Paediatric Pearls

by Dr Julia Thomson, Paediatrician

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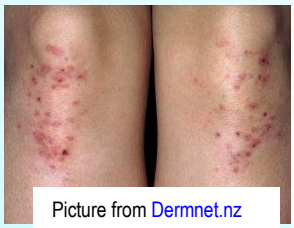
Monthly paediatric update newsletter for all health professionals working with children – put together by Dr Julia Thomson, Paediatric Consultant at Homerton University Hospital, London, UK. Housed at www.paediatricpearls.co.uk where comments and requests are welcome!

Dermatological manifestations of systemic disease by Dr Anusuya Kawsar, dermatology registrar at Barts Health NHS Trust. You know when you know that the rash in front of you could signify something but you can't quite remember all that information you learnt for your postgraduate exams? It's been happening to me a lot recently so I asked my dermatology colleagues for a reminder of some of the more important "skin clues" to a child's underlying disorder. First up, **Dermatitis herpetiformis:**

New dermatology series!!

Associated disease: **Coeliac disease**



Picture from Dermnet.nz

Patient information from British Association of Dermatologists here.

- extremely **itchy** papules and vesicles, appearing in **clusters** in a **symmetrical** pattern
- blisters may appear eroded / crusted due to scratching. May also present as flat red patches, thickened plaques or wheals
- usually affects shoulders, elbows, knees, buttocks, scalp
- GI symptoms include abdominal bloating, weight loss, diarrhoea / constipation, fatigue
- typically affects Caucasians between 15 - 40 years, M > F
- associated with HLA DQ2, HLA DQ8
- may warrant a skin biopsy to confirm diagnosis
- specific auto antibody tests include IgA anti-endoymsial antibodies and TTG while still on a gluten containing diet
- refer to gastroenterology
- management: steroids may help symptoms, long term gluten-free diet and dapsone

Genetics is a fast-moving field and array CGH (microarray test), used in clinical practice since around 2010, is the first line genetic test now for babies and children presenting with unexplained learning difficulties / developmental delay / behavioural problems (including autism) and those with dysmorphism / multiple congenital abnormalities suggestive of a chromosome abnormality.

But what is the "microarray test" and can it tell us everything about a child's genome? If a child's microarray is normal, does that mean there is no genetic component to their presentation?

Dr Jenny Thomson, Clinical Geneticist at Chapel Allerton Hospital in Leeds, enlightens us:

Array CGH is a technique for analysing chromosomes. It works by comparing a patient's DNA with a control DNA sample. It will detect whether a patient has a part of a chromosome missing (deletion) or an extra part (duplication) compared to normal eg 22q11 deletion (DiGeorge syndrome) and 7q11 deletion (William syndrome). Array CGH will also identify whole extra chromosomes eg Trisomy 21 (Down syndrome), 47XXY (Klinefelter syndrome) or whole missing chromosomes eg 45XO (Turner syndrome). If a chromosome deletion or duplication is very small, it may only involve 1 or 2 genes and the patient's phenotype may depend on those particular genes. For some conditions eg Prader-Willi syndrome, array CGH is able to pick up some of the cases (that are caused by chromosome deletions) but not all, due to specific methylation defects which can be diagnosed by other DNA techniques.

Busy clinicians should take a look at "Gene Reviews", a point-of-care resource on all things genetic: https://www.ncbi.nlm.nih.gov/books/NBK1116/. More useful and accessible information regarding ArrayCGH including clinician and patient information leaflets at: http://www.leedsth.nhs.uk/a-z-of-services/the-leeds-genetics-laboratory/constitutional-genetics/constitutional-cytogenetics/postnatal-array-cgh/, https://www.nbt.nhs.uk/sites/default/files/attachments/Array%20comparative%20genomic%20hybridisation%20(CGH)_NBT002584.pdf

"Our geneticist used an analogy which made things clearer for us. He said that previous test results were like an old-fashioned map of the world which showed just a wide overview (country level) and that doing an array is more like using Google Earth which allows us to zoom in much more closely, even down to street level, to give a closer and clearer idea of which genes, if any, are missing or duplicated." This quote is taken from the excellent patient information leaflet from the Unique Rare Chromosome Disorder Support Group, available here.

What does the microarray test ***not*** detect?

- it detects unbalanced, **but not balanced**, chromosome abnormalities. This is explained at: https://www.rarechromo.org/media/information/Other/Balanced%20translocations%20FTNW.pdf
- it **does not detect DNA sequence variation** (eg. point mutations), a major cause of dominant, recessive, and X-linked disorders eg.. Marfan, Noonan or Ehlers-Danlos syndromes

The clinical **significance of some abnormal results is uncertain**:

- parental microarray studies are sometimes necessary to interpret "variants of uncertain clinical significance"
- occasionally there are incidental findings **which predict adult onset disorders** eg. cancer. I am not sure that we always warn our patients / parents of that, do we?

LESSONS FROM THE FRONT LINE

Managing measles contacts

We have a measles outbreak in Hackney currently. 95% immunisation rate is needed for effective herd immunity and in north-east Hackney, only about 60% of the under 2s are vaccinated against measles. Last month, on the advice of Public Health England (PHE), we had to give a 3-day old baby immunoglobulin because he was in the resuscitation bay at our hospital at the same time as a 15-month-old with measles related pneumonitis. **These are the facts:**

- Measles is extremely infectious – droplet spread and non-immune people are at risk if they spend > 15 minutes in a confined space (including a GP's waiting room) with someone with it
- Most infectious 4 days before to 4 days after the onset of the rash
- Incubation period is 10-12 days
- Infants are particularly susceptible because maternal antibodies are not reliable

This is the current infant contact advice from PHE:

Table 4: Assessment and treatment of infants

Infants		
Infants <6 months	Assume susceptible and administer HNIG, ideally within 72 hours but up to six days, regardless of maternal status	
Infants aged 6-8 months	For household exposure, administer HNIG, ideally within 72 hours but up to six days if necessary	For exposures outside of the household, administer MMR, ideally within 72 hours
Infants ≥9 months	Administer MMR vaccine, ideally within 72 hours of exposure	

2017 PHE advice on post exposure prophylaxis here.
Patient information on the MMR vaccine here.
Website for the vaccine hesitant parent here.
A reminder of measles' typical clinical course here.

With thanks to Dr Helena Jones, FY2 in paediatrics at Homerton, for researching this in depth.

From the Literature – a paper in this month's Archives of Disease in Childhood (ADC) has backed up my practice of using a smartphone-based ECG recording device for children with sporadic palpitations and a low risk of significant arrythmias. Children with no family history of cardiac death before the age of 40, no syncope and a normal 12-lead ECG are unlikely to have anything seriously wrong with their heart. AliveCor (Kardia) monitors have been assessed by NICE for use in adults at risk of AF. Nguyen et al (2015) showed that smartphone devices can generate diagnostic tracings in children with SVTs. Macinnes et al found that the Kardia outperformed the conventional cardiac event monitors with respect to both diagnostic yield and patient satisfaction. The smartphone app is free and the gadget itself costs just under £100.