

# Aortic Arch Anomalies: Embryology and Pathology

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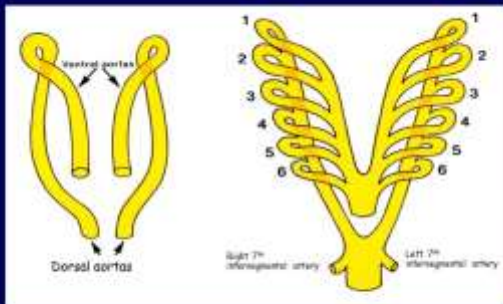
LinkedIn: **Brompton Cardiac Morphology**  
Website: [www.rbht.nhs.uk/morphology](http://www.rbht.nhs.uk/morphology)

# Aortic Arch Anomalies

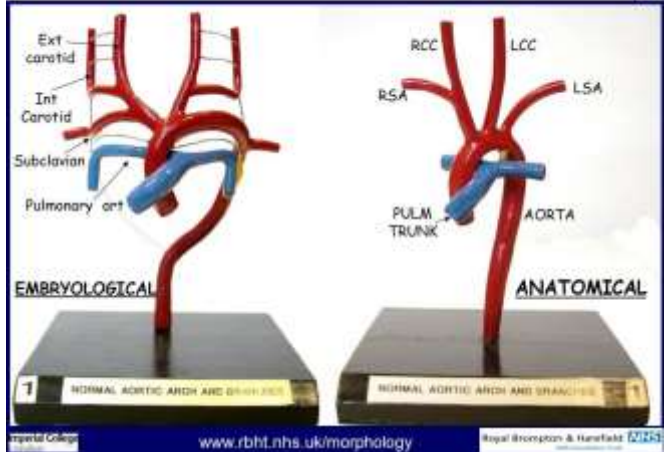
## Developmental aspects

- The left arch
- The right arch
- The partial double arch
- The double arch
- The 5<sup>th</sup> arch
- Obstructions to flow
- Others

# Aortic Arch Anomalies



# The aortic arch: development



# Aortic Arch Anomalies



# Aortic arch malformations - Left arch + Ab right subclav



## Right Arch

Associated with Fallot's tetralogy - 25%  
with Common Arterial Trunk - 50%

### Head and arm arteries

- mirror-imaged of normal left arch
- retroesophageal left subclavian artery

### Descending thoracic aorta

- Usually to right of spine
- Seldom to left of spine

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## Aortic arch malformations - Right Arch

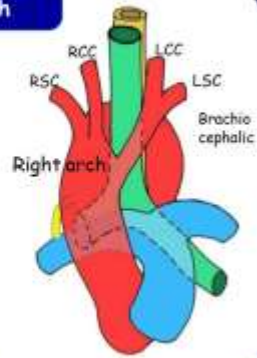
### Origins of head and arm arteries

- mirror-imaged of normal left arch

NORMAL: LEFT ARCH



RIGHT ARCH



### Associated

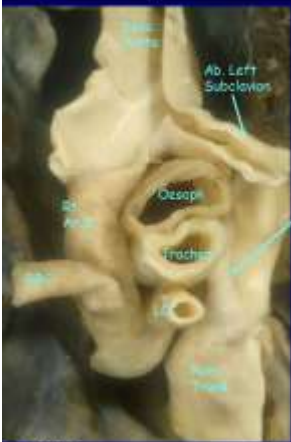
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## Right Arch, aberrant left subclavian artery



Vascular sling if left duct/ligament persists

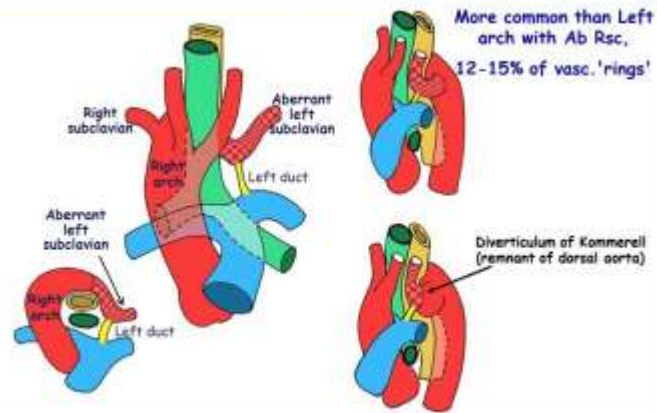


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## Aortic arch malformations - Right Arch - Ab Left Subclav



More common than Left arch with Ab Rsc, 12-15% of vase. 'rings'

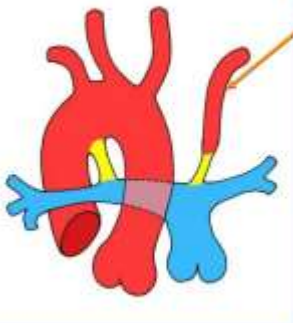
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## Right Arch, bilateral ducts

Isolation of left subclavian artery



Or isolation with 1 duct



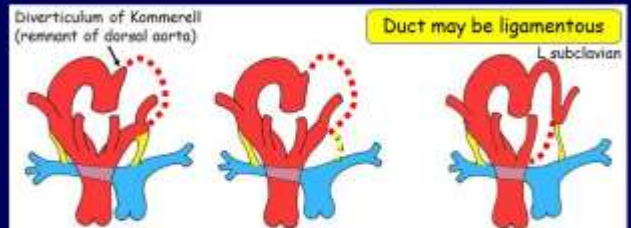
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## Partial double arch

Can be predominantly right or predominantly left



Dominant right arch - atretic segment or interruption

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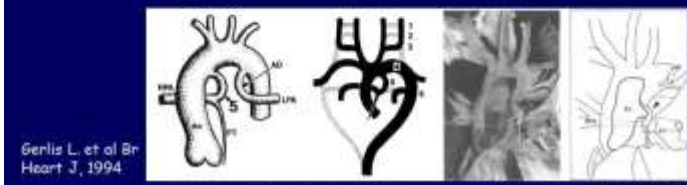
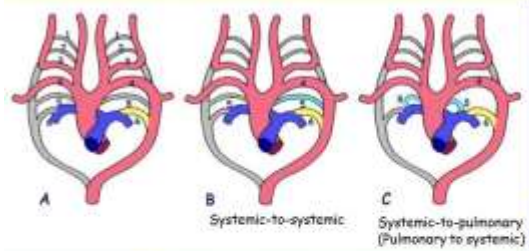
## Double Aortic Arch (ring)



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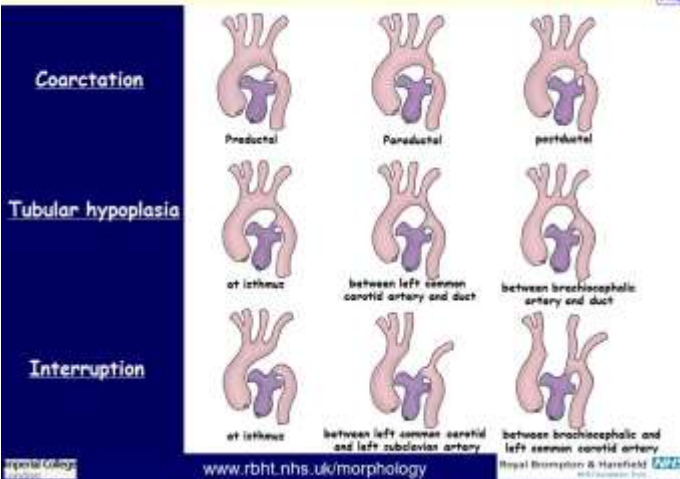
## Aortic Arch Anomalies: the fifth arch



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## Obstruction to flow



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## Obstruction to flow

**Coarctation**

**Incidence:**  
3.4 to 9.8% of congenital heart disease  
(An isolated lesion in approx 80% of incidence)

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## Obstruction to flow: coarctation vs TH

**Morphological types**

- Tubular hypoplasia - Long segment
- Coarctation - Discrete

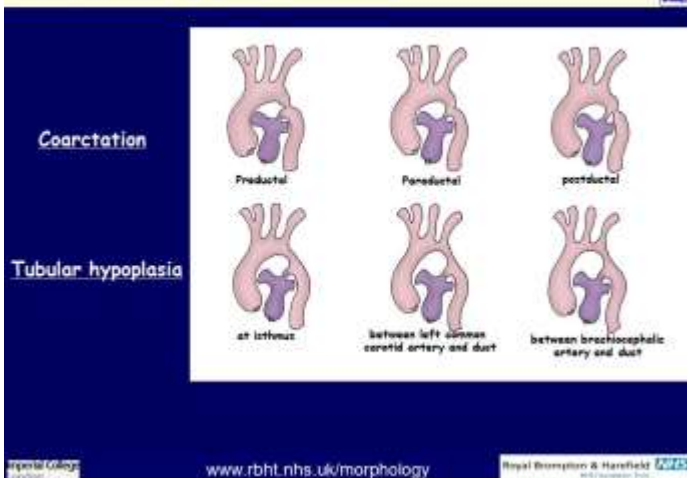
Can occur in isolation but often co-exist

Neonate: Commonly associated with intracardiac malformations

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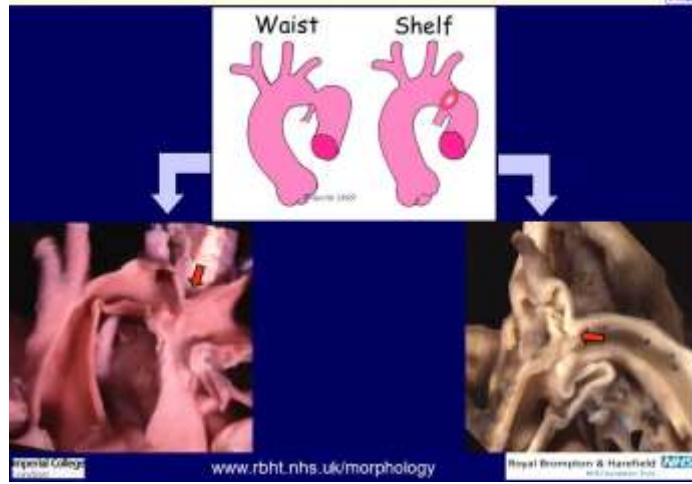
## Obstruction to flow: locations



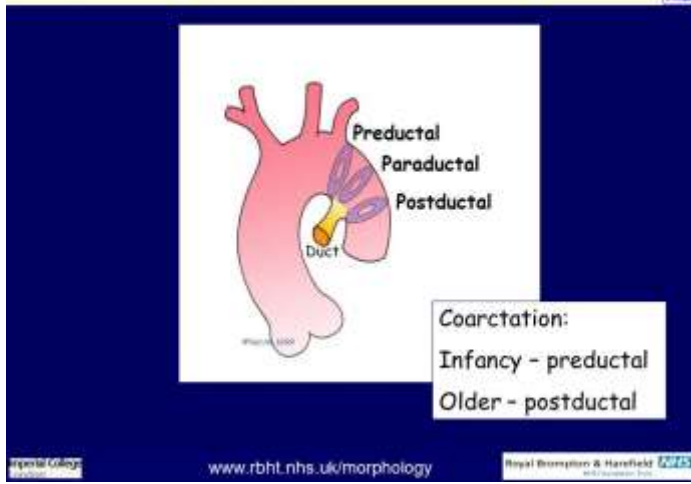
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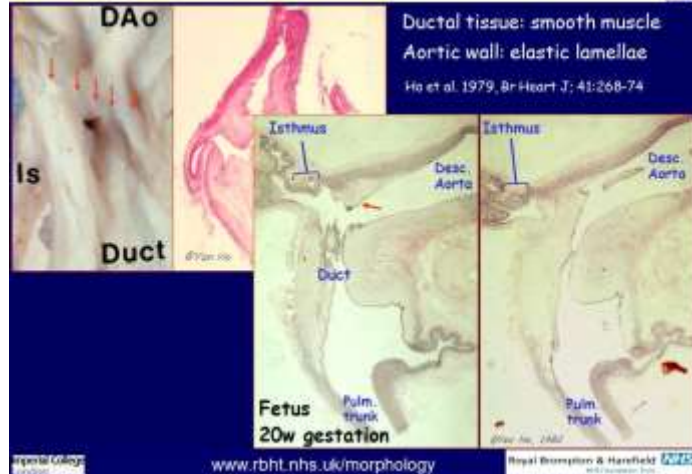
## Obstruction to flow: Coarctation



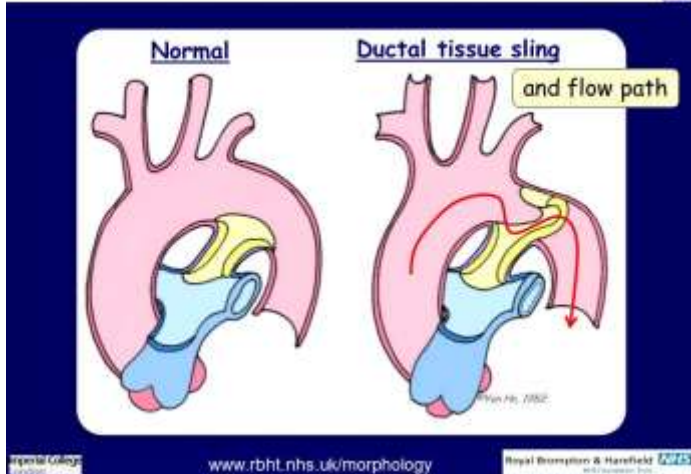
## Obstruction to flow: Coarctation location



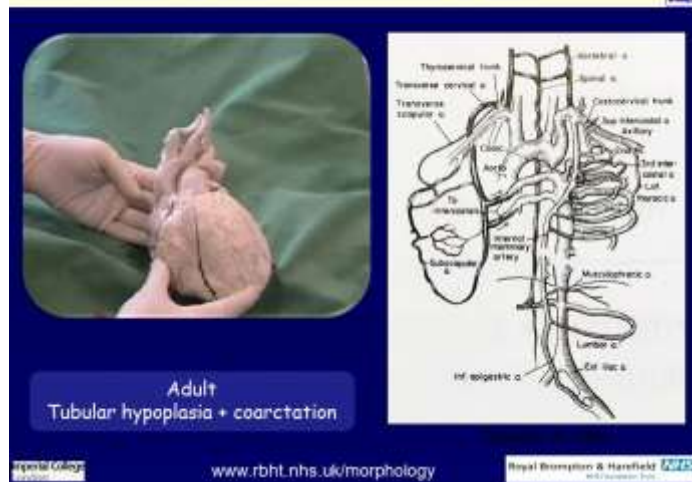
## Obstruction to flow: Coarctation & duct



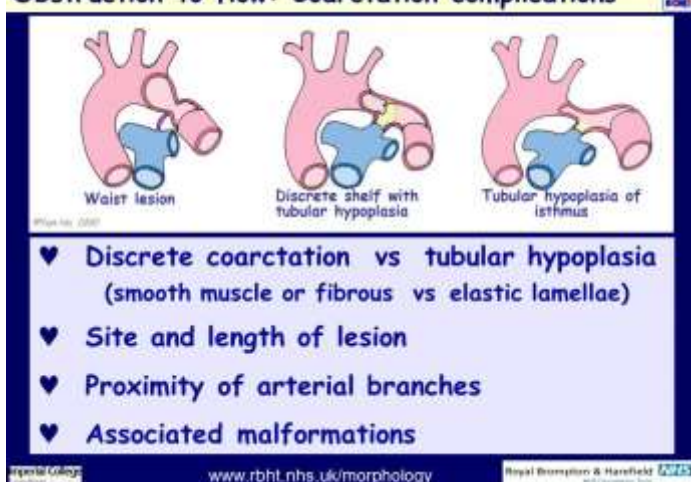
## Obstruction to flow: Coarctation & duct



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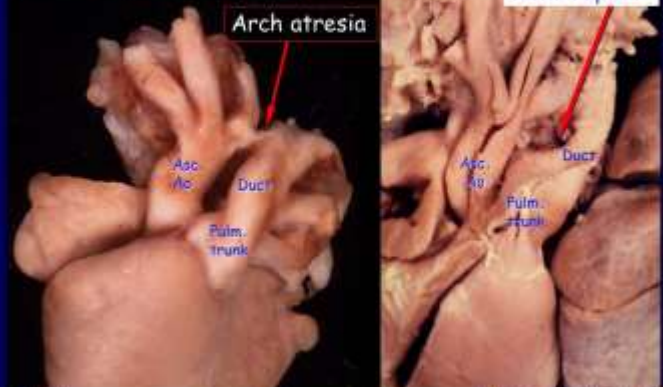
## Obstruction to flow: Coarctation complications





Accounts for approximately 1.3% of critical congenital anomalies in infancy  
 Highly lethal in first 2 weeks after birth  
 A duct-dependent lesion

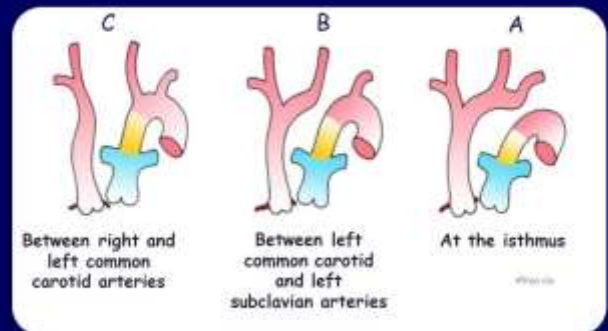
Interruption of flow



Anatomic features

- Site of interruption ?
- Anomalous subclavian artery ?
- Ventriculo-arterial connections ?
- Associated lesions ?

Interruption of flow



Ventriculo-arterial connections

- Concordant
- Common arterial trunk
- Discordant
- Double outlet right ventricle

The normal left arch

The abnormal arch

- Obstructions to flow
- Wrong side
- Wrong origin

Ring or Sling or Loop ??



Tracheal/esophageal compression

Associated malformations !

謝謝

Vielen Dank für Ihre Aufmerksamkeit

LinkedIn: Brompton Cardiac Morphology

E-mail: morphology@rbht.nhs.uk