Evaluation and management of fever in children

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The evaluation and management of fever in young children is one of the most difficult problems encountered by the practitioner who cares for children Shapiro 1986

Acute bacterial sepsis in a previously well child is a rare event, but if unrecognised can have serious consequences. A recent Coronial enquiry (see http://www.nzma.org.nz/journal/123-1309/3989/Coroner.pdf) described the events leading up to the death of a 3-year-old boy from overwhelming septicaemia.

The boy had complex congenital heart disease that had been repaired in infancy, and he was left with some aortic and pulmonary valve regurgitation. He presented to his General Practitioner with an acute history of going blue around his lips and feeling cold. On arrival he had a fever of 39.8ºC and an elevated heart rate of 120 beats per minute. Shortly afterwards he vomited.

A clinical assessment found no focal signs of infection and a diagnosis of probable viral gastroenteritis was made. He remained unwell for a further 5 days. His Doctor reviewed him on two occasions, once during a home visit, and had several phone conversations with the family. No source of infection was identified and no urine or blood cultures were taken. The boy later died at home, and a post-mortem examination showed the death was caused by Streptococcus pyogenes septicaemia. There was evidence of peritonitis, suggesting this was the primary focus of infection.

Occult bacteraemia (OB) is a diagnostic term used in children who present with high fever and no localising signs of infection and from whom a pathogen is isolated on blood cultures. Not all children with occult bacteraemia will go on to develop complicated infection but identifying children with OB has long been the focus of Paediatricians managing children with febrile illness.² OB is thought to precede many invasive infections such as meningitis and septicaemia, and it seems likely that this child was bacteraemic at some stage during his illness. Identifying OB is important because early treatment may prevent serious complications.

Historically, Haemophilus influenzae type B (Hib) and Streptococcus pneumoniae have been responsible for the vast majority of episodes of OB in children less than 3 years of age.³ In 1990 between 3 to 10% of highly febrile, non-toxic appearing children between the ages of 3 and 36 months were found to have OB(4). With the introduction of the Hib vaccine and the heptavalent conjugate pneumococcal vaccine (PCV) rates of OB have fallen dramatically.

Hib bacteraemia is now extremely uncommon, and several studies in the post-PCV era have suggested that the incidence of pneumococcal bacteraemia in well-appearing febrile children aged 3 to 36 months is in the range 0.24% to 0.91%.⁴ ⁵ However, OB due to this organism still occurs, and increasing rates of invasive disease caused by non-vaccine serotypes of S. pneumoniae have been noted in several countries.⁶ ⁹ Other organisms that less commonly cause OB include Neisseria meningitidis,
Escherichia coli and S. pyogenes. The rates of OB due to S. pyogenes have not been well defined but it appears to be extremely uncommon.\textsuperscript{10}

Changes in the incidence of OB have led to changes in the current recommendations for management of febrile children.\textsuperscript{11} The routine use of antibiotics in children with fever and no focus is not recommended, as a very large number of children would need to be treated to prevent one case of complicated bacterial infection. Instead the focus should be on detailed and accurate clinical assessment of the child, and referral to specialist paediatric care for further assessment if there are any signs to suggest serious illness.

In 2007 the National Institute for Health and Clinical Excellence (NICE) in the UK published a guideline for the initial assessment and management of children <5 years with fever.\textsuperscript{12} This document emphasizes that every child should have measurements recorded for temperature, respiratory rate, heart rate and capillary refill time at each assessment as well as an assessment for signs of dehydration.

It makes specific note that tachycardia in a febrile child can be sign of serious illness, particularly septic shock. It also recommends that healthcare professionals should make a thorough search for the cause of fever and check for the presence of signs and symptoms associated with specific diseases—e.g. petechiae and meningococcal disease. Part of this assessment should include urine culture, as urinary tract infection is now the commonest bacterial infection identified in children with fever and no focus of infection. Blood cultures should always be taken if the child is thought to have a high risk of bacterial infection.

The decision as to when to refer a child with fever to specialist paediatric care is often a difficult one. Fever is a very common presentation in children and most will not require referral. While the risks of an individual child with high fever having OB appear to be very low if they are fully vaccinated, the consequences of missing a case of OB remains unchanged. This child appears to have had an atypical presentation of septicemia with an illness lasting several days. The clinical signs of septicaemia may be difficult to identify in children, particularly if the child is seen early in the illness or for only a short consultation. Referral for paediatric assessment allows for prolonged observation of children and repeated clinical assessment, and is a key step in the NICE guideline for any child with significant abnormal clinical findings.\textsuperscript{12}

A great deal of progress has been made in preventing OB in children since Shapiro made his comments back in 1986. However the challenges of assessing children with fever of unknown origin remain. This tragic case highlights the need for continued vigilance, with careful and detailed assessment of all children who present to their medical practitioner with unexplained fever.

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