Pediatric (and Adolescent) Scoliosis

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Scope and Incidence

- Scoliosis is spinal asymmetry in the coronal plane—not a specific disease, rather a family of similar diseases.
- 4-14% of all kids have some degree of measurable spinal asymmetry.
- 2% of children have “scoliosis” (>10 degrees of spinal asymmetry).
- 14-40% of those children need some form of treatment (Orthopaedic literature).
- Other disciplines (eg: Chiropractic) present wildly varying estimates.
- Scoliosis is not one thing—it is many, many things.
Goals

- Understand the family of diseases that cause scoliosis.
- Develop an algorithmic approach.
- Minimize expense and radiation exposure.
- Identify what needs referral vs. reassurance/observation.
Types of scoliosis

- Non-pathologic spinal asymmetry
- Adolescent idiopathic scoliosis
- Juvenile idiopathic scoliosis
- Infantile idiopathic scoliosis
- Congenital scoliosis
- Neuromuscular disease (Cerebral Palsy)
- Myelodysplasia
- Tumor (typically benign)
- Neurofibromatosis
- Spondylolisthesis (Olisthetic)
- Diskitis/Infection
- Fracture
- Congenital defect
- Dwarfism
- Connective tissue disorders
- Muscular dystrophy
- Others....
Algorithmic approach

- School screening: worthwhile or not? No firm answer.
- Primary care provider: inspection, test flexibility, ubiquitous forward bend test, consider scoliometer.
- When to refer?
- Four main variables are severity, progression, associated symptoms.
- Xrays? MRI?
Adolescent Idiopathic Scoliosis

- Age: 10-16
- Sex: 90% female
- Ethnic: Most common in Caucasian, then Asian, then African-American populations.
- Familial incidence is an important consideration.
- The big questions:
  - Is it bad?
  - Is it getting worse?
Adolescent Idiopathic Scoliosis

- What is the goal?
  - Less than 40 degrees at skeletal maturity
- What are the treatments?
  - Observation, bracing, surgery
- Who gets what treatment?
  - Old and mild: observation
  - Young and stable: observation
  - Young and progressive: bracing
  - Over 40 degrees at any point: surgery
Juvenile Idiopathic Scoliosis

- Onset less than age 10.
- Highly associated with intra-spinal pathology?
- Deserves MRI at first visit.
- Very high rate of progression and needing surgery.
- Brace almost 100% of these kids.
- Surgery on over 50%.
Infantile Idiopathic Scoliosis

- Scoliosis at birth or in first year.
- Can be very problematic.
- Sometimes spontaneously remits.
- Surgical options are not good.
- Bracing is very difficult.
Congenital Scoliosis

- Scoliosis at birth due to structural defects.
- Usually does not require surgery.
- Bracing is not an option.
- Surgical options frequently require excision of a hemivertebra.
Neuromuscular scoliosis and others

- Bracing generally not an option.
- Treatment is either observation or surgery.
- Surgery can be more difficult/complicated, but is associated with major improvements in quality of life.
- Scoliosis is very frequently associated with other musculoskeletal problems that require Orthopaedic treatment.
- Early referral is highly recommended.
Treatments

- Test or treat?
- Observation
- Brace
- Surgery
  - Surgical options have gotten much more effective and risks have become much lower over the past 20 years.
Conclusions

- Scoliosis is a spinal shape that results from a family of diseases with highly variable prognoses and recommended treatments.
- The critical steps in work-up are to determine the cause, the need for further studies, and the need for treatments.
- The most common cause of scoliosis is Adolescent Idiopathic Scoliosis, which typically has a great prognosis if diagnosed and treated in a timely fashion.
References

- Early onset scoliosis: modern treatment and results. Tis JE; Karlin LI; Akbarnia BA; Blakemore LC; Thompson GH; McCarthy RE; Tello CA; Mendelow MJ; Southern EP. *Journal of Pediatric Orthopedics*. 32(7):647-57, 2012 Oct-Nov.