Whittington Health NHS

Kawasaki Disease

Subject:	Kawasaki Disease
Policy Number	N/A
Ratified By:	Clinical Guidelines Committee
Date Ratified:	September 2004 and October 2006 (minor amendments January 2012, November 2014 and July 2016).
Version:	5.0
Policy Executive Owner:	Dr Neeta Patel, Clinical Director CYP ICSU
Designation of Author:	Dr Jane Simpson Dr Gopa Sen (Consultant) Dr Vanessa Zammit Ventura (Consultant)
Name of Assurance Committee:	Clinical Guidelines Committee
Date Re-issued:	July 2016
Review Date:	3 years hence
Target Audience:	Paediatricians and Paediatric ED Staff
Key Words:	Kawasaki disease, Paediatrics

Version Control Sheet

Version	Date	Author	Status	Comment
3	Jan 2012	Dr Gopa Sen	Off line	Trust switching to a different brand of IVIG. Generic review of contents.
4	Nov 2014	Changes made by Dr Jane Simpson. Approved by Dr N Patel (Clinical Director)	Off line	In light of new clinical guideline for UK management published in the Archives of Diseases in Childhood (doi: 10.1136/archdischild-2012-302841), minor changes to the introductory text, and sections on diagnosis and general management have been made. A new treatment algorithm has been added to the specific management section.
5	July 2016	Dr Vanessa Zammit-Ventura	Live	Changes to include the management of patients with previous Kawasaki disease with acute coronary syndrome. In response to the patient safety alert issued by NHS Improvement 11th May 2016 and Critical Care Information Circular 020 to acute hospital trusts from London Ambulance Services regarding 'Management of patients with previous Kawasaki Disease.'

Criteria for use

For all suspected cases of Kawasaki Disease

Background/ introduction

Kawasaki Disease (KD) is an acute febrile illness of early childhood, with about 80% of cases occurring between 6 months and 5 years of age. It is an acute inflammatory vasculitis of medium sized arteries that has a propensity to damage the coronary arteries. As a consequence it is the most common cause of acquired heart disease in children in the developed world.

The nature of the symptoms and the epidemiology suggest that one or more widely distributed infectious agent triggers an abnormal inflammatory response in a genetically predisposed child. Genetic studies have identified several susceptibility genes for KD as well as genes influencing response to IVIG.

Inclusion/Exclusion Criteria

Diagnostic Criteria

Fever ≥ 5 days duration (typically high spiking, with peak temperatures generally > 39 degrees) **and** ≥ 4 of the 5 principle clinical features:

1. Changes in extremities
    a. Acute: Erythema of palms and soles, oedema of the hands and feet
    b. Subacute: periungual peeling of the fingers and toes in weeks 2 and 3
2. Polymorphous rash (normally within 5 days of onset of the fever)
3. Bilateral conjunctival injection without exudate (shortly after onset of the fever)
4. Changes in lips and oral cavity: Erythema, lips cracking, strawberry tongue, diffuse injection of the oral and pharyngeal mucosa (one of these is sufficient).
5. Cervical lymphadenopathy: usually unilateral and >1.5cm in diameter

Further Clinical Findings

- Central Nervous System: Extremely irritable, aseptic meningitis
- Gastrointestinal: Diarrhoea, vomiting and abdominal pain, hepatic dysfunction
- Genitourinary: Urethritis/meatitis
- Musculoskeletal: Arthritis and arthralgia
- BCG reactivation

Exclude conditions with a similar presentation:

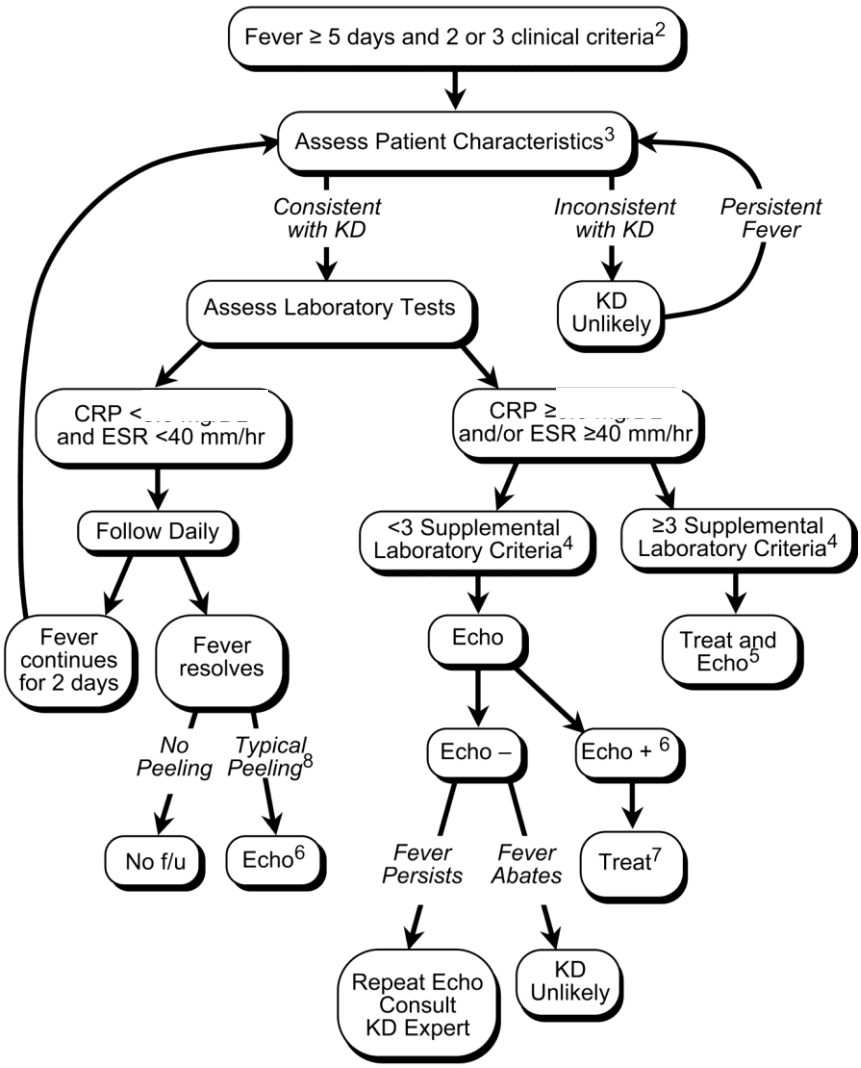
Staphylococcal infection (e.g. toxic shock syndrome), streptococcal infection (e.g. scarlet fever), viral infections e.g. measles/EBV, leptospirosis, rickettsial disease, Steven Johnson's syndrome, drug reaction, juvenile idiopathic arthritis.

Diagnosis can be difficult as the features can occur sequentially and may not all be present at the same time; watchful waiting is sometimes necessary before a diagnosis can be made. Discuss with duty consultant if diagnosis considered likely. Specialist advice may be required if there is diagnostic uncertainty.

Some patients do not develop sufficient features to fulfil the formal diagnostic criteria. Clinical vigilance and recognition of this possibility are necessary as incomplete cases are still at risk of coronary complications. The American Heart Association Algorithm has been developed to assist diagnosis in such cases:

American Heart Association Algorithm on Evaluation of Incomplete Kawasaki Disease

Evaluation of Suspected Incomplete Kawasaki Disease (KD)[1]



[1] In the absence of gold standard for diagnosis, this algorithm cannot be evidence based but represents the informed opinion of the expert committee. Consultation with an expert should be sought anytime assistance is needed.

[2] Infants ≤6 months old on day ≥7 of fever without other explanation should undergo laboratory testing and, if evidence of systemic inflammation is found, an echocardiogram, even if the infants have no clinical criteria.

[3] Characteristics suggesting disease other than Kawasaki disease include exudative conjunctivitis, exudative pharyngitis, discrete intraoral lesions, bullous or vesicular rash, or generalized adenopathy.

[4] Supplemental laboratory criteria include albumin ≤30 g/L, anaemia for age, elevation of alanine aminotransferase, platelets after 7 d ≥450 x10^9/l, white blood cell count ≥15 x10^9/l, and urine ≥10 white blood cells/high-power field.

[5] Treat before performing echocardiogram.

[6] Echocardiogram is considered positive for purposes of this algorithm if any of 3 conditions are met: z score of LAD or RCA ≥2.5, coronary arteries meet Japanese Ministry of Health criteria for aneurysms, or ≥3 other suggestive features exist, including perivascular brightness, lack of tapering, decreased LV function, mitral regurgitation, pericardial effusion, or z scores in LAD or RCA of 2–2.5.

[7] If the echocardiogram is positive, treatment should be given to children within 10 d of fever onset and those beyond day 10 with clinical and laboratory signs (CRP, ESR) of ongoing inflammation.

[Type text]

[8] Typical peeling begins under nail bed of fingers and then toes.

Investigations

Full blood count: white blood cell count >15 x 10^9/L in 50%, anaemia, thrombocytosis (in the second week)

Erythrocyte Sedimentation Rate: > 60mm/hr in 60% of cases

C-reactive protein: >35 mg/L in 80% of cases

Liver Function Tests: Elevated serum transaminases, mild hyperbilirubinaemia and hypoalbuminaemia

Urea and electrolytes

Antistreptolysin O titre (ASOT)

Coagulation screen

Autoantibody screen

Monospot test

Save serum for viral studies for enterovirus, adenovirus, parvovirus, Epstein Barr virus, cytomegalovirus

Throat swabs for bacterial and viral culture

Urine analysis: mild to moderate sterile pyuria

Electrocardiogram: arrhythmia, prolonged PR interval or nonspecific ST and T wave changes and myocardial ischaemia/infarction

Echocardiogram

General Management

Supportive management

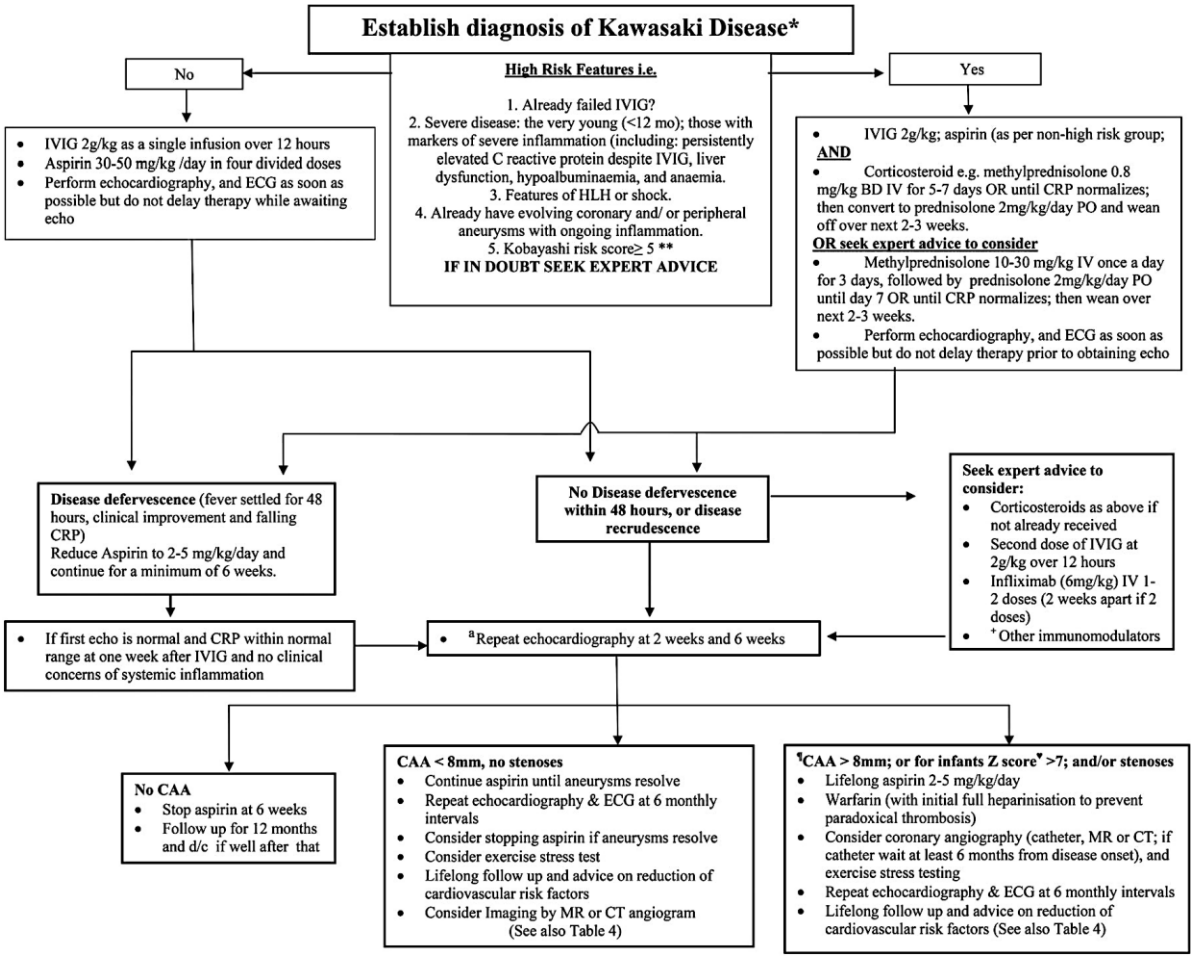
- Paracetamol : for fever or pain

- Fluids : oral, naso-gastric or intravenously (IV) but beware of fluid overload because patients at risk of cardiac failure

- If an infective cause cannot be ruled out, treat for staphylococcal or streptococcal infection as appropriate.

Specific Management

Early recognition and treatment of KD with aspirin and IVIG has been shown unequivocally to reduce the occurrence of coronary artery aneurysms. IVIG resistance occurs in up to 20% of cases and these patients are at increased risk of developing CAA unless they receive additional treatment in the form of steroids. Please follow the treatment algorithm below (taken from Elefteriou et al. ADC 2013).



Recommended clinical guideline for the management of Kawasaki disease in the UK. *Treatment can be commenced before 5 days of fever if sepsis excluded; treatment should also be given if the presentation is > 10 days from fever onset if there are signs of persistent inflammation; **Kobayashi risk score ≥5 points [a]Refer to paediatric cardiologist; ¶ Other specific interventions such as positron emission tomography (PET) scanning, addition of calcium channel blocker therapy, and coronary angioplasty at discretion of paediatric cardiologist. + Other immunomodulators may include ciclosporin. ♥For infants, Z score for internal coronary artery diameter >7 based on Montreal normative data: http://parameterz.blogspot.co.uk/2010/11/montreal-coronary-artery-z-scores.html.

Kobayashi risk score:

- This is a model to predict responsiveness to IVIG developed in Japan. It has been found to have a high specificity but low sensitivity in the non-Japanese population, meaning that a positive score (>/= 5) makes IVIG resistance likely but a negative score does not reliably exclude it.

Na </= 133	2 points
</= 4 days of illness	2 points
ALT >/= 100 U/L	1 point
Platelets </= 300 x 10	1 point
CRP >/= 10	1 point
Age </= 12 months	1 point
Neutrophils >/= 80%	2 points

IVIG:

	Please see Whittington Health Guideline: **'Intravenous Immunoglobulin Use'**

Aspirin:

- Avoid concomitant use of NSAIDS in all patients on aspirin as they interfere with the anti-platelet effect of low-dose aspirin
- Consider ranitidine if GI irritation
- Varicella and influenza exposure on aspirin: advise parents to contact hospital if this occurs. Aspirin may need to be substituted with another antiplatelet agent due to increased risk of Reye's syndrome but this should be discussed with GOSH.

ECHO:

- Initial ECHO should be performed at diagnosis (next working day). Discuss any abnormal findings with Paediatric Cardiology at GOSH for more specific management.
- ECHO should be performed weekly if aneurysms detected at initial ECHO or ongoing active inflammation
- If initial ECHO normal and no ongoing active inflammation, ECHO at 2 and 6 weeks post-disease onset.

Immunisations:

- Immunisations should not be given within the first three months after IVIG treatment for KD. This is due to the potential lack of effectiveness of live vaccines, and the potential for vaccines to induce a detrimental immune activation during the convalescent phase of KD.
- Patients on long-term aspirin should be considered for the varicella zoster virus vaccine in view of the association of VZV and aspirin with Reye's syndrome.

Follow up:

- Minimum review of patient at 2 weeks, 8 weeks and 12 weeks if normal ECHO's. Consider follow-up for 12 months.
- If any abnormalities then more regular and prolonged follow-up required but be guided by GOSH cardiology team/specialist input.

Management of Acute Coronary Syndrome and previous KD

Patients with previous KD and persistent coronary artery aneurysms (CAA) are at increased risk of acute coronary syndrome (ACS), myocardial infarction and death. ACS in children and young adults with previous KD often present with atypical symptoms and ECG changes.

Patients with known history of KD presenting with **any** the following symptoms should be suspected to have a KD related event.

- Chest or abdominal pain
- Breathlessness
- Exercise intolerance
- Unusual pallor
- Restlessness
- Vomiting
- Discolouration of skin suggestive of embolization

These patients with typical or atypical symptoms should be transferred to **St Thomas' Emergency Department** regardless of ECG pattern where they will be managed by the Evelina Children's Hospital.

St Thomas' Hospital is the only centre in London with an emergency department, paediatric cardiology services and adult Heart Attack Centre on the same site.

When phoning you should activate the STEMI (ST Segment Elevation Myocardial Infarction) pathway and explain the patient has Kawasaki Disease.

Contacts

- Paediatric Registrar or Consultant on call (via switch)
- Cardiology Registrar, Great Ormond Street Hospital
- Immunology/Infectious Diseases Registrar, Great Ormond Street Hospital

References

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Compliance monitoring

If there are patients with Kawasaki disease who are mis-managed then we will review the situation and arrange for an audit.

To be completed and attached to any procedural document when submitted to the appropriate committee for consideration and approval

		Yes/No	Comments
1.	**Does the procedural document affect one group less or more favourably than another on the basis of:**		
	• Race	No	
	• Ethnic origins (including gypsies and travellers)	No	
	• Nationality	No	
	• Gender	No	
	• Culture	No	
	• Religion or belief	No	
	• Sexual orientation including lesbian, gay and bisexual people	No	
	• Age	No	
	• Disability - learning disabilities, physical disability, sensory impairment and mental health problems	No	
2.	**Is there any evidence that some groups are affected differently?**	No	
3.	**If you have identified potential discrimination, are any exceptions valid, legal and/or justifiable?**	No	
4.	**Is the impact of the procedural document likely to be negative?**	No	
5.	**If so can the impact be avoided?**	N/A	
6.	**What alternatives are there to achieving the procedural document without the impact?**	N/A	
7.	**Can we reduce the impact by taking different action?**	N/A	

If you have identified a potential discriminatory impact of this procedural document, please refer it to the Director of Human Resources, together with any suggestions as to the action required to avoid/reduce this impact.

For advice in respect of answering the above questions, please contact the Director of Human Resources.

Checklist for the Review and Approval of Procedural Document

To be completed and attached to any procedural document when submitted to the relevant committee for consideration and approval.

	Title of document being reviewed:	Yes/No	Comments
1.	**Title**		
	Is the title clear and unambiguous?	Yes	
	Is it clear whether the document is a guideline, policy, protocol or standard?	Yes	
2.	**Rationale**		
	Are reasons for development of the document stated?	Yes	
3.	**Development Process**		
	Is it clear that the relevant people/groups have been involved in the development of the document?	Yes	
	Are people involved in the development?	Yes	
	Is there evidence of consultation with stakeholders and users?	Yes	
4.	**Content**		
	Is the objective of the document clear?	Yes	
	Is the target population clear and unambiguous?	Yes	
	Are the intended outcomes described?	Yes	
5.	**Evidence Base**		
	Are key references cited in full?	Yes	
	Are supporting documents referenced?	N/A	
6.	**Approval**		
	Does the document identify which committee/ group will approve it?	Yes	
7.	**Dissemination and Implementation**		
	Is there an outline/plan to identify how this will be done?	Yes	

	Title of document being reviewed:	Yes/No	Comments
8.	**Document Control**		
	Does the document identify where it will be held?	Yes	
9.	**Process to Monitor Compliance and Effectiveness**		
	Are there measurable standards or KPIs to support the monitoring of compliance with and effectiveness of the document?	Yes	
	Is there a plan to review or audit compliance with the document?	Yes	
10.	**Review Date**		
	Is the review date identified?	Yes	
	Is the frequency of review identified? If so is it acceptable?	Yes	
11.	**Overall Responsibility for the Document**		
	Is it clear who will be responsible for co-ordinating the dissemination, implementation and review of the document?	Yes	

Executive Sponsor Approval			
If you approve the document, please sign and date it and forward to the author. Procedural documents will not be forwarded for ratification without Executive Sponsor Approval			
Name		Date	
Signature			
Relevant Committee Approval			
The Director of Nursing and Patient Experience's signature below confirms that this procedural document was ratified by the appropriate Governance Committee.			
Name		Date	
Signature			
Responsible Committee Approval – only applies to reviewed procedural documents with minor changes			
The Committee Chair's signature below confirms that this procedural document was ratified by the responsible Committee			
Name		Date	
Name of Committee		Name & role of Committee Chair	
Signature			

Tool to Develop Monitoring Arrangements for Policies and guidelines

What key element(s) need(s) monitoring as per local approved policy or guidance?	Who will lead on this aspect of monitoring? Name the lead and what is the role of the multidisciplinary team or others if any.	What tool will be used to monitor/check/observe/Assess/inspect/ authenticate that everything is working according to this key element from the approved policy?	How often is the need to monitor each element? How often is the need complete a report ? How often is the need to share the report?	What committee will the completed report go to?
Element to be monitored	**Lead**	**Tool**	**Frequency**	**Reporting arrangements**
All aspects	**Attending Consultant**	**Discussion at weekly grand round when a case occurs on the ward.** **Consider formal audit if any mismanagement is identified.**	**Depends on case presentation in view of rarity of disease.**	**Departmental/ ward meetings or by exception to Paediatric Consultant meeting**