, MD, PhD[1,2,4]

THE JOURNAL OF PEDIATRICS • www.jpeds.com CLINICAL AND LABORATORY OBSERVATIONS

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Table. Patient characteristics

N	37
Age at first CT, years	7.8 ± 3.9
Number of PAVMs	2.6 ± 2.0
Female	14 (37.8)
ENG mutations	27 (73.0)
ALK-1 mutations	2 (5.4)
SMAD4 mutations	1 (2.7)
Definite clinical diagnosis (Curaçao n ≥ 3)	6 (16.2)
Likely diagnosis (Curaçao n = 2)	1 (2.7)

Values are number (%) or mean ± SD.

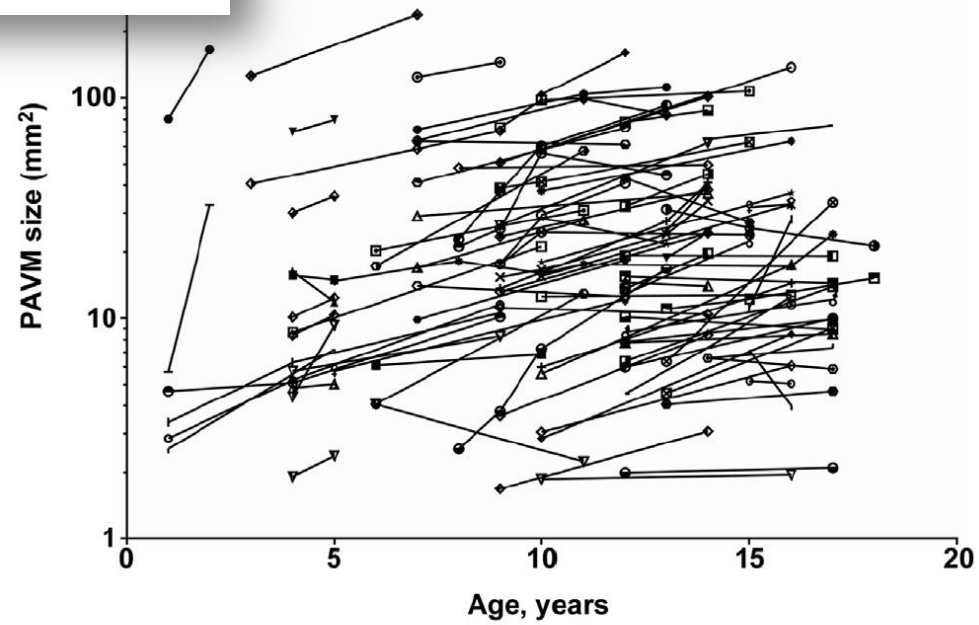

Figure. Changes in the absolute size of PAVMs over time in pediatric patients with HHT. Each symbol represents an individual patient.

Pulmonary AVM

- Screening Protocol:
  - Initial bubble ECHO
  - Chest computed Tomography q5 years

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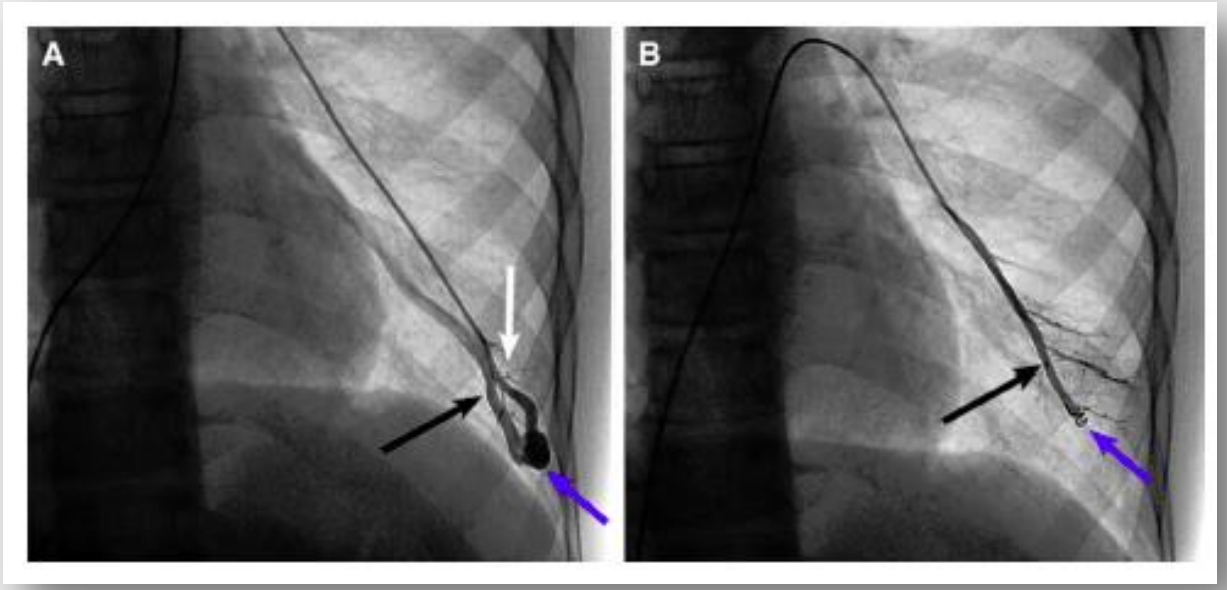
CLINICAL AND LABORATORY OBSERVATIONS

The Diagnostic Yield of Rescreening for Arteriovenous Malformations in Children with Hereditary Hemorrhagic Telangiectasia

Giuseppe A. Latino, MD[1,2,3], Suhail Al-Saleh, MD, FRCPC[1,2], Susan Carpenter, RN[1,2], and Felix Ratjen, MD, FRCPC[1,2,4]

Pulmonary AVM

- Management:
  - Use of IV Filters
  - Antibiotics for dental procedures
  - Embolization of pAVM



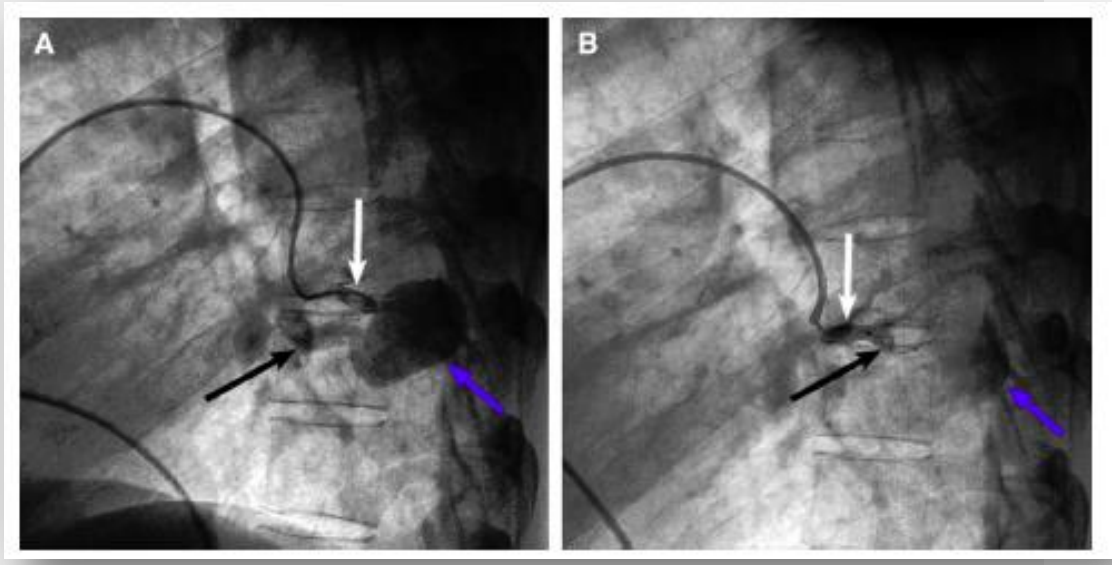
Cardiovasc Intervent Radiol (2016) 39:1110–1114
DOI 10.1007/s00270-016-1357-7

CIRSE CrossMark

CLINICAL INVESTIGATION ARTERIAL INTERVENTIONS

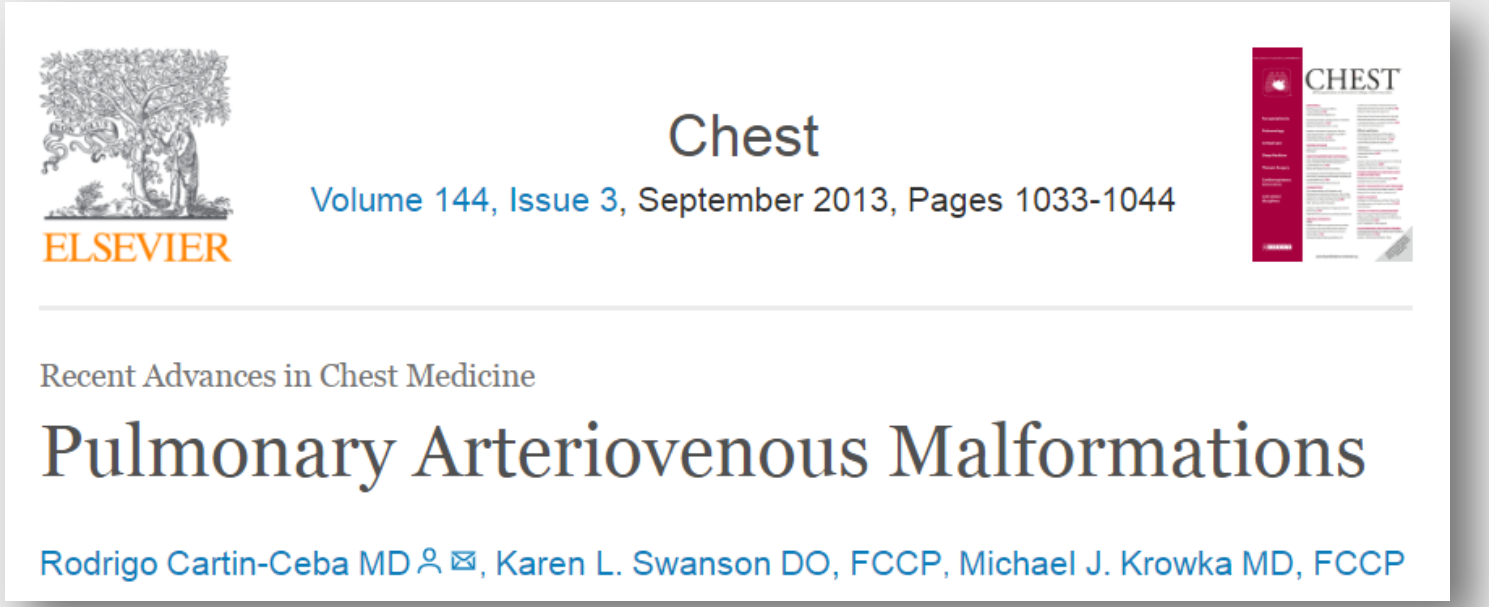
Amplatzer Vascular Plugs Versus Coils for Embolization of Pulmonary Arteriovenous Malformations in Patients with Hereditary Hemorrhagic Telangiectasia

Noam Tau[1,4] · Eliyahu Atar[1,4] · Meir Mei-Zahav[2,4] · Gil N. Bachar[1,4] · Tamir Dagan[3,4] · Einat Birk[3,4] · Elchanan Bruckheimer[3,4]



Pulmonary AVM

- Embolization complications
  - Hemorrhage
  - Pulmonary Infarction
  - Translocation of embolic material
  - Recanalization



Thromboembolism

Hereditary hemorrhagic telangiectasia: diagnosis and management from the hematologist's perspective

Athena Kritharis,[1] Hanny Al-Samkari[2] and David J Kuter[2]

[1]Division of Blood Disorders, Rutgers Cancer Institute of New Jersey, New Brunswick, NJ and [2]Hematology Division, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA

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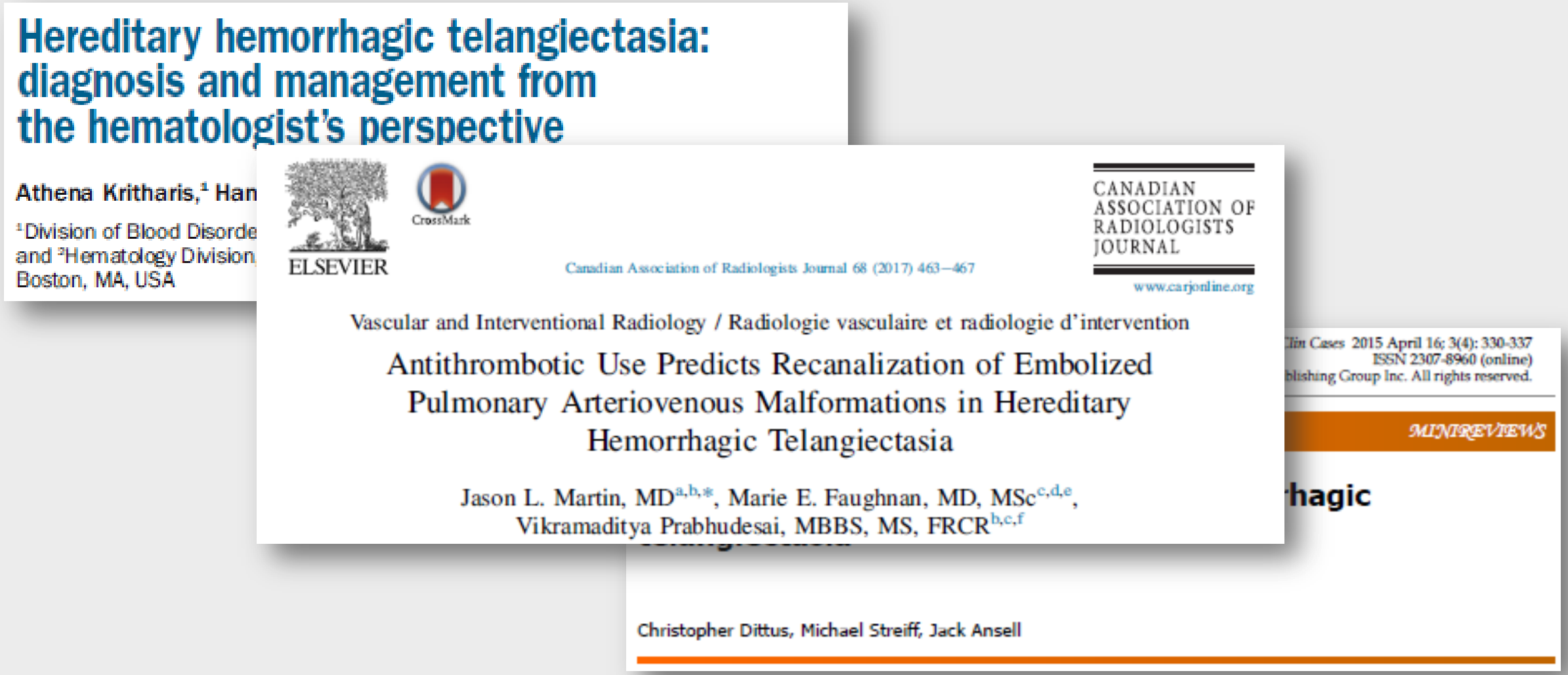
World J Clin Cases 2015 April 16; 3(4): 330-337
ISSN 2307-8960 (online)

MINIREVIEWS

Bleeding and clotting in hereditary hemorrhagic telangiectasia

Christopher Dittus, Michael Streiff, Jack Ansell

Thromboembolism



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ELSEVIER

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Canadian Association of Radiologists Journal 68 (2017) 463–467

CANADIAN ASSOCIATION OF RADIOLOGISTS JOURNAL

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Vascular and Interventional Radiology / Radiologie vasculaire et radiologie d'intervention

Antithrombotic Use Predicts Recanalization of Embolized Pulmonary Arteriovenous Malformations in Hereditary Hemorrhagic Telangiectasia

Jason L. Martin, MD[a,b,*], Marie E. Faughnan, MD, MSc[c,d,e], Vikramaditya Prabhudesai, MBBS, MS, FRCR[b,c,f]

Clin Cases 2015 April 16; 3(4): 330-337
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MINIREVIEWS

hagic

Christopher Dittus, Michael Streiff, Jack Ansell

End of Act 1

A story of 3 old men

Case 2

A time and place for prostration

Clinical Scenario

- You are asked to assess a patient transferred from community hospital to HSC PICU who has severe respiratory distress

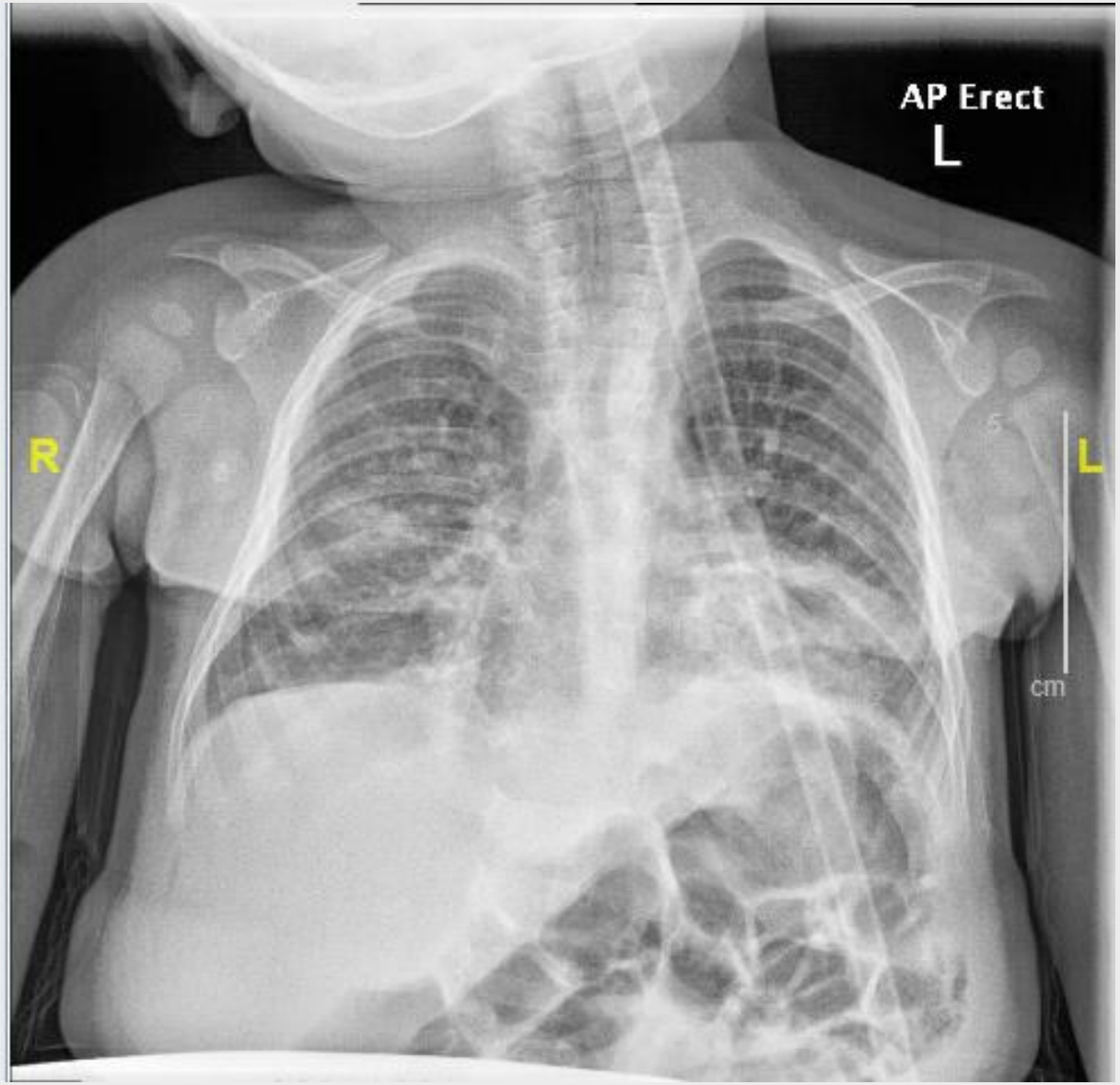
Clinical Context

- 9 month old F, who presented to community hospital in respiratory distress after 4/7 of cough, coryza, fever
- Required HFNC 2 L/Kg and 90% FiO2, then intubated
- Started on asthma protocol, ceftriaxone and acyclovir
- Transferred to HSC PICU

Clinical Context

- 9 month old F, who presented to community hospital in respiratory distress after 4/7 of cough, coryza, fever
- Required HFNC 2 L/Kg and 90% FiO2, then intubated
- Started on asthma protocol, ceftriaxone and acyclovir
- Transferred to HSC PICU

- Past Medical History:
  - Ex-35 weeker, BW 6’11”
  - DOL1 CPAP,
  - DOL5 HFNC,
  - DOL9 LFNC,
  - DOL14 RA
- Social and Family History are non-contributory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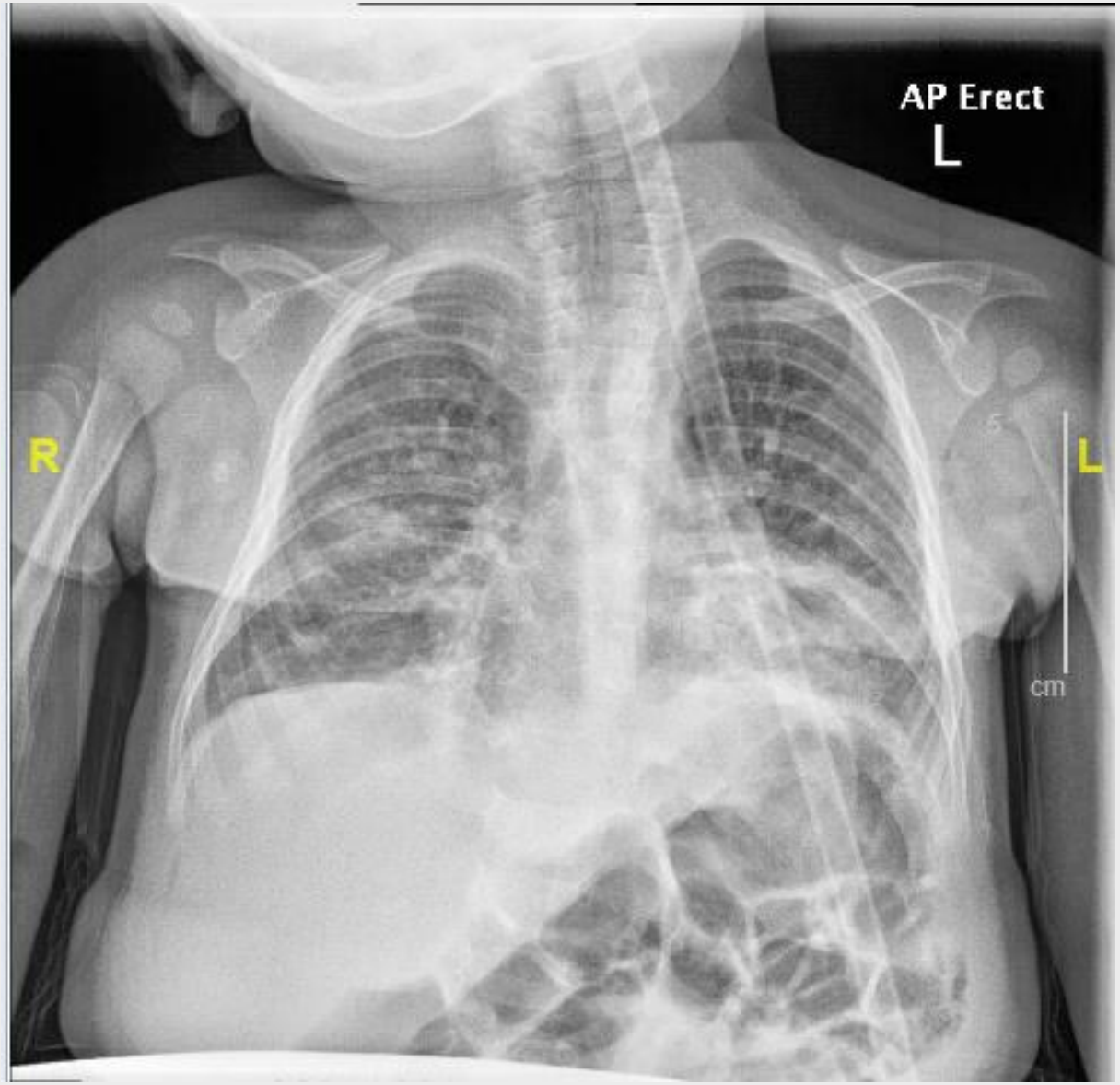
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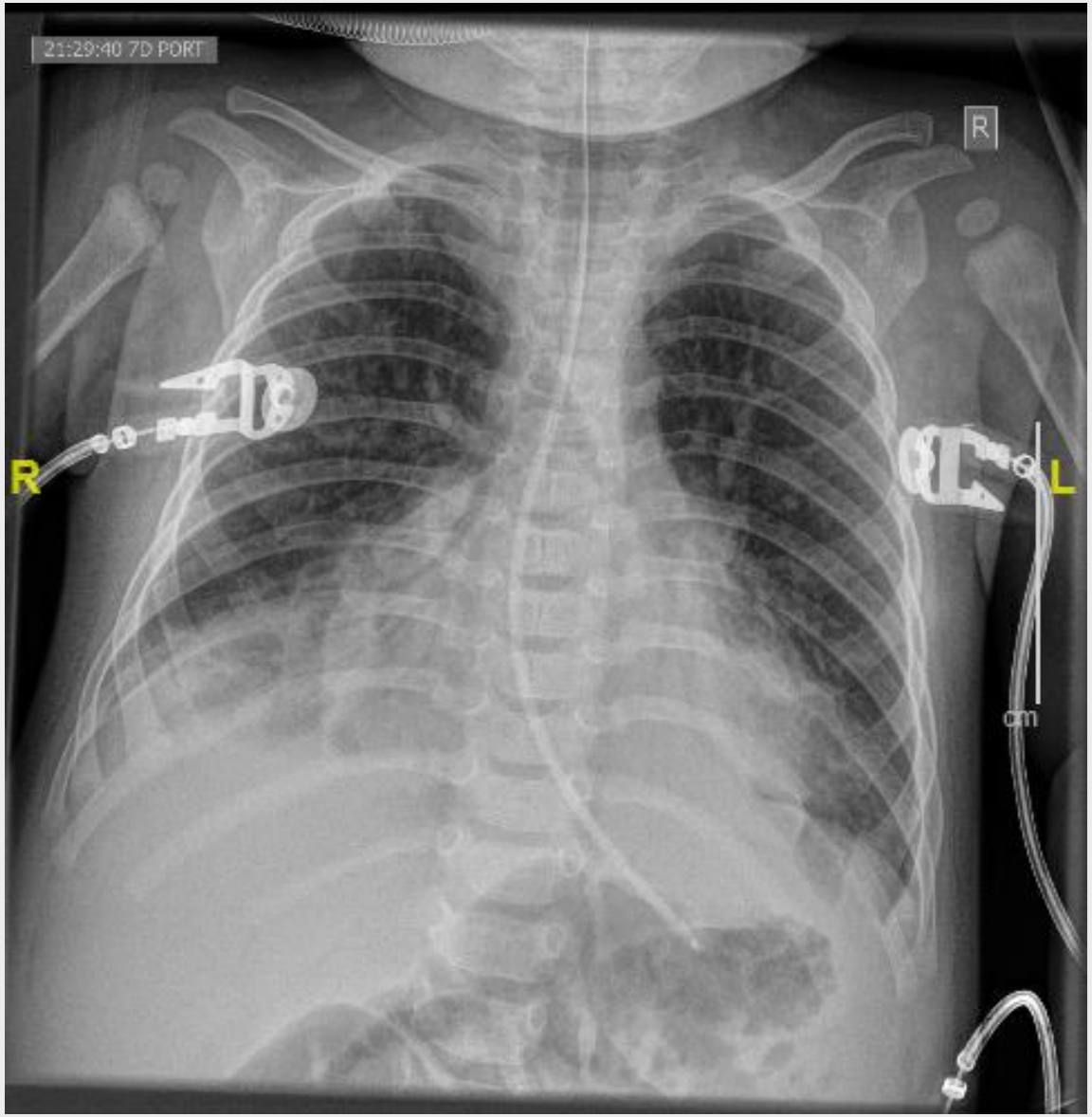
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Clinical Story Continued

- One week into PICU admission continued to be intubated and ventilated with significant pressures, FiO2 >90%.
- Started on inhaled NO
- Requiring significant secretion management
- Found to be Entero-rhino virus positive

Continued to have significant deterioration…

What would you do next?

Table 2. Definition of Pediatric ARDS

Age	Exclude patients with perinatal-related lung disease			
Timing	Within 7 d of known clinical insult			
Origin of edema	Respiratory failure not fully explained by cardiac failure or fluid overload			
Chest imaging	Chest imaging findings of new infiltrates consistent with acute pulmonary parenchymal disease			
Oxygenation	Noninvasive ventilation	Invasive mechanical ventilation		
		Mild PARDS	Moderate PARDS	Severe PARDS
	Total face mask bi-level ventilation or CPAP $\geq$ 5 cm H_2O	4 $\leq$ OI $<$ 8	8 $\leq$ OI $<$ 16	OI $\geq$ 16
	P_{aO_2}/F_{IO_2} ratio $\leq$ 300			
	S_{pO_2}/F_{IO_2} ratio $\leq$ 264*	5 $\leq$ OSI $<$ 7.5	7.5 $\leq$ OSI $<$ 12.3	OSI $\geq$ 12.3
Special populations				
Cyanotic heart disease	Standard criteria above for age, timing, origin of edema, and chest imaging with an acute deterioration in oxygenation not explained by underlying cardiac disease†			
Chronic lung disease	Standard criteria above for age, timing, and origin of edema with chest imaging consistent with new infiltrate and acute deterioration in oxygenation from baseline that meet oxygenation criteria above†			
Left-ventricular dysfunction	Standard criteria for age, timing, and origin of edema with chest imaging changes consistent with new infiltrate and acute deterioration in oxygenation that meet criteria above not explained by left-ventricular dysfunction			

Respir Care 2017;62(6):718 –731.

Strategies in ARDS

- Mechanical Ventilation
  - Modes
  - Tidal volumes
  - Peak Inspiratory Pressures
  - Plateau Pressures
  - PEEP
  - Recruitment Maneuvers
  - HFOV
- Corticosteroids
- Inhaled nitric oxide
- Prone Positioning
- Exogenous Surfactant
- Neuromuscular Blockade
- Extra-Corporeal Membrane Oxygenation (ECMO)

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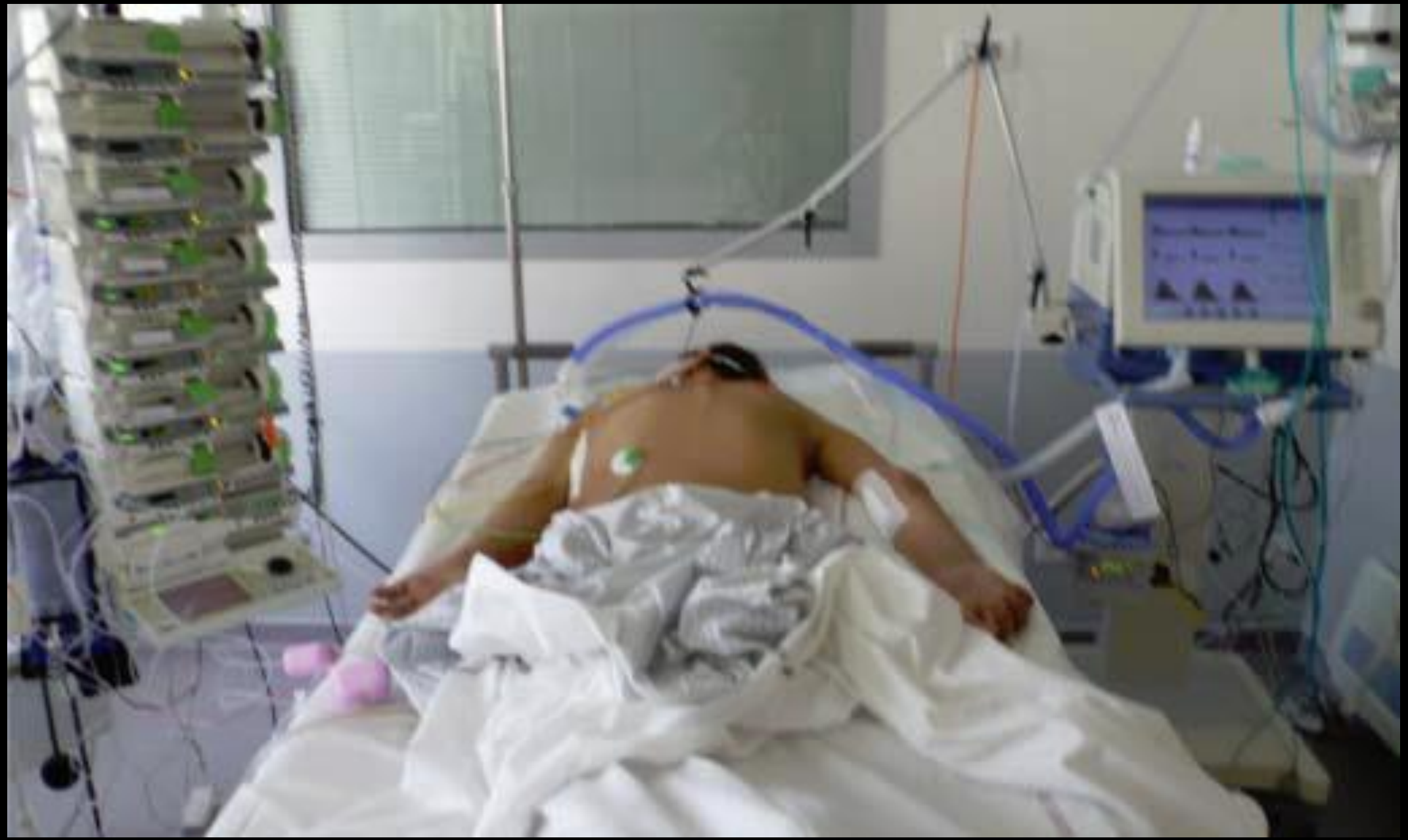

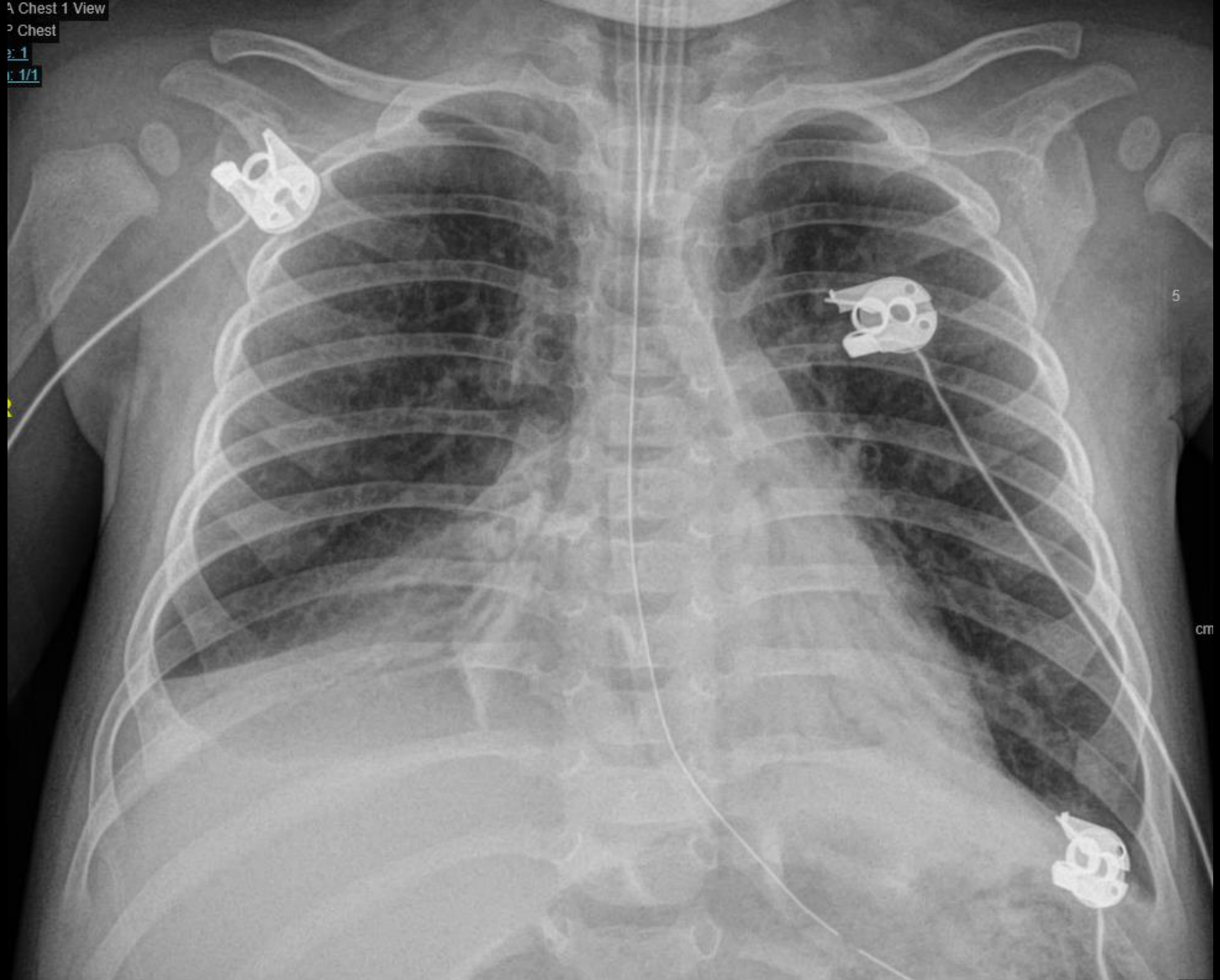
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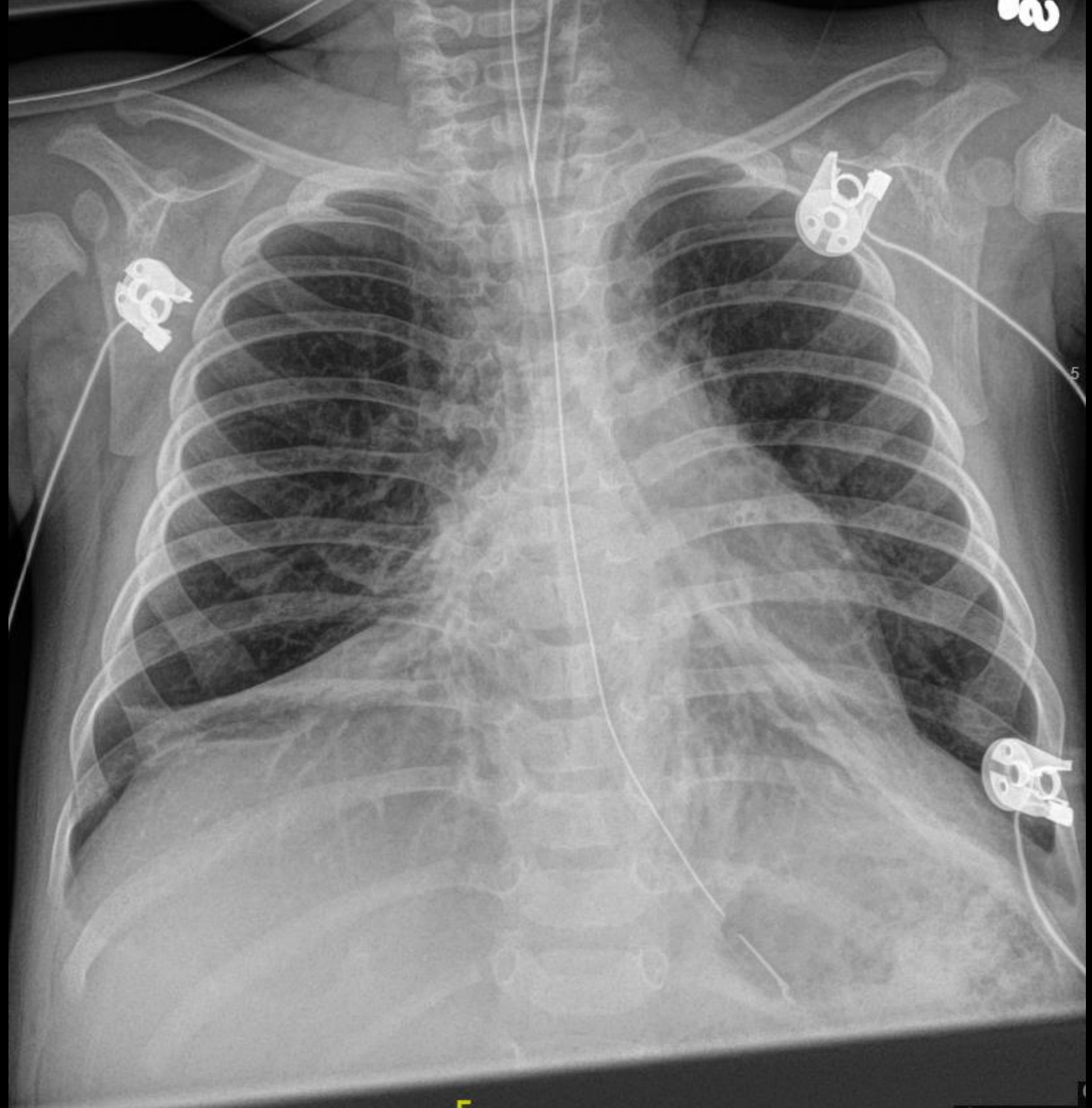

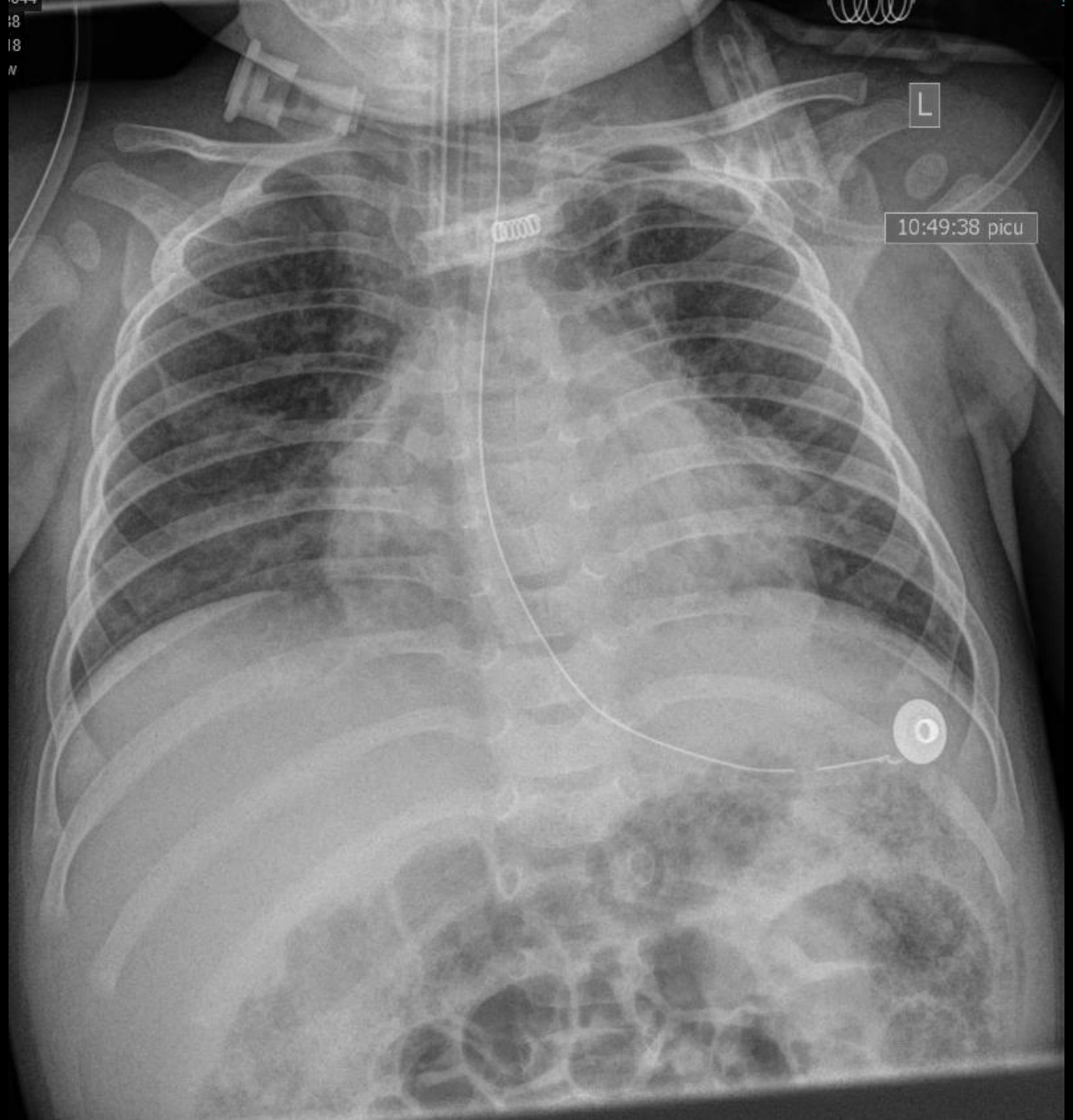
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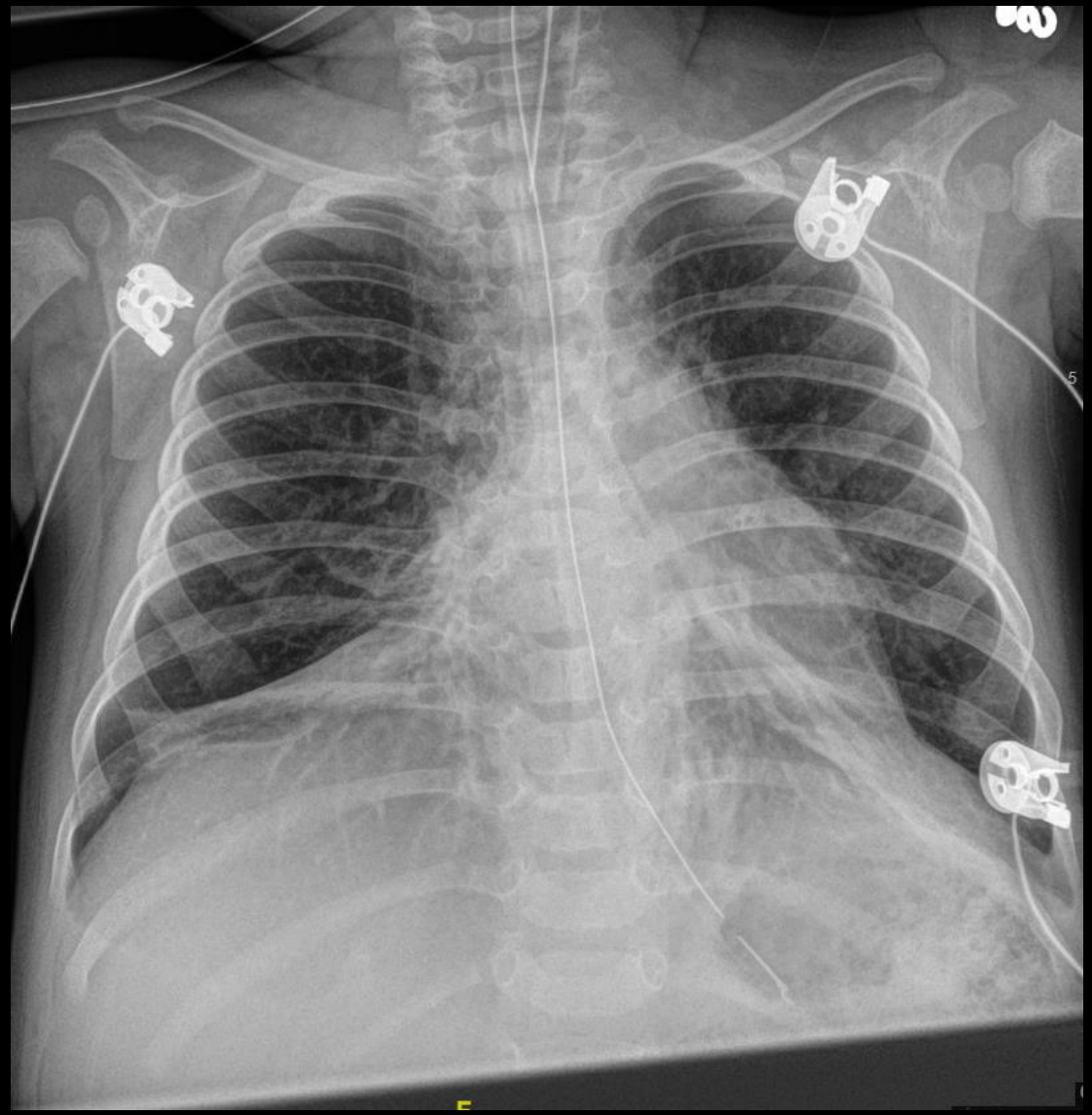

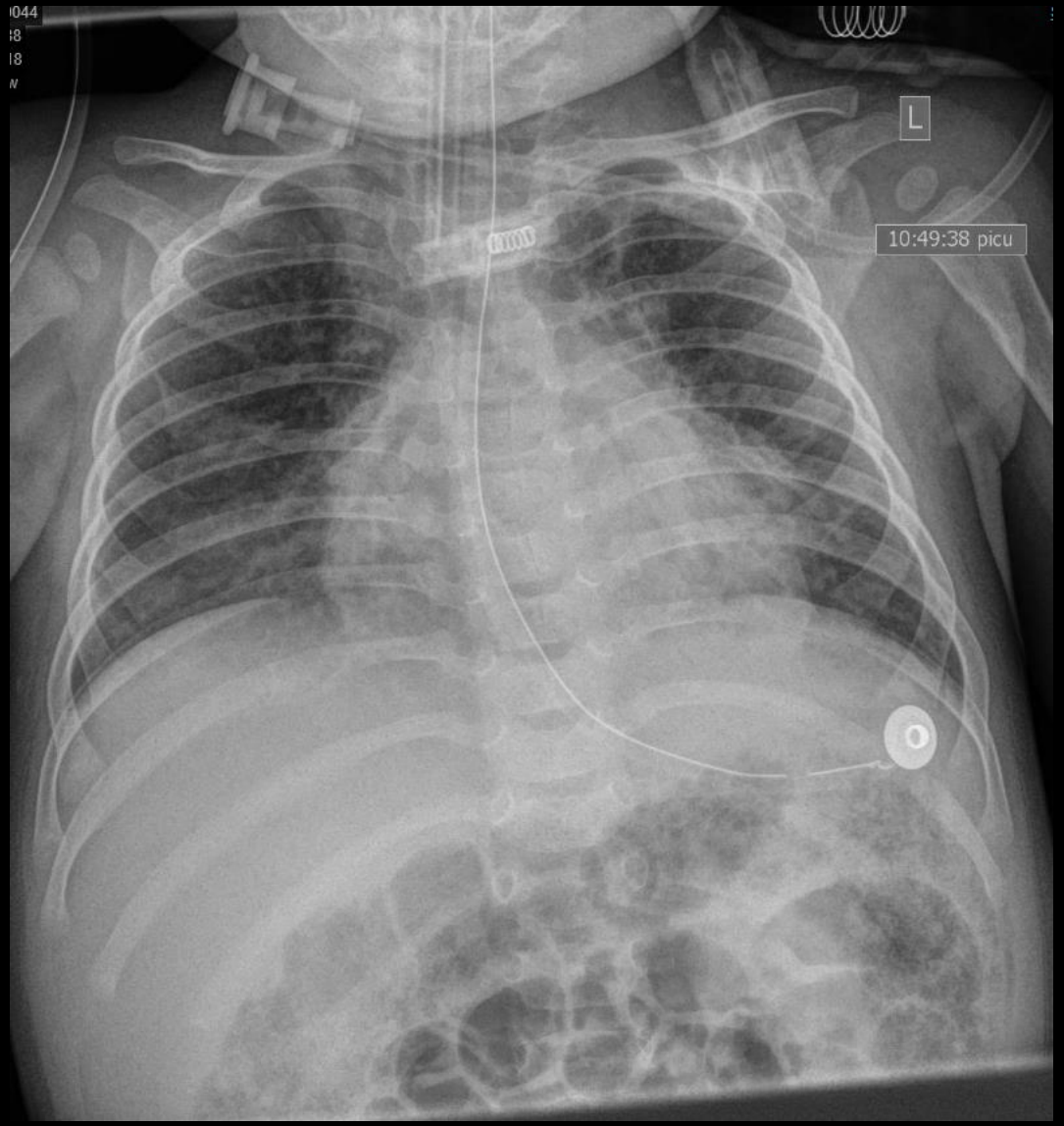
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Prone Positioning (Prostration)

Why does it help with oxygenation?

Prone Position

Models

- Sponge Model

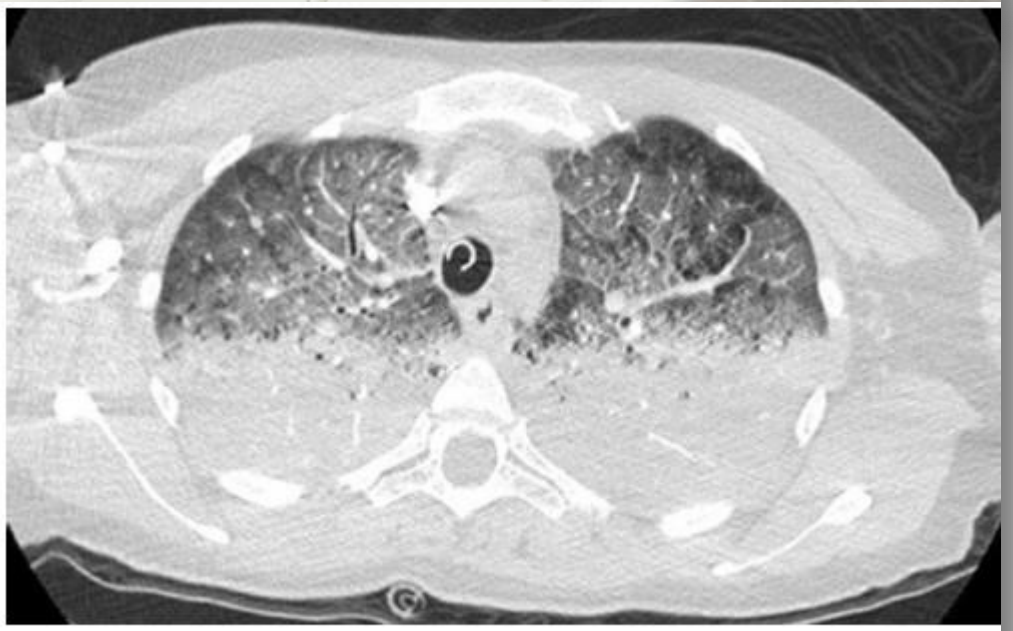


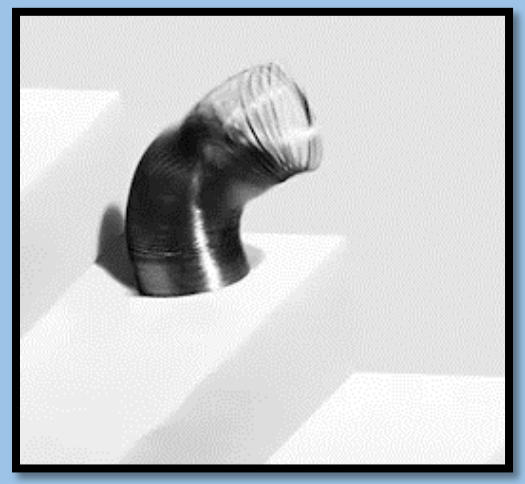
Fig.: ARDS : CT showing ground glass in the non dependent regions, and show consolidation in the dependent lung due to atelectasis.

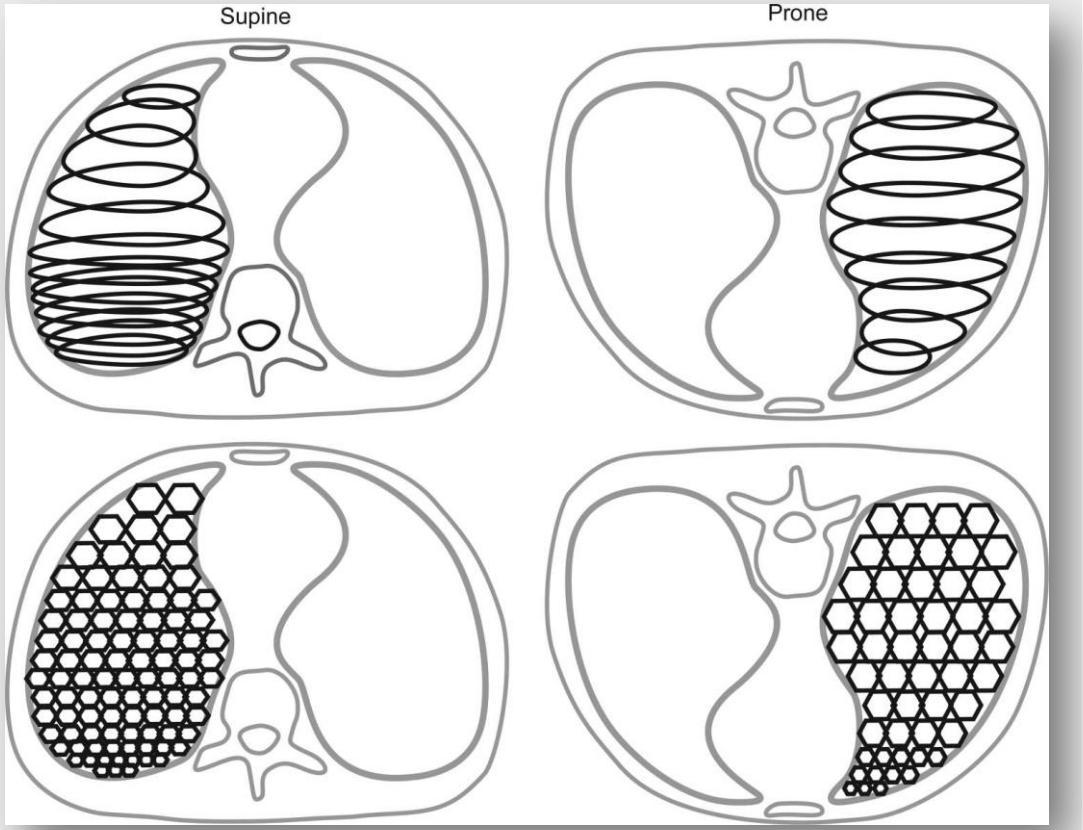
DOI: 10.5492/wjccm.v5.i2.121

Prone Position Models

Models

- Sponge Model
- Slinky Model

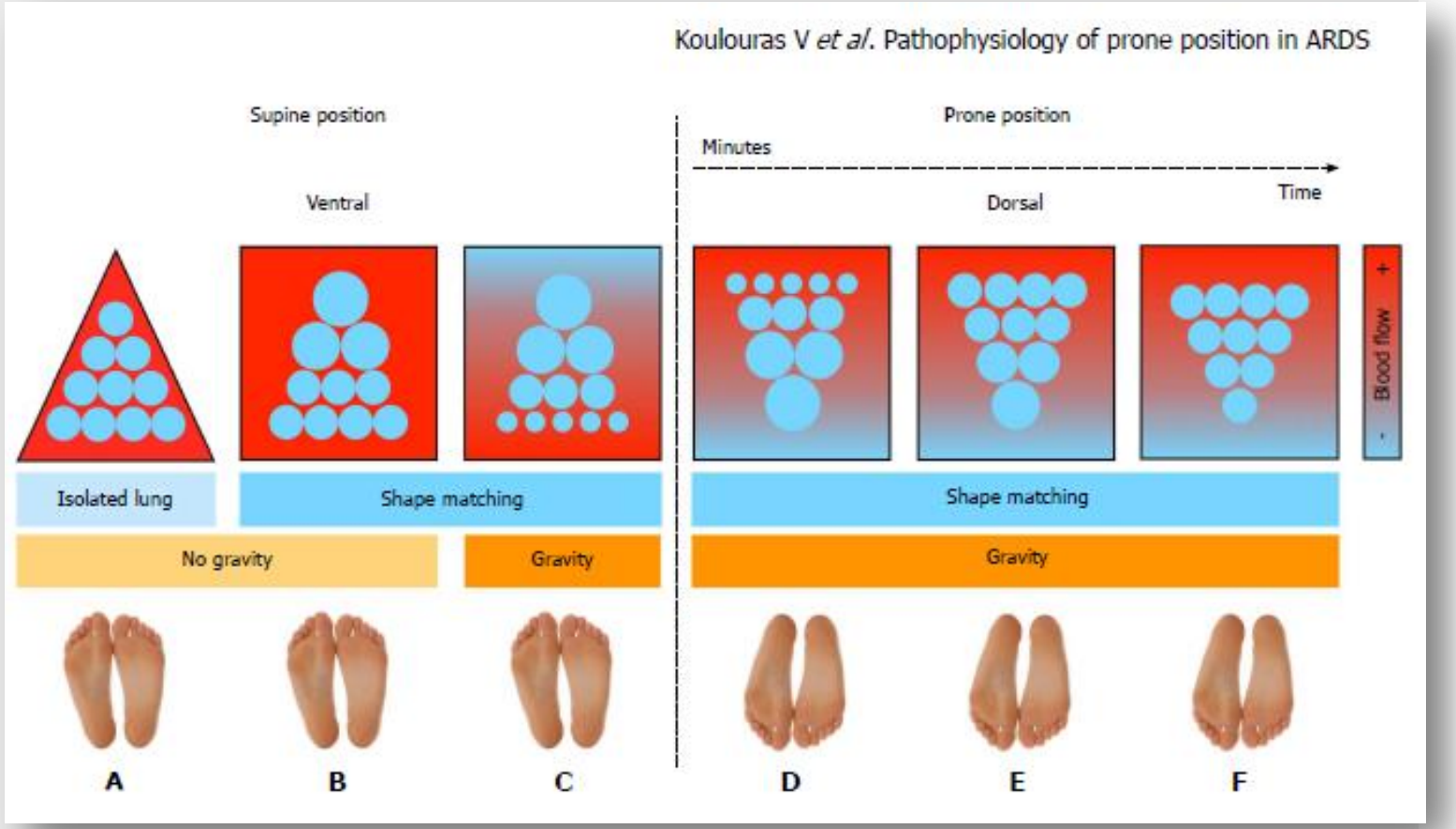




Prone Position Models

Models

- Sponge Model
- Slinky Model
- Shape Matching Model

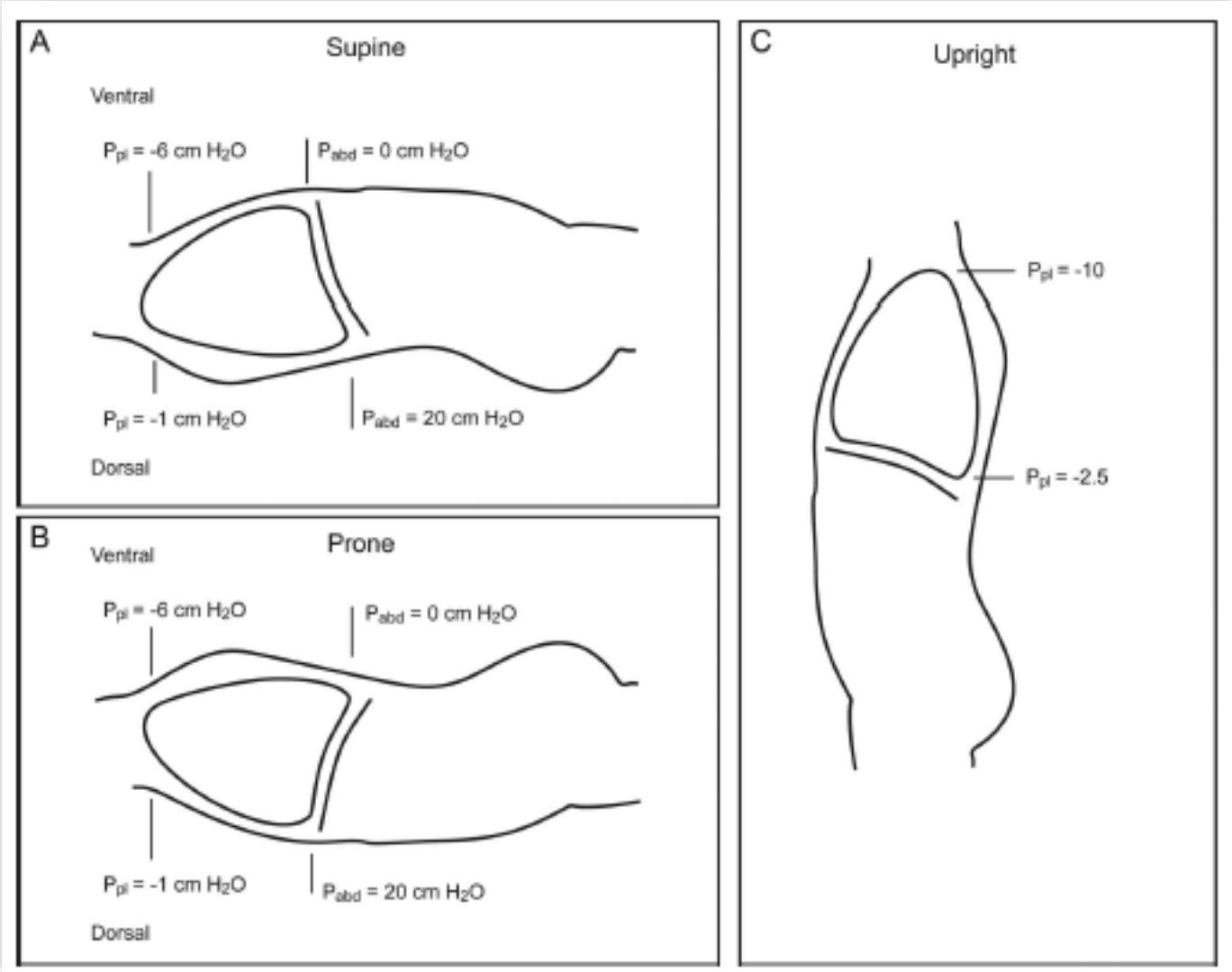


Prone Position Models

Models

- Sponge Model
- Slinky Model
- Shape Matching Model

Effect on Respiratory Mechanics



Proposed Algorithm

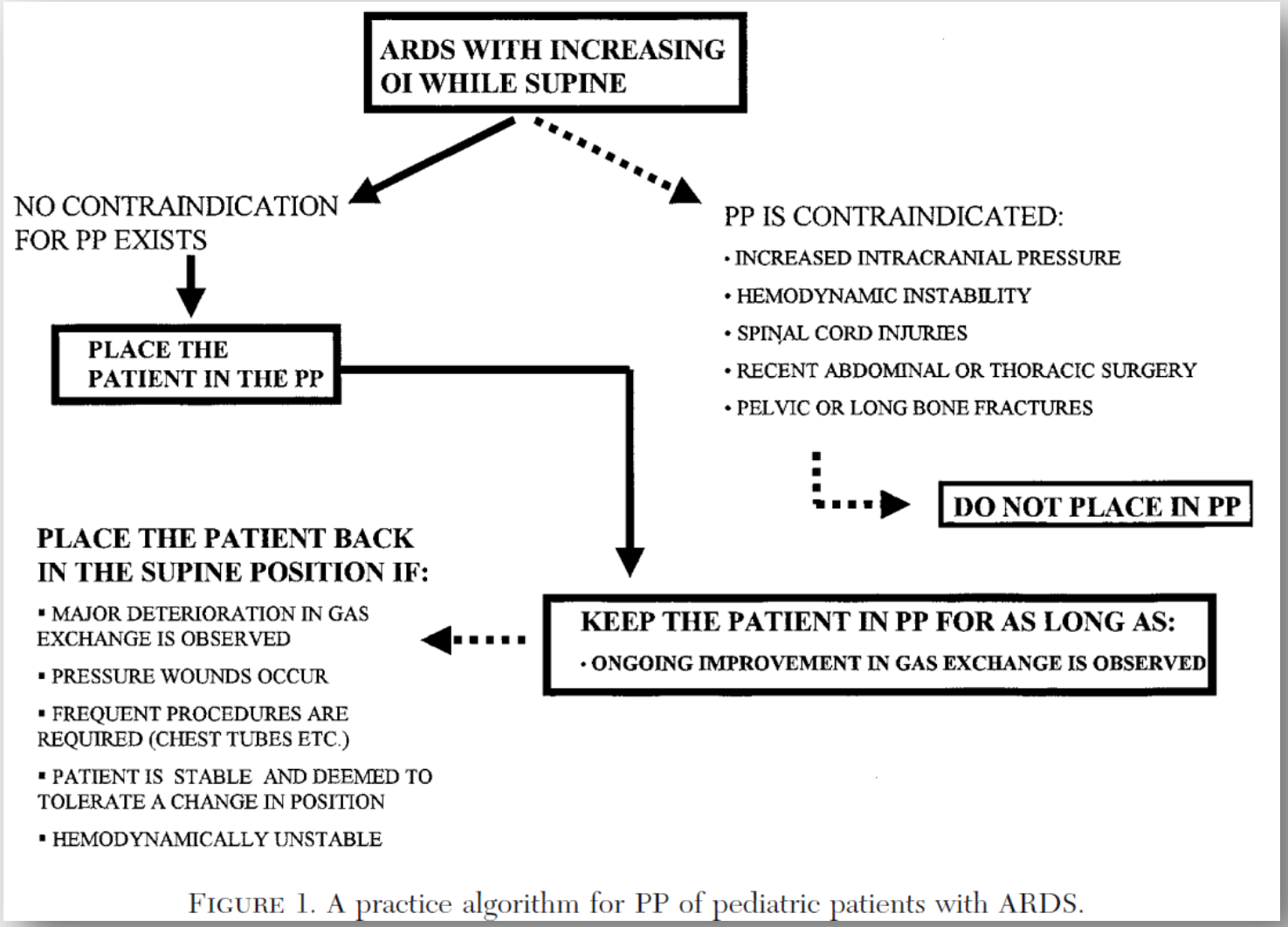


FIGURE 1. A practice algorithm for PP of pediatric patients with ARDS.

CHEST 2003; 124:269–274

End of Act 2

A time and place for prostration

Act 3

???What are those???

Clinical Context

2 year old F referred abn. CXR

History

- Previously well
- Recent hospital admission for pneumonia from Inf. A
- PMHx is unremarkable
- No recent travels
- Lives on farm
- FHx: sibling with WAS

Clinical Context

2 year old F referred abn. CXR

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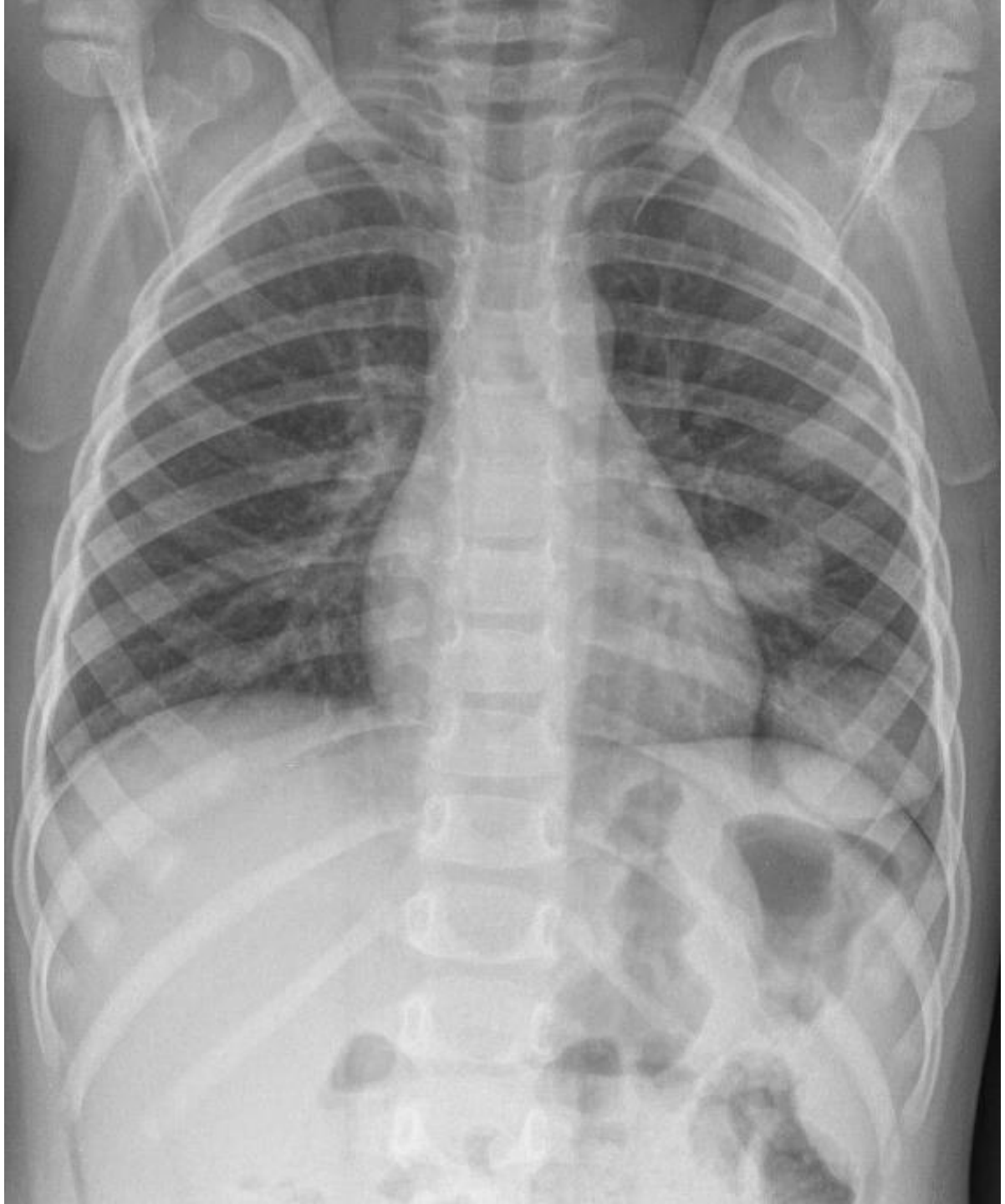
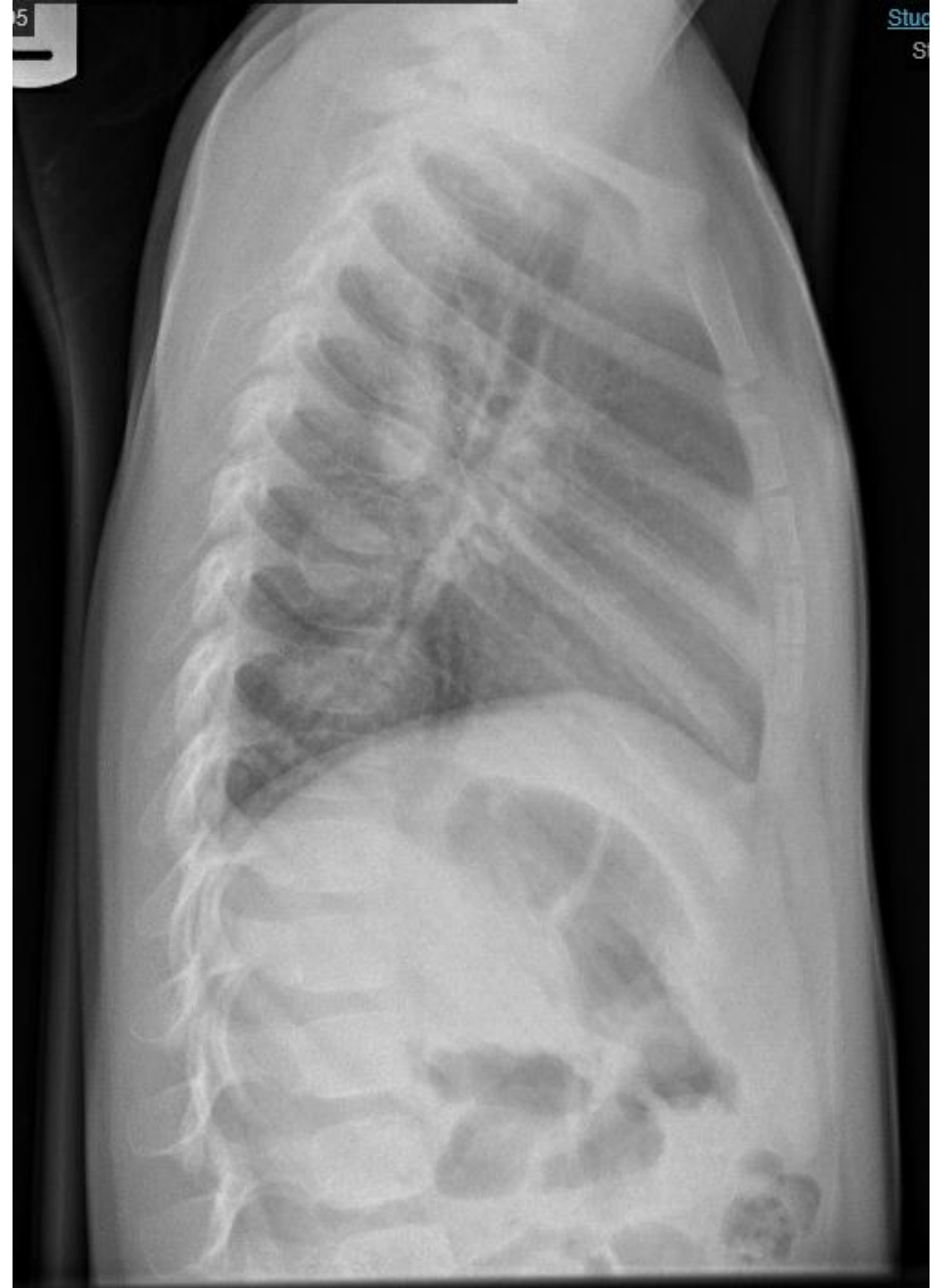
- PMHx is unremarkable
- No recent travels
- Lives on farm
- FHx: sibling with WAS

Physical Exam

- Appearance: Well. No pallor or jaundice
- H/N: Normal
- Resp: Normal
- CVS: Normal
- Abdomen: Normal
- Clubbing: None
- Skin: Normal

Bloodwork: Unremarkable





Possible Diagnoses?

Differential for Pulmonary Nodule

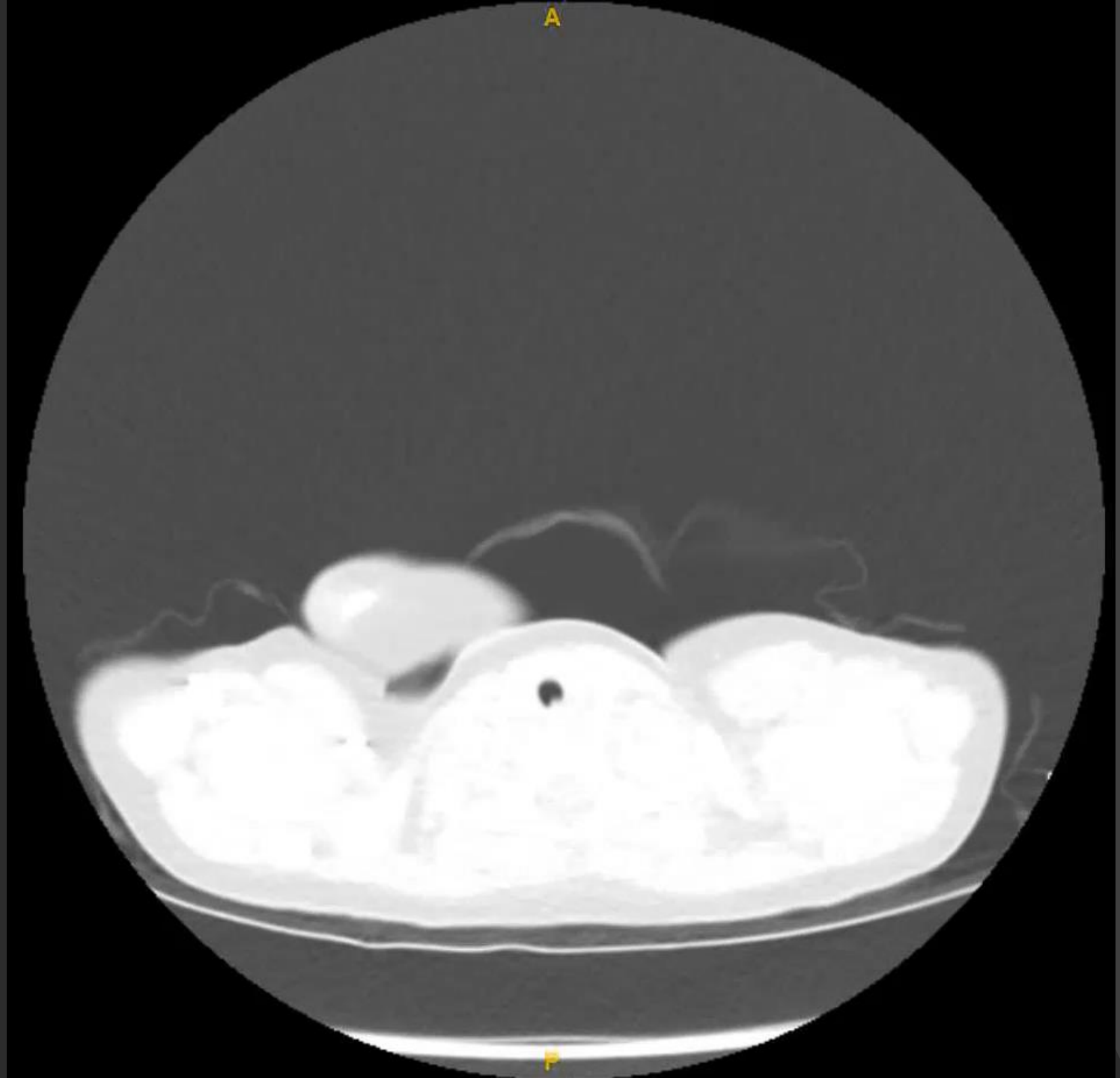
Table 1 Differential diagnoses of solitary pulmonary nodules

Benign lesions		
Infective	Active granulomatous infection	Tuberculosis, histoplasmosis, aspergillosis
	Healed or non-specific granulomas	
	Abscesses	Bacteria (anaerobes, staphylococcus)
	Round pneumonia	Pneumococcus
Inflammatory	Connective tissue disease	Rheumatoid nodule, Wegener's granulomatosis
	Sarcoidosis	
	Non-specific inflammation and fibrosis	
Neoplasm	Hamartoma	
Vascular	Arteriovenous malformation	
	Pulmonary infarct	
	hemangioma	
Malignant lesions		
Neoplasm	Bronchogenic carcinoma	Adenocarcinoma, squamous cell carcinoma, undifferentiated non-small cell carcinoma, small cell carcinomas, bronchioloalveolar carcinomas
	Solitary metastasis	
	Lymphoma	
	Carcinoid tumour	

doi: 10.3978/j.issn.2223-4292.2013.12.08

What would you do next?

Chest CT



Ultrasound

COMPARISON:
Chest CT scan November 7, 2018. Chest radiographs November 14, 2018 and earlier. Outside facility ultrasound May 14, 2018.

FINDINGS:
A unilocular cystic structure is seen in the left posterolateral lower lung measuring 3.5 x 2.6 x 2.5 cm, exhibiting a thin smooth (1 - 2 mm) wall). This likely corresponds to the largest lesion on the previous CT scan which abuts the left posterolateral chest wall. It exhibits predominantly anechoic fluid with minimal internal low-level echoes. No septations present. No solid nodular components or vascular flow demonstrated.

The other two smaller cysts seen on the previous CT were not demonstrated on this examination because of intervening lung.

IMPRESSION:
Unilocular mostly simple cyst involving the left posterolateral lower lung, without septations, solid components, or internal daughter cysts, corresponding to the largest cyst on the previous CT scan. Differential diagnoses as discussed on the previous CT scan are unchanged.

Management

Consulted

- ID, then Gen Surgery and IGT

Serologies

- Echinococcus Multilocularis

Medical

- Albendazole and praziquantel

Surgical

- Resection of pulmonary cysts

Echinococcus

- Causes echinococcosis
- Major Species
  - E. Granulosus
  - E. Multilocularis
- Definitive host: Canines

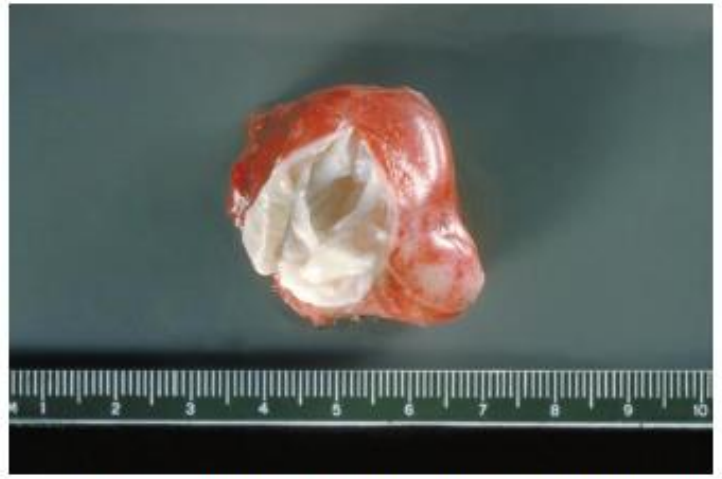
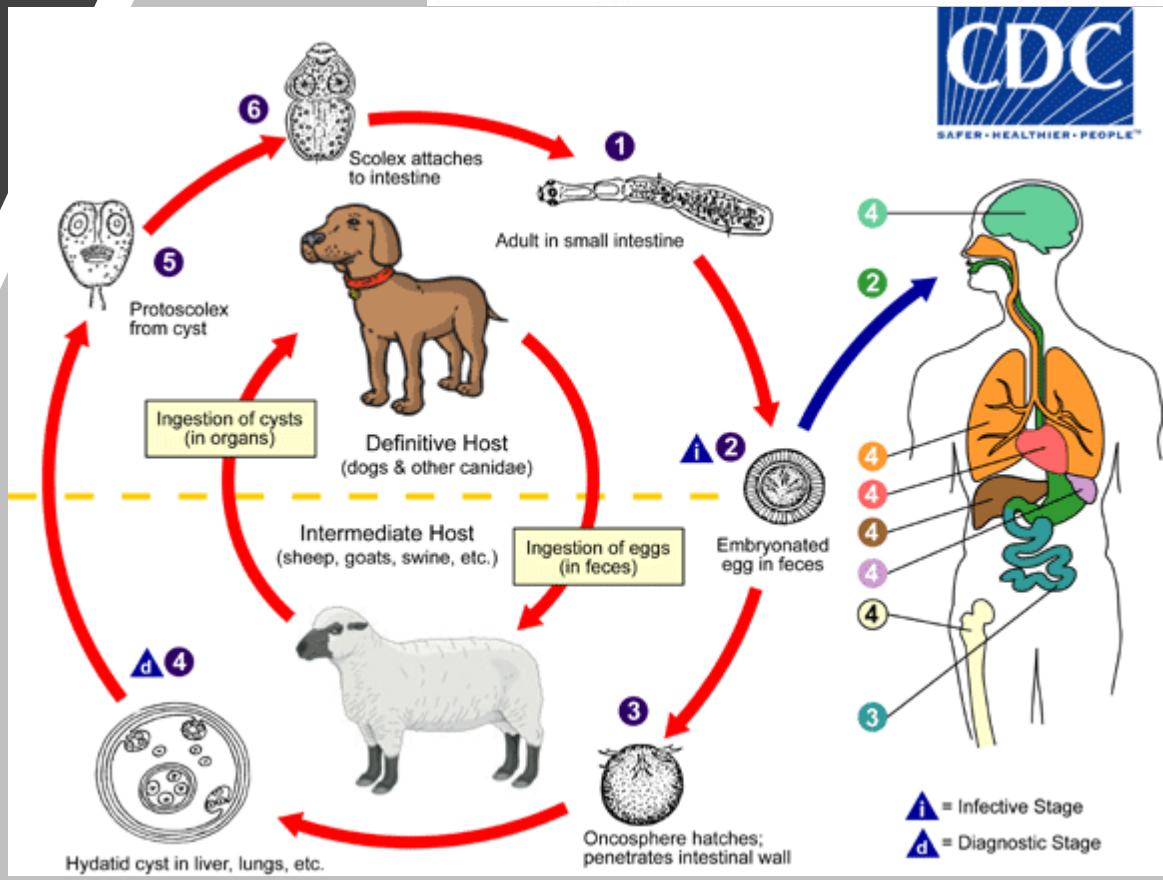


Fig. 33.1 Gross pathology of membrane and hydatid daughter cysts from human lung.



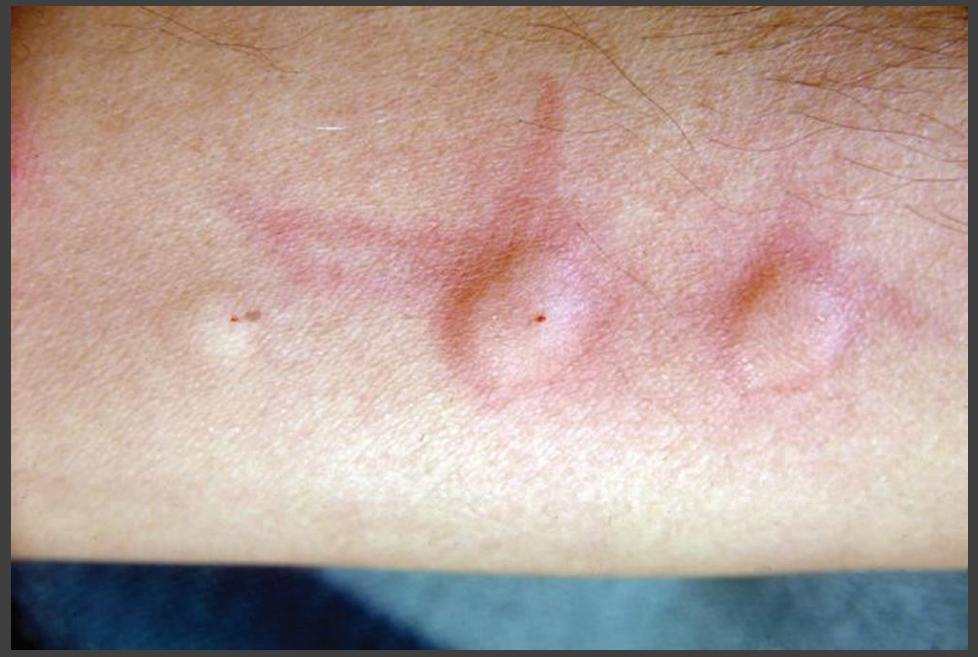
Clinical Manifestations

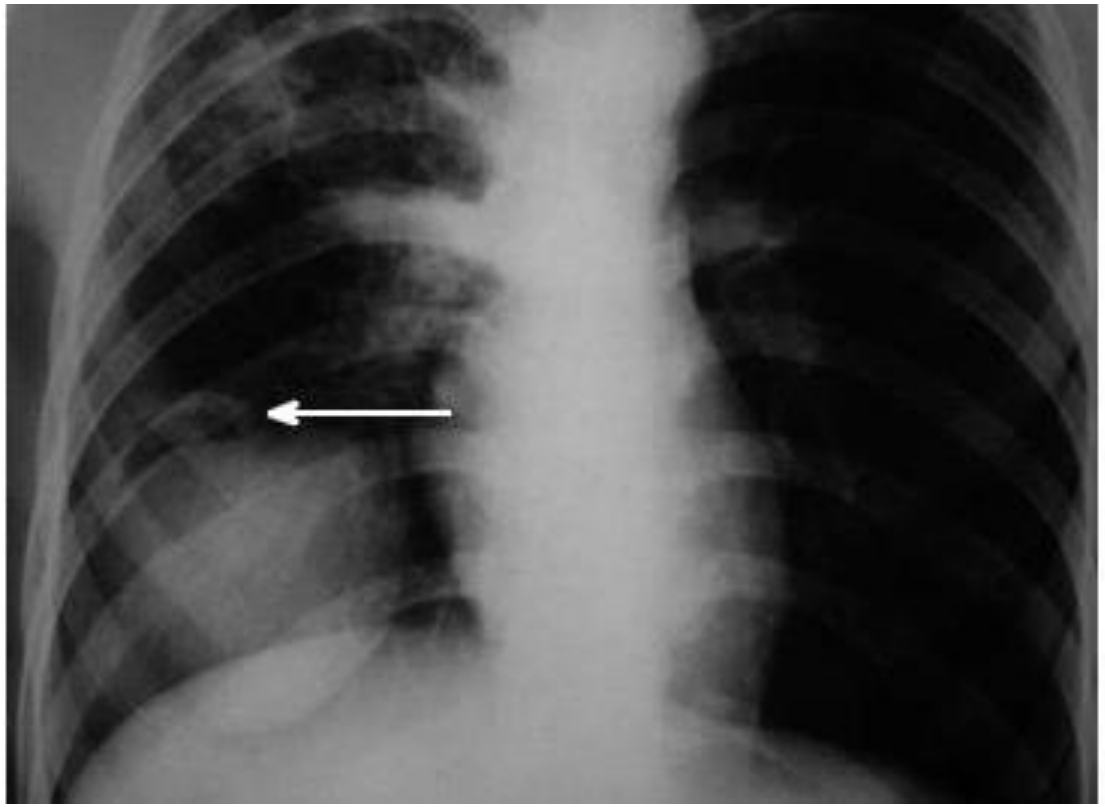
Symptoms

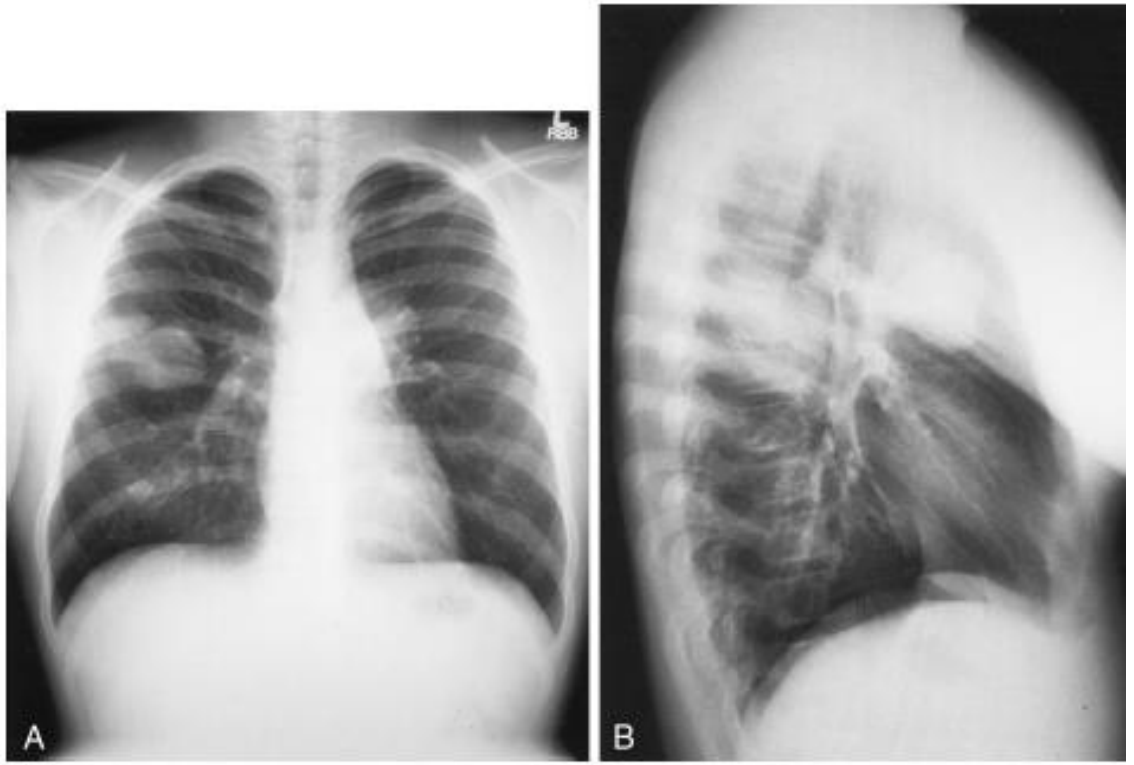
- Cough; “grape skins”
- Chest pain
- Hemoptysis
- Fever
- Malaise

Physical Exam

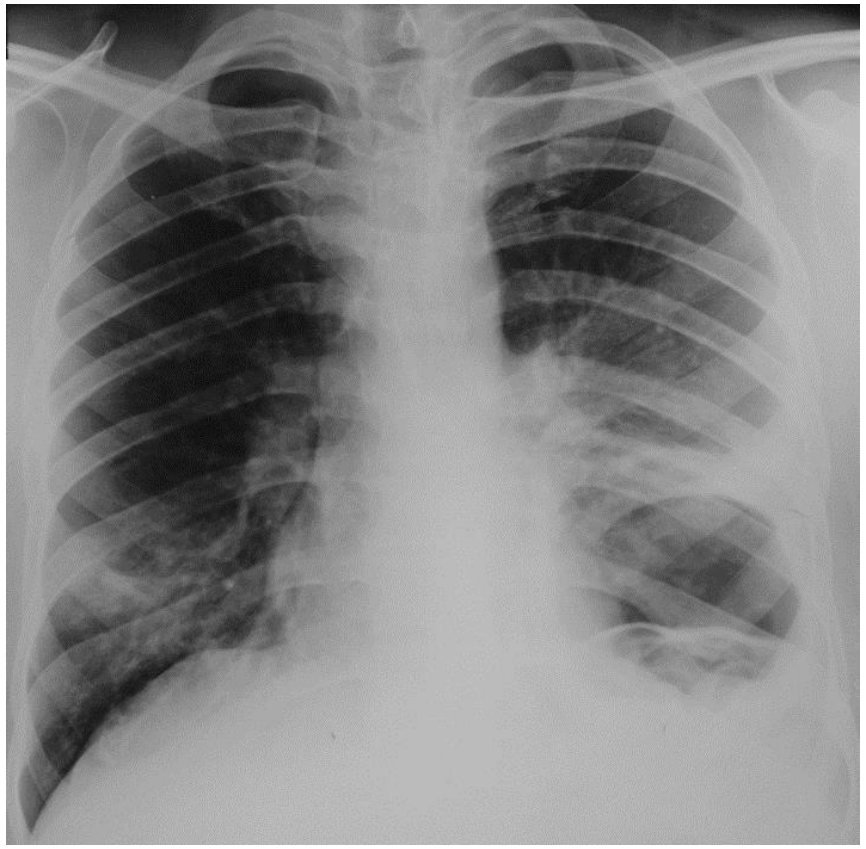
- Hydatid thrill
- Pneumothorax
- Asphyxia

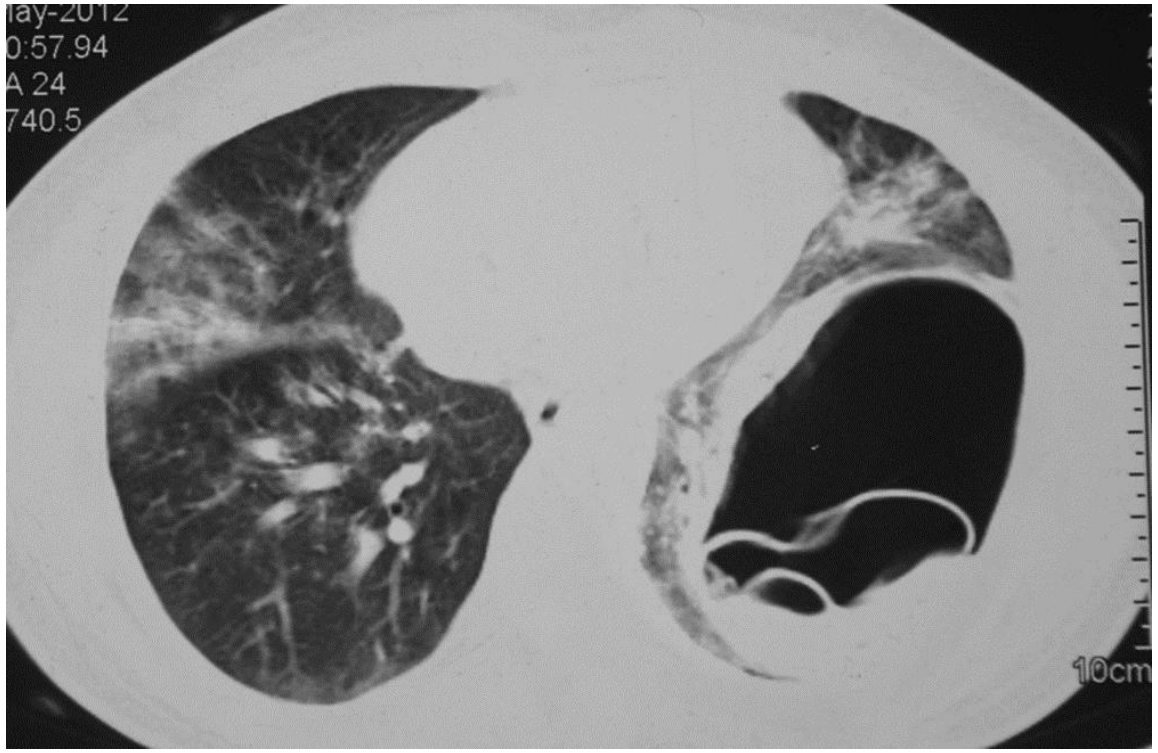






Imaging Findings

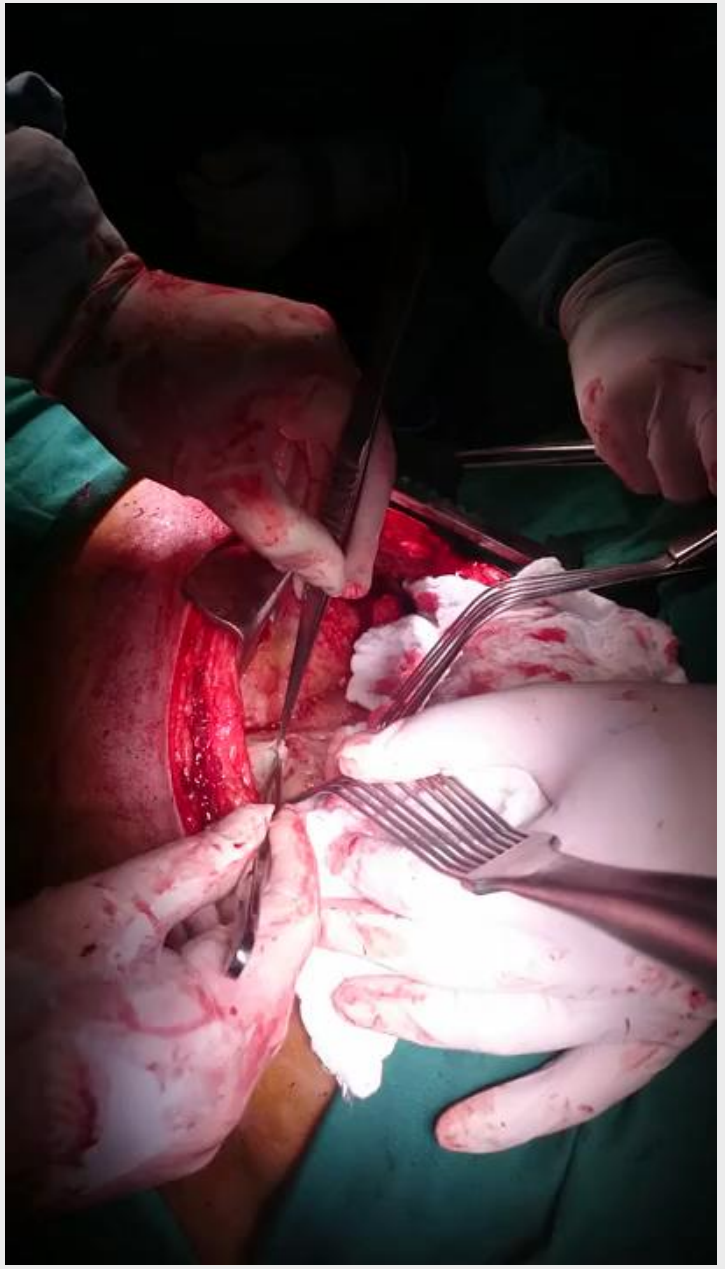




Imaging Findings

Management

- Conservative
- Medical
  - Albendazole
- Surgical



End of Act 3

???What are those???






Take home points

Case 1: HHT

- Review the diagnostic criteria and management
- Explore some clinical considerations

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Case 2: Prostration

- Learn about the physiology involved with proning
- Appreciate the role of proning for oxygenation

Take home points

Case 1: HHT

- Review the diagnostic criteria and management
- Explore some clinical considerations

Case 2: Prostration

- Learn about the physiology involved with proning
- Appreciate the role of proning for oxygenation

Case 3: Echinococcus

- Appreciate an interesting clinical case
- Review imaging findings