Childhood Infection- Immunological Profile

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- Musculoskeletal infections in children
  - Pyomyositis
  - Septic arthritis
  - Osteomyelitis
- They are called “deep seated infections”
- Rare
- Not present in immunocompetent children

Immunoglobulin levels vs. age

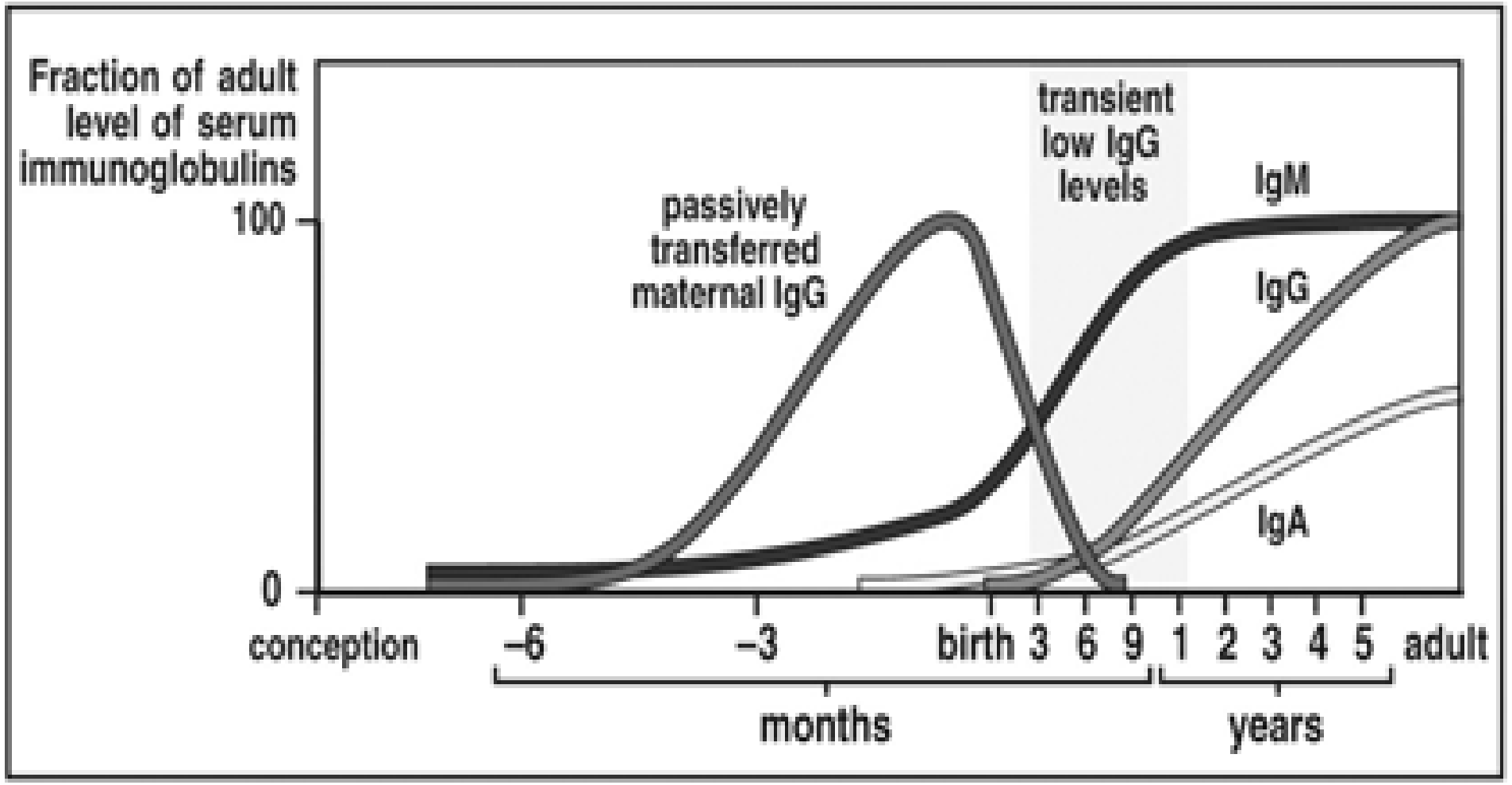
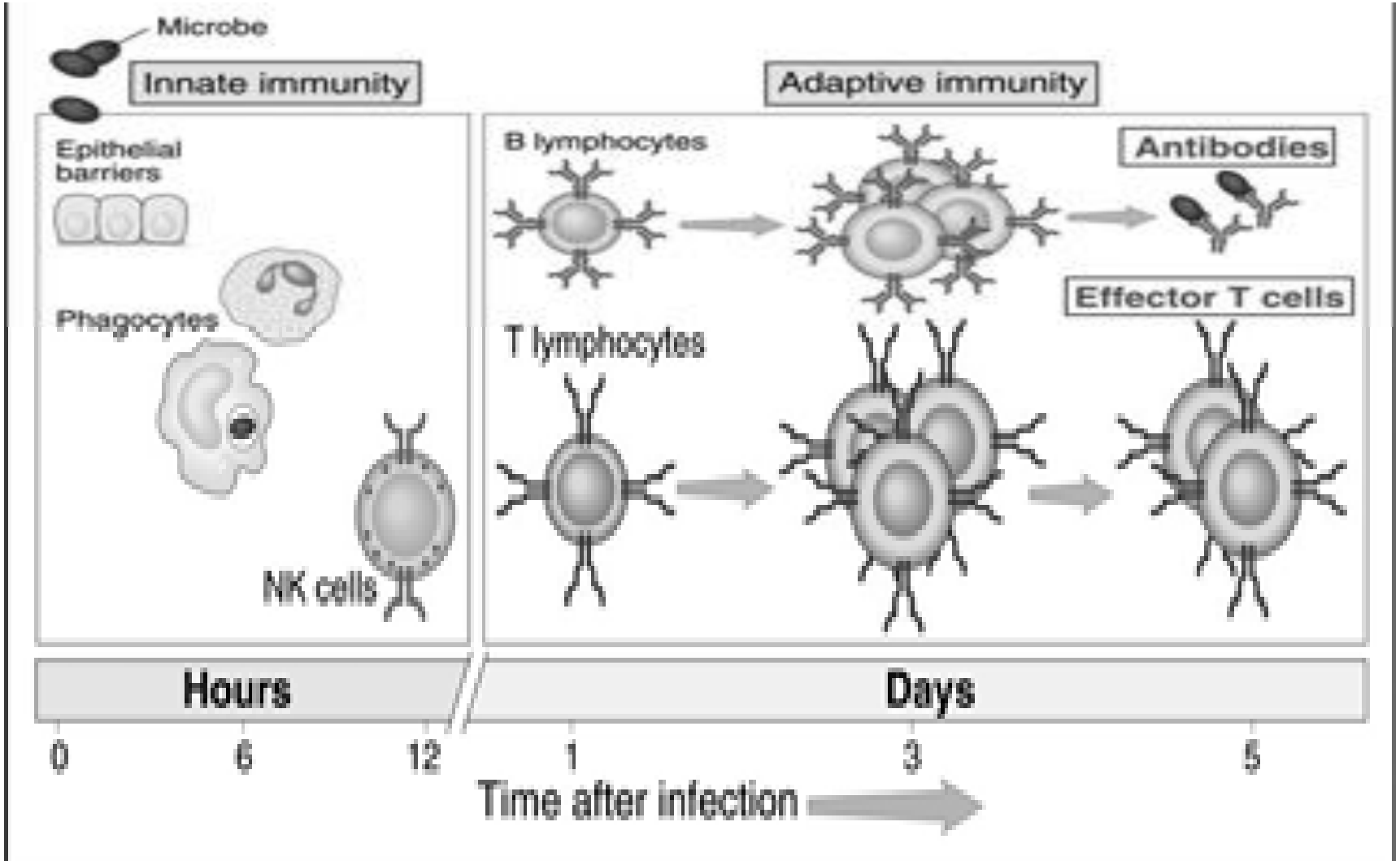


Figure 11-11 Immunobiology, 6/e. (© Garland Science 2005)

Innate and adaptive immunity



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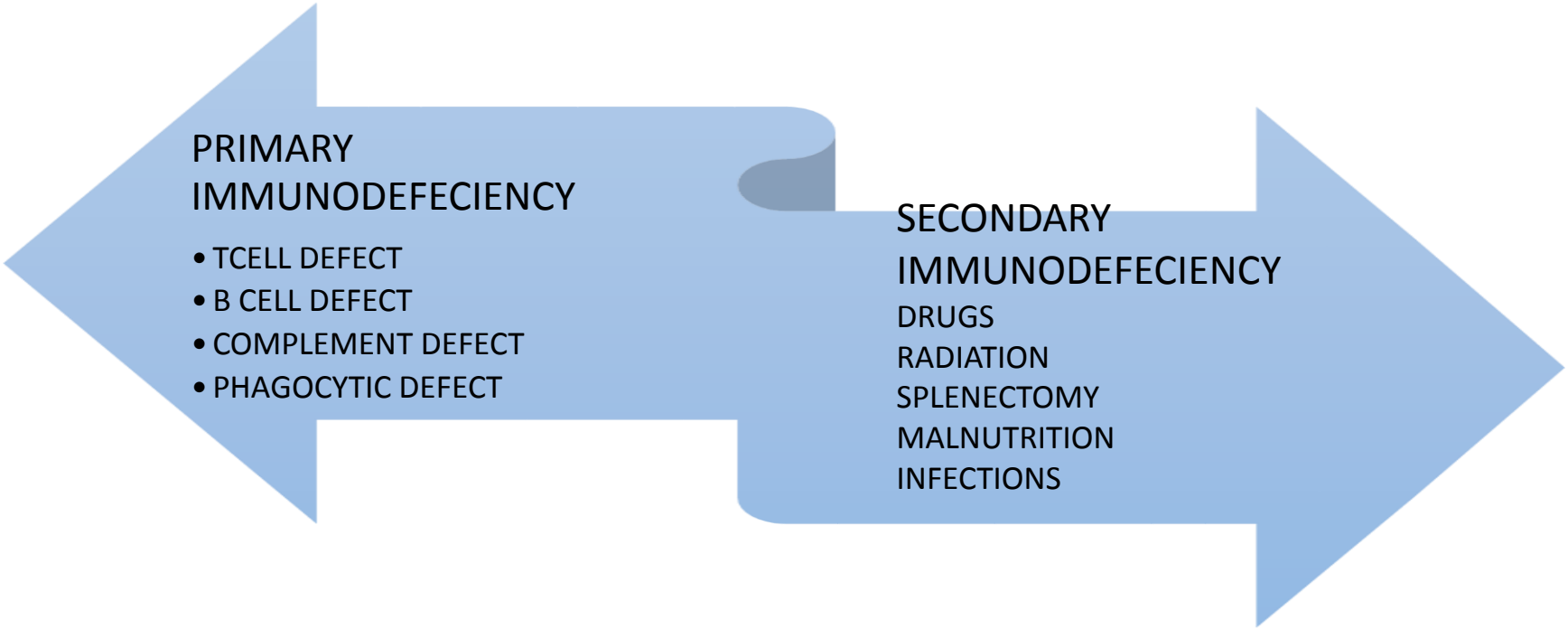


When to suspect immunodeficiency ?

- In every case of musculoskeletal infection

Specially when….

- Very frequent infections
- Very severe infections
- Family history
- Unusual clinical presentation
- Unusual microorganism
- Longer duration of treatment
- Not responding to treatment

Additional clues..

- >8 ear infections per year
- >2 serious sinus infections per year
- >2 months treatment with poor result
- Requirement of iv antibiotics
- Failure to thrive with or without diarrhea

At Any Age…

- History for secondary immunodeficiency

➢Diet

➢Medication

➢Infections

➢Immunization

➢Splenectomy

➢Radiation

➢Systemic illness

Age of presentation

- Onset before age 6 mo suggests a T-cell defect
- Onset between the age of 6 and 12 mo may suggest combined B- and T-cell defects or a B-cell defect
- Later than 12 mo usually suggests a B-cell defect or secondary immunodeficiency

Detailed history

Upto 6 months

- History of newborn seizures, cardiac anomaly
- Delayed cord detachment, recurrent infection
- Diarrhea, pneumonia, oral thrush, FTT
- Bloody stools, draining ears, eczema

6 months to 5 years

- Persistent thrush, nail dystrophy, endocrinopathies
- Short stature, fine hair, severe varicella
- Oculocutaneous albinism with recurrent infection
- Lymphadenopathy, dermatitis, pneumonia, osteomyelitis

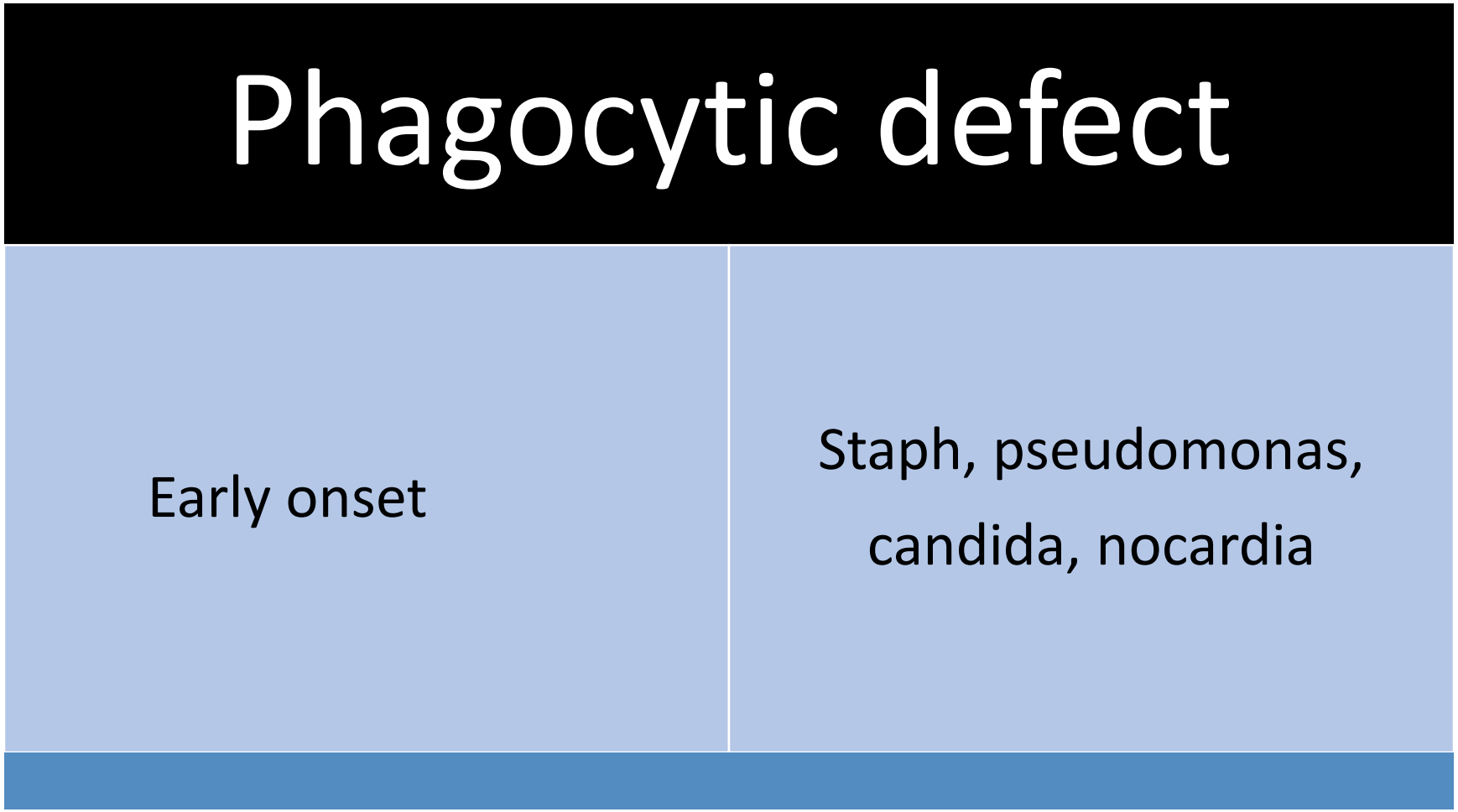
Characterstic features

Predominant T cell	
Early onset (2-6 mnths)	Gram positive and neg bacteria, mycobacteria,CMV, EBV, and fungi – candida

Characterstic features

Predominant B cell	
Onset after 5-7 months of age	Pneumococci,staph, strepto,enteroviruses,giardia

Characterstic features



Characterstic features

Compliment defect	
Onset at any age	Pneumococci and neiserria

Muscukoskeletal Infection in HIV patients

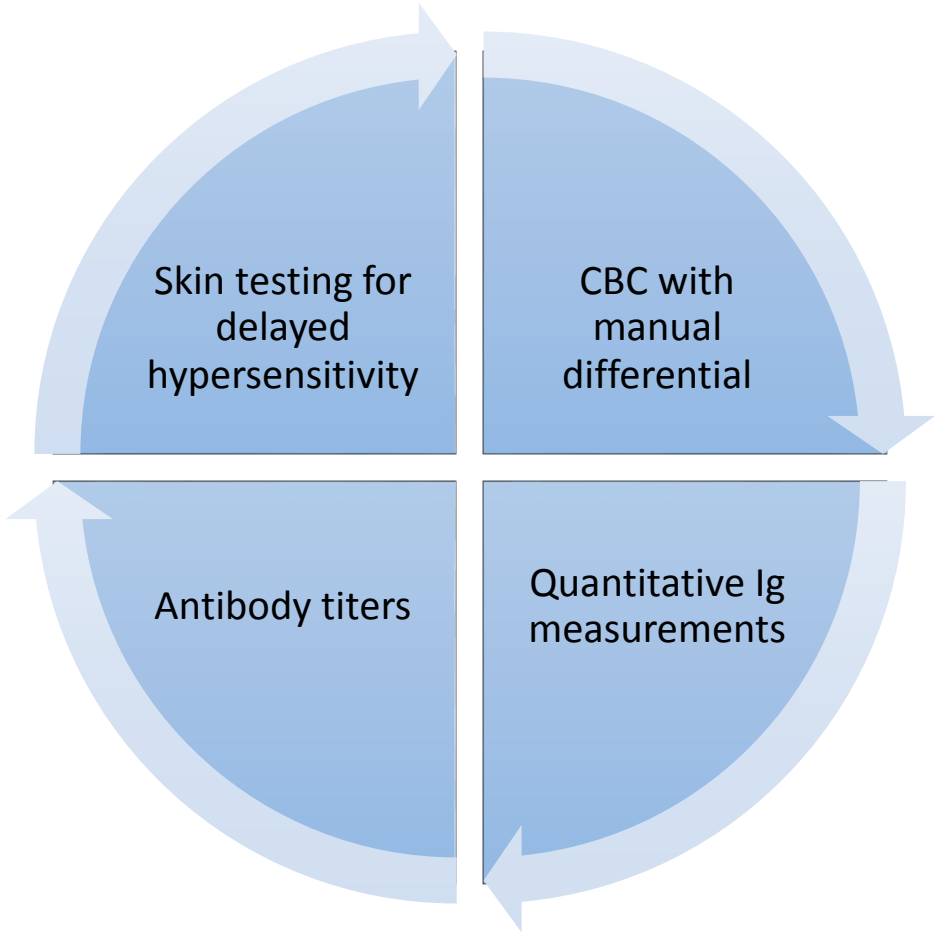
- Arthalgia and myalgia-symptom of acute infection
- Staphylococcus aureus, Streptococcus pyogenes, Mycobacterium tuberculosis, Nocardia and Cryptococcus common organisms
- Myositis common- bacterial infections, opportunistic and direct viral infection
- Tuberculous osteomyelitis common
- Bacillay angiomatosis
- Knee and ankle arthritis common

Examination

Clinically-

- BCG scar absent
- wasted, stunted, malnourished
- Skin eczema present, hypopigmented patches
- Oral thrush, nail fungal infection
- Absence of tonsils and lymph nodes
- Respiratory system-b/l ronchi , wheeze, crepts

Screening tests



Laboratory tests to assess immune function

(1) T cell: Enumeration (flow cytometry), functional assays (mitogen response, DTH skin tests)

(2) B cell: Enumeration, circulating antibody levels

(3) Macrophage: Enumeration, functional assays (nitroblue tetrazolium)

(4) Complement: Direct measurement of complement components, complement hemolysis assay

Key Points

- Done in every child with musculoskeletal infection
- High index of suspicion
- Thorough history and complete physical examination is must
- Begin with screening tests and appropriate additional testing as required
- Early diagnosis and prompt treatment could be life saving

References

- Nelsons textbook of pediatrics 19 th ed
- Diagnostic Approach to Primary Immunodeficiency Disorders; indian pediatrics,june 2013
- Approach to the Patient With Suspected Immunodeficiency: Immunodeficiency Disorders: Merck Manual

THANK YOU