Screening for enteroviral meningitis in infants and children
- is it useful in clinical practice?
Paul Turner, Jessica Brayley, Hannah Downing, Gareth Homfray, Georgia Doolan, Siba Paul
Department of Microbiology and Paediatrics, Torbay and South Devon NHS Foundation Trust, Torquay, Devon, UK

BACKGROUND

Viral meningitis in children:
- Common cause of hospital admission especially during summer months
- Requirement to admit to HDU reduced
- 49/196 CSF samples were PCR +ve across all age ranges
- Role of surrogate markers (e.g. CRP, WCC, CSF WCC count) uncertain
- Is there a role for additional laboratory markers and does CSF viral EV PCR testing impact on care pathway/management/prognosis?
- Can the care pathway be improved?

PURPOSE AND HYPOTHESIS

Purpose:
- Compare outcomes for infants and children (excluding SCBU) diagnosed with EV meningitis vs no virus detected on CSF samples
Hypothesis:
- Is there a role for additional laboratory markers and does CSF viral EV PCR testing impact on care pathway/management/prognosis?
- Can the care pathway be improved?

MATERIALS AND METHODS

- Infants and children admitted to Hospital between 2011 and 2017 where CSF viral PCR tests performed (n=215)
- PCR testing 2011-April 2015 by Bristol virology PHE laboratory using in house panel
- PCR testing May 2015-2017 by Torbay Hospital using FTD (Fast Track Diagnostics) viral meningitis panel
- 19 CSFs excluded (repeat sample, not admitted, taken post mortem)
- Reviewed remaining case notes (n=196)

Created clinical/pathological database combining lab data, PAS records and case notes

LABORATORY ANALYSIS/ RESULTS

- 49/196 CSF samples were PCR +ve across all age ranges
- 41 (19.9%) +ve for EV
- HSV 1/2, VZV and HHV-6 detected in 2 (1.0%), 5 (2.6%) and 1 (0.51%), respectively
- Most EV cases amongst infants aged 1-6m (21/39, 54%)
- Followed by infants aged <1m (15/39, 38%)
- Additional analysis done on infants (non SCBU) and children (n=136) (Figs 2-6)

EV clinical outcomes (n=136)

- Retrograde study evaluated laboratory and clinical outcomes for EV meningitis in infants and children
- SCBU excluded as management different with relatively low numbers of positives (2/60 CSFs EV +ve, 3.3%)
- Most diagnosis aged <6m old (34/79 CSFs EV +ve if <6m)
- Relatively few >6m old (5/57 CSFs EV +ve if >6m) reflecting adult incidence
- Most cases healthy infants with non-severe infection – need to be aware of changing epidemiology, outbreaks and/or more pathogenic strains (e.g. EV D68/71)

Analysis of clinical outcomes (EVB PCR +ve vs SCBU +ve):
- Adjusted CSF WCC vs PCR +ve
- Peripheral WCC and CRP count (Figs 3a and 3b)
- Antibiotics given and antibiotic duration (Figs 4a and 4b)
- Whether admitted to HDU (Fig 5) and LOS (Fig 6)

DISCUSSION/ CONCLUSIONS

- Most diagnosis aged <6m old (34/79 CSFs EV +ve if <6m)
- Relatively <6m old (5/57 CSFs EV +ve if >6m) reflecting adult incidence
- Most cases healthy infants with non-severe infection – need to be aware of changing epidemiology, outbreaks and/or more pathogenic strains (e.g. EV D68/71)
- Focus needs to be on infants <6m old taking into account presentation including severity, past medical history and laboratory parameters below

Analysis of laboratory parameters (EVB PCR +ve vs PCR -ve):
- Adjusted CSF WCC (Fig 2) - cut off <5µl would have missed 32% (12/37)
- CRP (Fig 3a) – cut off ≤50 mg/L would have detected 92.3% (37/39)
- Peripheral WCC (Fig 3b) – cut off <17µl would have detected 92.3% (36/39)

Analysis of clinical outcomes (EVB PCR +ve vs PCR -ve):
- Use of antibiotics (Fig 4a) greater with EV meningitis – 97% vs 78%
- Mean Duration reduced (Fig 4b) - 2.8 vs 3.9 days (excludes >7 days/unknown)
- Requirement to admit to HDU reduced - 7.7% vs 33%
- Mean Length of Stay (LOS) - 3.3 vs 4.7 days (excludes >10 days)

Suggested guidance for suspected EV meningitis to improve care pathways:
- Focus on optimal age for viral PCR testing (<6m old)
- EV PCR irrespective of adjusted CSF WCC (<6m old)
- Review of antibiotics/antivirals 24h as part of antimicrobial stewardship
- Promote earlier discharge if EV PCR +ve with safety netting
- Provide reassurance to the parents/carers concerning overall prognosis

BIBLIOGRAPHY