

Classifying Vertebral Artery Anatomy Abnormalities in Children with Skeletal Dysplasias



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Background + Purpose

- Cervical disorders needing surgical treatment are common in pediatric skeletal dysplasia (SKD) patients
 - Vertebral artery anatomy understanding is important
 - Certain populations have shown more abnormalities:
 - Morquio, Klippel-Feil
- We aim to determine:
 - classifiable anatomy system of the vertebral a.
 - do SKD patients have typical anatomic abnormalities?

Methods

Retrospective review of neck CTAs 2006-2018, single institution

- 2 radiologists reviewed each CTA
- 2 groups:
 - SKD patients
 - controls (CTA for reasons other than ortho/nsgy concerns)

Methods

Radiographic data collected for **vertebral artery**:

- **dominance** - L, R, co-dominant
- curvature at **C2 foramen** - above, within, below
- direction of **exit at C3** foramen - medial, lateral, central
- **fenestration**
- presence of **intersegmental artery**

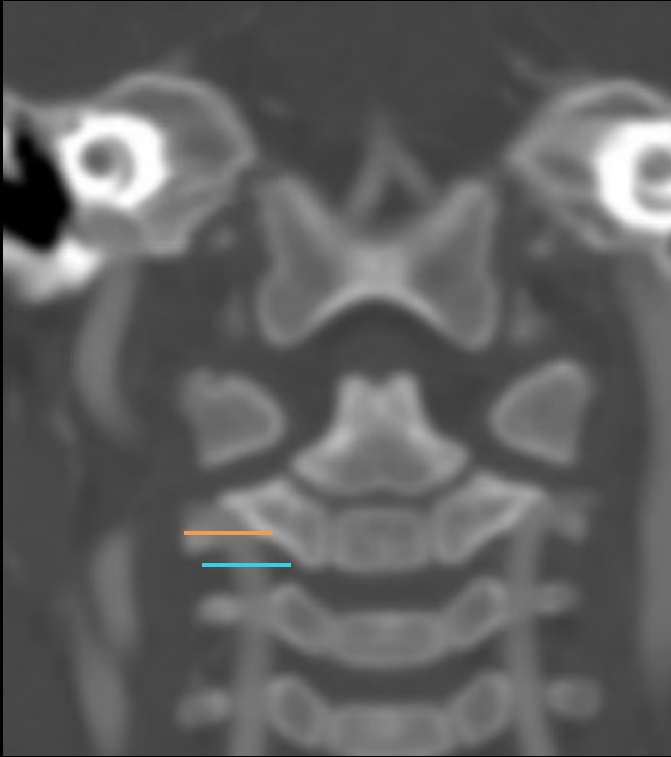
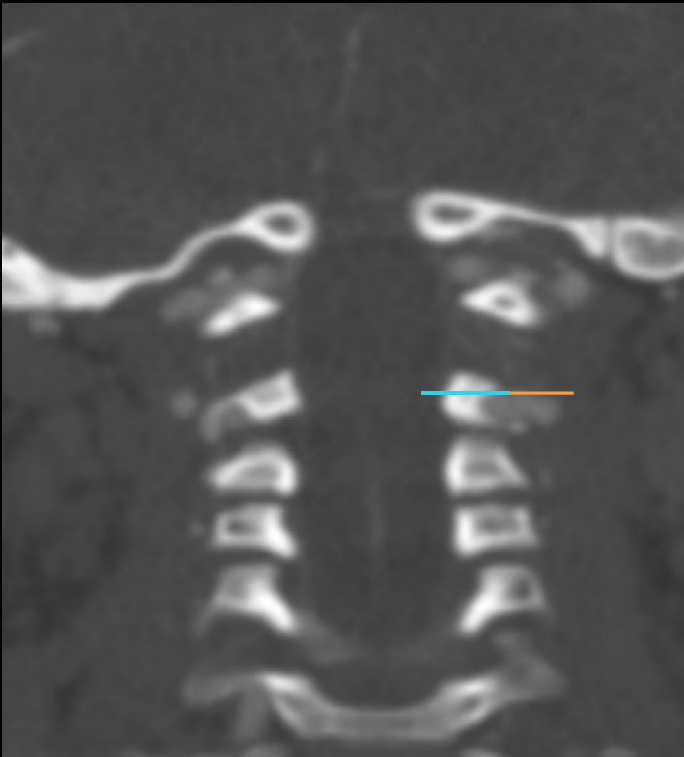
Curvature at C2 foramen:

Horizontal Line at Prominent Portion of Intra-axial VA relative to the outlet of C2 transverse foramina (TF)

Above

Within

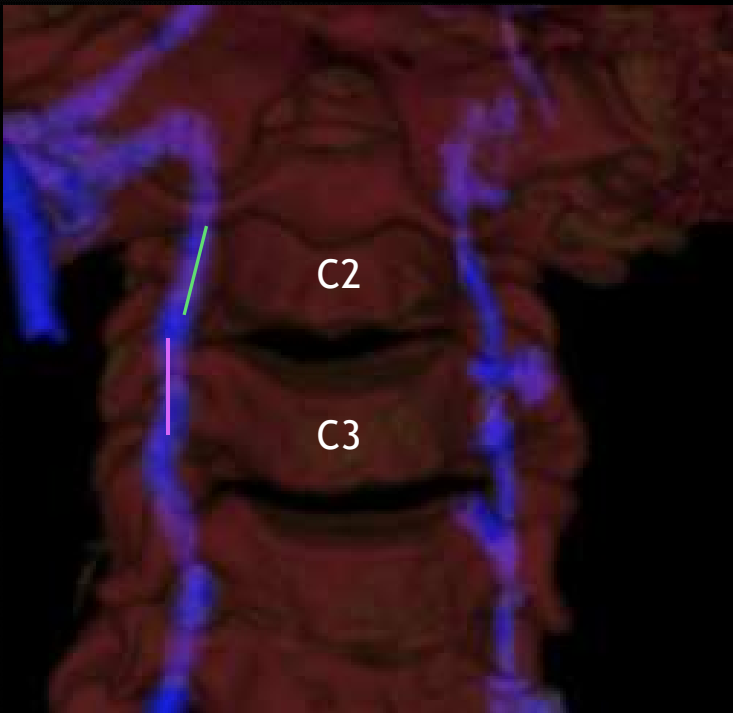
Below



C3 foramen exit:

Trajectory of VA as enters C2 TF (transverse foramina) relative to C3 TF

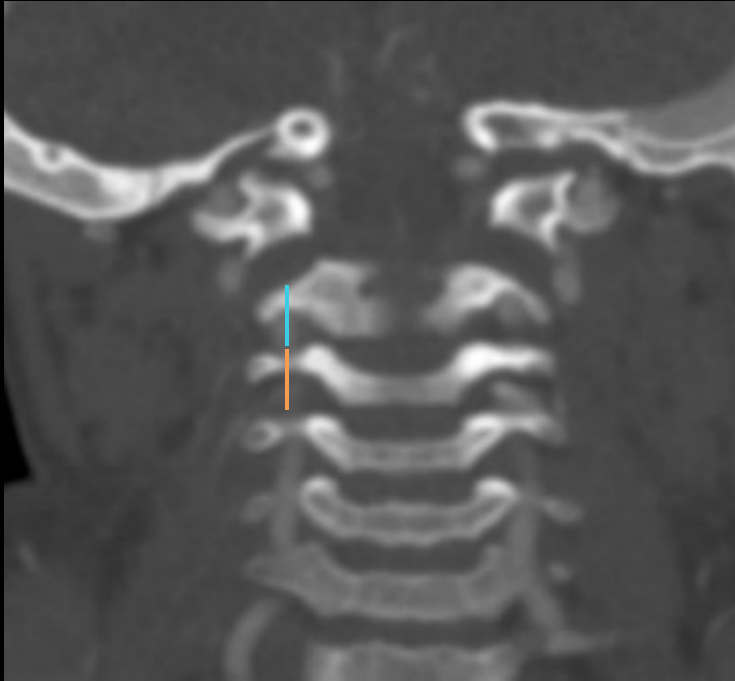
Medial



Lateral



Central



Results

- 18 SKD patients vs. 33 controls
- No significant difference in C2 or C3 vertebral artery anatomy
- Dominance most commonly neutral (61% SKD, 60% control)
- No fenestrated vertebral arteries
- No first intersegmental arteries

Results

Dominance

	L	Neutral	R	(total)
SKD	5	11	2	18
Control	9	20	4	33
(total)	14	31	6	51

Curvature at C2 RIGHT Foramen:

	Above	Within	Below	p
SKD	3	12	3	-
Control	3	21	9	-
(total)	6	33	12	0.56

C3 RIGHT Foraminal Exit:

	Lateral	Medial	Central	p
SKD	8	3	7	-
Control	15	5	13	-
(total)	23	8	20	0.99

Curvature at C2 LEFT Foramen:

	Above	Within	Below	P
SKD	3	15	0	-
Control	2	26	5	-
(total)	5	41	4	0.14

C3 LEFT Foraminal Exit:

	Lateral	Medial	Central	p
SKD	5	3	10	-
Control	9	9	15	-
(total)	14	12	25	0.69

Conclusions

- SKD children in our cohort do not have typical vertebral artery abnormalities different from other children
- Vertebral artery dominance, exiting direction from C3, and curvature at C2 foramen are important, classifiable abnormalities
- **Anatomy in all pediatric patients is variable thus routine CTA is recommended for all preoperative workup**