Atlanto Axial Rotatory Fixation in Children

Alan Crockard, Dominic Thompson and John Crossman
National Hospital and Great Ormond Hospital
London

CONFLICT OF INTEREST STATEMENT
No funds were received in support of this study.
7yr old boy
Heading soccer ball
Felt a click and head “stuck”
No change for 3 weeks

Much scepticism

Collar and psychotherapy unsuccessful

Referred 6 months later
CT Scan shows
Unilateral complete dislocation
of lateral masses
AARD
Question 1
Paediatric Atlantoaxial Rotatory Fixation

1. occurs with lax ligaments (Down Syn)
2. assoc with congen malformation
3. may occur with idiopathic scoliosis
4. never assoc with infection
5. assoc with anaesthetic positioning
6. none of the above

(ONE CORRECT)
Question 1
Paediatric Atlantoaxial Rotatory Fixation

1. occurs with lax ligaments (Down Syn) 27%
2. assoc with congen malformation 20%
3. may occur with idiopathic scoliosis 4%
4. never assoc with infection 2%
5. assoc with anaesthetic positioning 2%
6. none of the above 45%
Question 2
Diagnosis of AARF

1. has characteristic head tilt
2. is obvious on plain X Ray
3. needs rotational CT Scan
4. needs MRI to exclude cord compress
5. is rarely made in first month
6. All of the above

(2 CORRECT)
**Question 2**  
Diagnosis of AARF

1. has characteristic head tilt  
   - 41%

2. is obvious on plain X Ray  
   - 13%

3. needs rotational CT Scan  
   - 45%

4. needs MRI to exclude cord compress  
   - 13%

5. is rarely made in first month  
   - 12%

6. All of the above  
   - 17%
Atlantoaxial rotatory fixation

Clinical features
- Initially painful
- Rotation & head tilt
- “Cock robin” posture

Etiology
- Infectious Grisel (1930)
- Traumatic
- Post anaesthetic
- Spontaneous
Dynamic HRCT

Rotation to the right

Rotation to the left
Question 3
Treatment of AARF

1. includes Psychotherapy and soft collar
2. manip under anaesthesia and halo
3. transoral reduction and fixation
4. posterior occip cervical fusion
5. may require open reduction and halo
6. other

(2 CORRECT)
### Question 3

**Treatment of AARF**

1. Includes psychotherapy and soft collar — 5%
2. Manip under anaesthesia and halo — 72%
3. Transoral reduction and fixation — 5%
4. Posterior occip cervical fusion — 18%
5. May require open reduction and halo — 52%
6. Other — 0%
Results

- Aetiology
  - 2/3 trauma and infection
  - 14% trauma
  - 5% infection
  - 5% spontaneous
  - 44% tumor

- Rotation
  - 10 L side
  - 14 R side
  - 32% post anaest
Treatment options

- Traction, reduction, internal fixation  
  (Fielding & Hawkins 1977)

- Traction, reduction and immobilisation alone  
  (Subach et al 1998)

- Open reduction and immobilisation  
  (Crossman et al 2002)
# Failure of closed treatment

<table>
<thead>
<tr>
<th>Study</th>
<th>Recurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lee &amp; Lee 2002</td>
<td>3/6</td>
</tr>
<tr>
<td>Hisanori et al 2001</td>
<td>9/35</td>
</tr>
<tr>
<td>Subach et al 1998</td>
<td>6/20</td>
</tr>
<tr>
<td>Phillips &amp; Hensinger 1989</td>
<td>3/7</td>
</tr>
<tr>
<td>Pang &amp; Li 2005</td>
<td>13/35</td>
</tr>
</tbody>
</table>

- Delay in diagnosis the most commonly cited cause
Fibrofatty Plane

A.K. Henry: Exteme Exposure (1973)
**Question 4**

Long term outlook for treated AARF include

1. recurrence in adult life
2. progressive facial asymmetry
3. no rotatory movements
4. AA instability due T Lig damage vert art insufficiency none of the above

(1 CORRECT)
Question 4
Long term outlook for treated AARF include

1. recurrence in adult life  10%
2. progressive facial asymmetry  16%
3. no rotatory movements  29%
4. AA instability due T Lig damage vert art insufficiency none of the above  45%
Late referral (6mo) facial asym

Before treatment  After treatment
Referred 1mo no facial asym

Before treatment

After treatment
AARF establish diagnosis with rotational CT

CT confirmed reduction

MUA

< 1 month

Hard collar

Halo 3/12

> 1 month

recurrence

Open reduction Temp fix

Avoid fusion

Recurrence MUA

cured