CLINICAL PREDICTORS OF POST-SEPTAL DISEASE IN PAEDIATRIC PERIORBITAL CELLULITIS

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Background:
Periorbital cellulitis is a clinical entity comprising of pre-septal and post-septal disease, the latter carrying higher morbidity and mortality. It is thus important to distinguish the locus of disease early: urgent surgical intervention by otolaryngologists is often necessary for post-septal disease whereas pre-septal disease can be managed with antibiotic therapy. In the paediatric population it can often be difficult to differentiate between pre- and post-septal disease. When diagnostic uncertainty exists, CT scans may be performed. The considerable radiation burden of this investigation needs to be justified.

Aims:
1. Investigate the predictive value of presenting signs and laboratory tests to identify patients with post-septal cellulitis.
2. Establish criteria for CT scanning in paediatric patients with periorbital cellulitis.

Methods:
- Retrospective case study across two large district general hospitals in the West Midlands, UK.
- 2 years: January 2016-January 2018.
- Patients under age of 16 years with coded diagnosis of periorbital cellulitis.
- Data obtained from physical and electronic records.

Data domains:
- Patient demographics: age, gender.
- Clinical signs: red flag eye signs, temperature.
- Biochemical markers: white cell count (WCC), C-reactive protein (CRP).
- Microbiology: blood cultures, swab cultures.
- Final diagnosis.

Results:
- Total cases: n = 116.
- Average age: 5.3 years (5 days – 16 years).
- Final diagnosis:
  - Pre-septal: n = 101 (87%)
  - Post-septal: n = 15 (13%)
- Number of red flag eye signs:
  - 0 : n = 91 (78%)
  - 1 : n = 16 (14%)
  - 2 : n = 7 (6%)
- Pyrexial at presentation : n = 79 (68%)
- Biochemical markers:
  - Blood cultures: n = 79 (68%). Positive growth: n = 4 (5%)
  - White cell count (WCC):
    - Average: 13.3
    - Range: 3.4 - 44
  - C-reactive Protein:
    - Average: 45.1
    - Range: 1 - 200

- Eye swabs: n = 57 (49%)
  - Conjunctivitis:
    - Acute: 3 (5%)
    - Chronic: 1
  - Staphylococcus aureus:
    - Acute: 9 (15%)
    - Chronic: 7 (12%)
  - Hemolytic streptococcus:
    - Acute: 3 (5%)
    - Chronic: 5 (9%)

Conclusions:
1. The combination of any number of red flag eye signs with elevated WCC and CRP offers the best predictive values of post-septal disease.
2. In paediatric patients with periorbital cellulitis, CT scanning may be indicated in this subset of patients with red flag eye signs and elevated inflammatory markers in order to exclude post-septal disease.

Discussion:
- Goldman et al. found that “local ocular symptoms” (especially lid oedema) and pyrexia were the only significant predictors for admission in children with periorbital cellulitis.
- Rudloe et al. identified that patients with protosis, limitation of extra-ocular movements and neutrophilia are at higher risk of developing subperiosteal abscesses in periorbital cellulitis. They recommend CT scanning in this group of patients.
- Our study corroborates these findings, and adds more robust recommendations.

Results:
- CT scans performed: n = 32 (28%)
  - Pre-septal: 17
  - Post-septal: 15
- Factors significantly correlated with final diagnosis:
  1. Number of red flag eye signs
  2. White cell count
  3. CRP
  4. Eye swab result
- Blood culture results:
  - Positive: 57 (87%)
  - Negative: 20 (31%)
- Specificity:
  - White cell count (WCC > 12 + CRP > 40): 61% (95%)
  - CRP > 40: 70% (91%)
- Sensitivity:
  - Red flag eye signs: 100% (95%)
  - Post-septal disease: 100% (95%)

Future directions:
Continue prospective data collection to add to existing database. Audit results of current recommendations for CT scanning in periorbital cellulitis.

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