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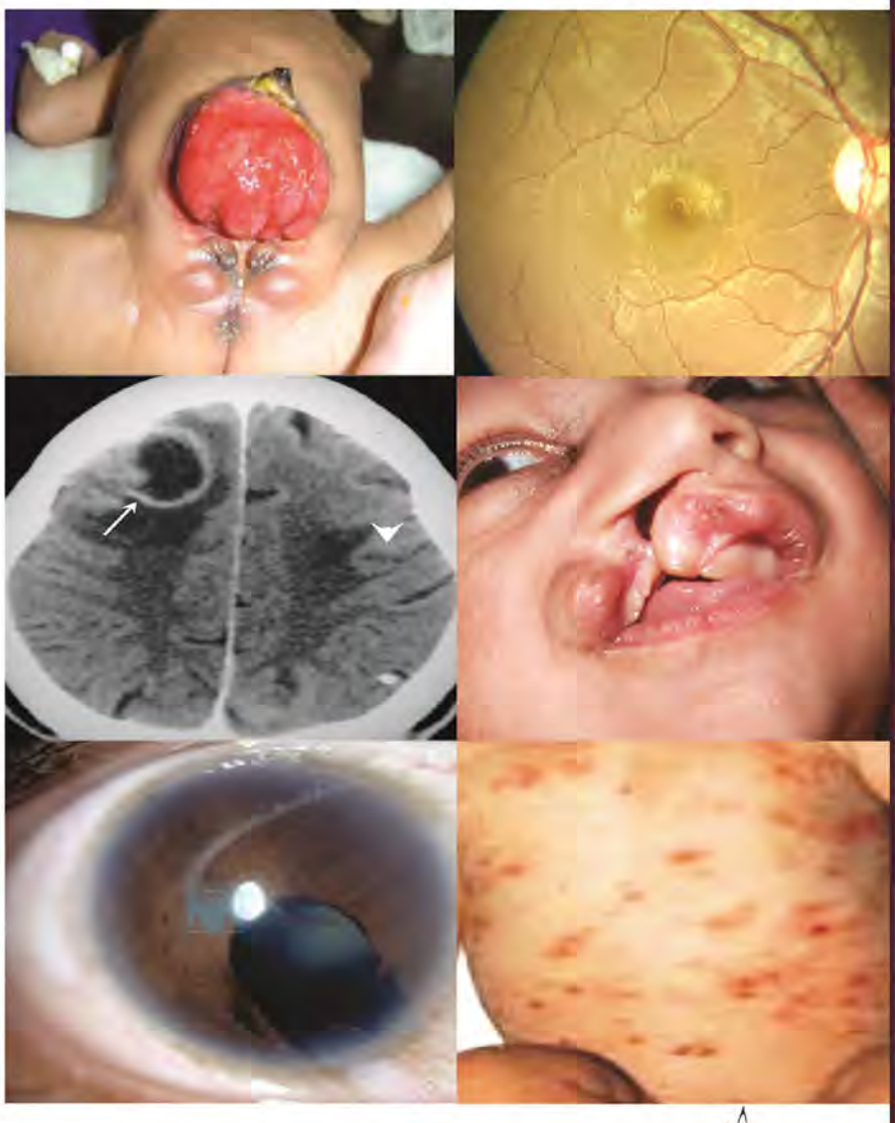

3rd Edition

JAYPEE

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4

INFECTIOUS DISEASES

Section Editors

Jaydeep Choudhury, Bhaskar Shenoy

Photo Courtesy

Arun Shah, Atul Kulkarni, Dipankar Das, Jaydeep Choudhury, Nupur Ganguly, Prabhas Prasun Giri, Priyankar Pal, Ritabrata Kundu, Sandipan Dhar, Swapan Kumar Ray, (Late) Tapan Kumar Ghosh

Section Outline

4.1 COMMON CONDITIONS

Picture	Description	Approach

4.1.1 Bacterial Infections

Erythema Nodosum

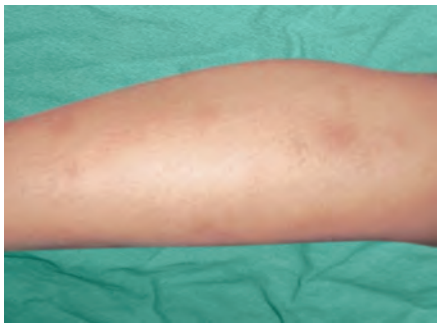


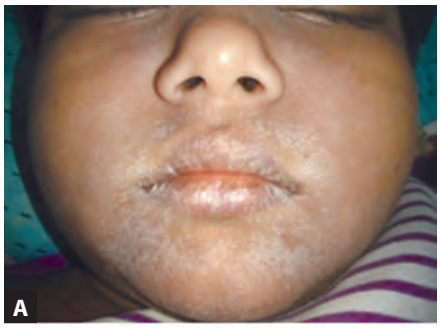
Figure 4.1.1.1: Erythema nodosum, in the shin bone.
Photo Courtesy: Prabhas Prasun Giri, Kolkata.

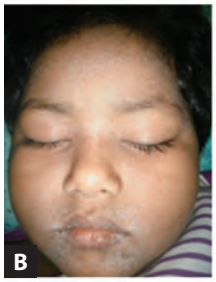
- Erythema nodosum (EN) is an acute, nodular, erythematous eruption that is usually limited to the extensor aspects of the lower legs. Chronic or recurrent erythema nodosum is rare but may occur
- Erythema nodosum is presumed to be a hypersensitivity reaction which may occur in association with several systemic diseases, drug therapies, or it may be idiopathic
- The inflammatory reaction occurs in the panniculus
- Lesions begin as red tender nodules **(Fig. 4.1.1.1)**. Lesion borders are poorly defined, and lesions vary from 2 to 6 cm in diameter. During the first week, lesions are tense, hard, and painful; during the second week, they may become fluctuant, as in an abscess, but do not suppurate or ulcerate. Individual lesions last approximately 2 weeks, but occasionally, new lesions continue to appear for 3–6 weeks. Aching legs and swollen ankles may persist for weeks
- Streptococcal infections and primary tuberculosis are one of the most common causes of erythema nodosum

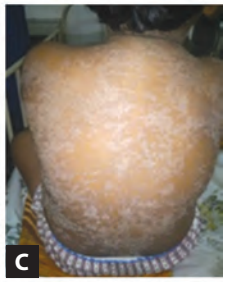
In most patients, erythema nodosum is a self-limited disease and requires only symptomatic relief using nonsteroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen, cool-wet compresses, elevation, bed rests, and identification and treatment of the underlying cause

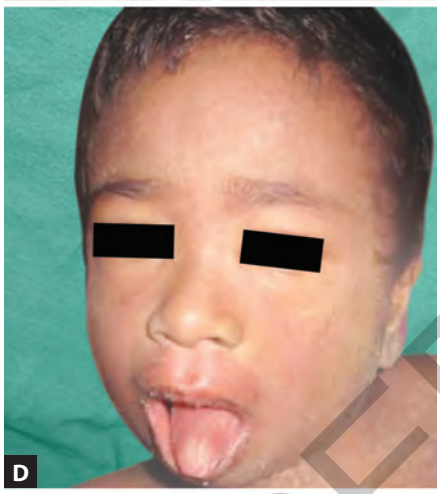
Picture	Description	Approach

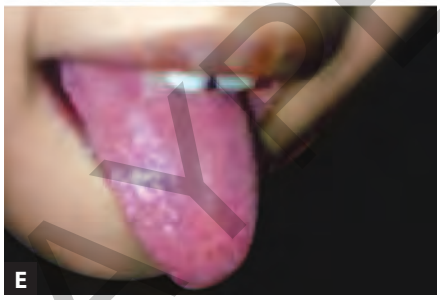
Scarlet Fever











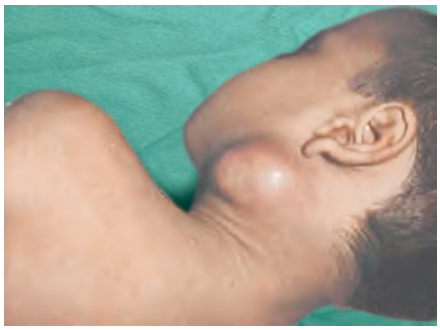
Figures 4.1.1.2A to E: (A and B) Characteristic sandpaper skin appearance in the face; (C) Sandpaper skin appearance at the back—closer view; (D) Scarlet fever showing strawberry tongue and characteristic desquamation of the skin; (E) Strawberry tongue—closer view.
Photo Courtesy: Nupur Ganguly, Prabhas Prasun Giri, Kolkata.

- Typical sandpaper like rash of scarlet fever
- It is characterized by:
  - Sore throat
  - Fever
  - Bright red tongue with a "strawberry" appearance
  - Palatal petechiae
  - Rash
- Rash is fine, red, and rough-textured, blanches on pressure. It appears 12–48 hours after the fever usually starting on the chest, armpits, and behind the ears but sparing the face (although some circumoral pallor is characteristic). It is worse in the skin-folds. Pastia lines (where the rash runs together in the armpits and groin) appear and can persist after the rash is gone. The rash begins to fade 3–4 days after onset and desquamation (peeling) begins. This phase begins with flakes peeling from the skin. Peeling from the palms and around the fingers occurs about a week later. Peeling also occurs in axilla, groin, and tips of the fingers and toes

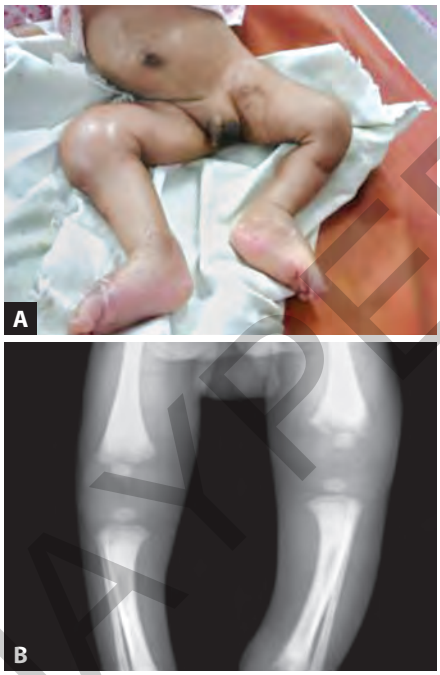
- Penicillin is the first choice treatment, since group A β-hemolytic streptococci (GABHS) remains universally susceptible to penicillin. Although penicillin V is the drug of choice, ampicillin or amoxicillin are equally effective and, due to the good taste, represent a suitable option in children. Moreover, penicillin suspension is not commercially available in our country, so amoxicillin 40–50 mg/kg/day is drug of choice
- The standard duration of antibiotic therapy is 10 days
- To improve the patient's compliance one should explain the importance of the complete treatment (10 days) to eradicate the bacterium even if, clinical improvement occurs in the first 4–5 days of treatment. Macrolides are used in patients who are allergic to β-lactam antibiotics

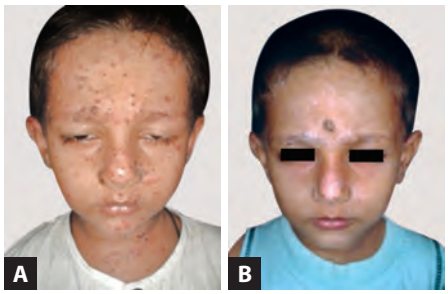
Picture	Description	Approach

Scrofuloderma

 **Figure 4.1.1.3:** Scrofuloderma in the left cervical lymph node. *Photo Courtesy:* Sandipan Dhar, Kolkata.	▪ Scrofuloderma, also called "tuberculosis colliquativa cutis" is a common form of cutaneous tuberculosis affecting children and young adults in which there is breakdown of skin overlying a tuberculous focus in the lymph node, bone or joint. Initially, these are firm painless, subcutaneous nodules that gradually enlarge and suppurate. These lead to ulcers and sinus tracts with undermined edges and ultimately puckered scars ▪ Diagnosis is usually performed by needle aspiration biopsy or excisional biopsy of the mass with micro-biological demonstration of acid-fast bacteria, cartridge-based nucleic acid amplification test (CBNAAT) or culture by *Mycobacteria* Growth Indicator Tube (MGIT)	Antitubercular drug for the total duration of 6 months which is divided into initial 2 months intensive phase with 4 drugs—isoniazid, rifampicin, pyrazinamide and ethambutol (HRZE) and continuation phase of 4 months with habituation of reinforcer effectiveness (HRE) is recommended

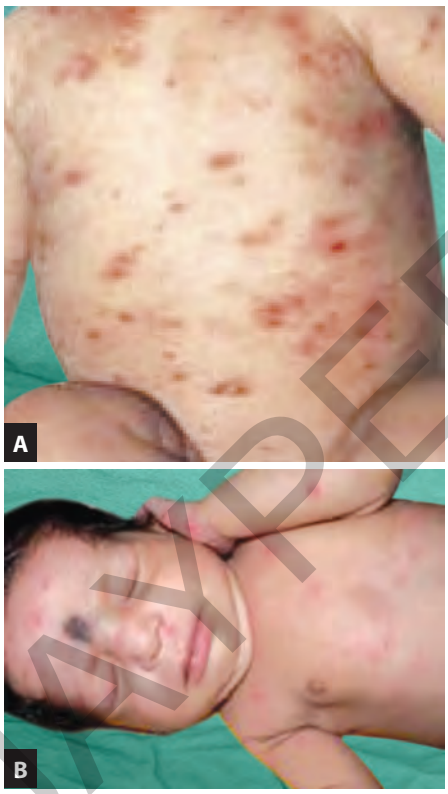
Septic Arthritis

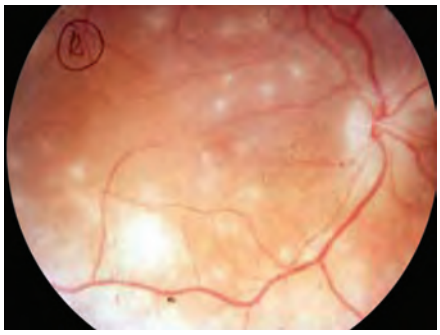
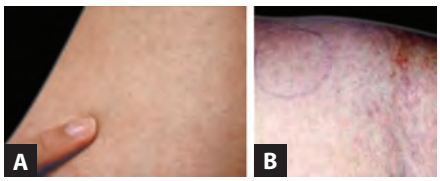
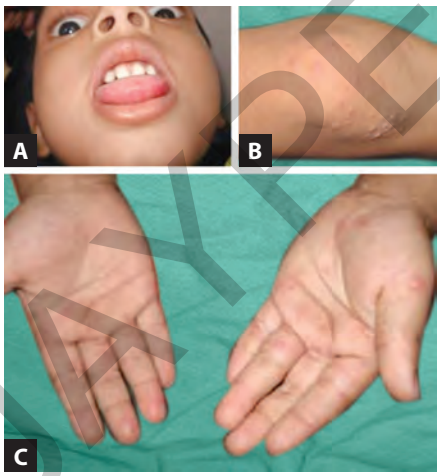
 **Figures 4.1.1.4A and B:** (A) Septic arthritis in multiple joints; (B) X-ray shows bony erosion in the lower end of the femur and upper end of the tibia. *Photo Courtesy:* Priyankar Pal, Prabhas Prasun Giri, Kolkata.	The most common causative organism is *Staphylococcus aureus*. In septic arthritis, different organisms predominate in different age groups. *Staphylococcus aureus, Streptococcus agalactiae*, and *Escherichia coli* are the most frequent causes of acute hematogenous infection in infants. *Staphylococcus aureus, Streptococcus pyogenes, Kingella kingae* and *Haemophilus influenzae* are common in children below the age of 4 years	▪ The treatment of septic arthritis is mainly nonoperative. Surgery is indicated only for drainage of pus. Treatment is supportive for pain and dehydration, splintage, antibiotics therapy, and surgical decompression. Analgesics and fluids are used for pain and dehydration, the limb is splinted for comfort and to prevent contractures and antibiotics are commenced empirically. Drugs can be changed when culture and sensitivity results become available. The duration and routes of antibiotic therapy have traditionally been 1–2 weeks intravenously followed by 2–6 weeks of oral therapy. Some literature suggests a shorter duration of therapy is efficacious. Generally, however, sequential intravenous—oral therapy is the accepted standard. Appropriate intravenous therapy should be continued until there is clinical improvement and the C-reactive protein (CRP) levels approach normal ▪ Oral therapy is then commenced and continued until the erythrocyte sedimentation rate (ESR) normalizes

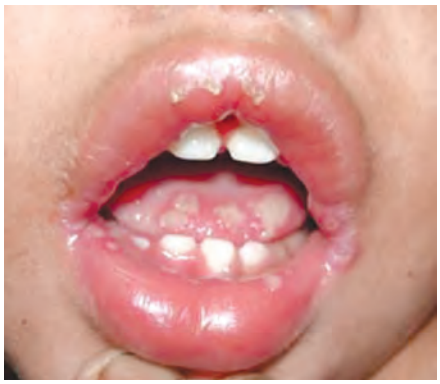
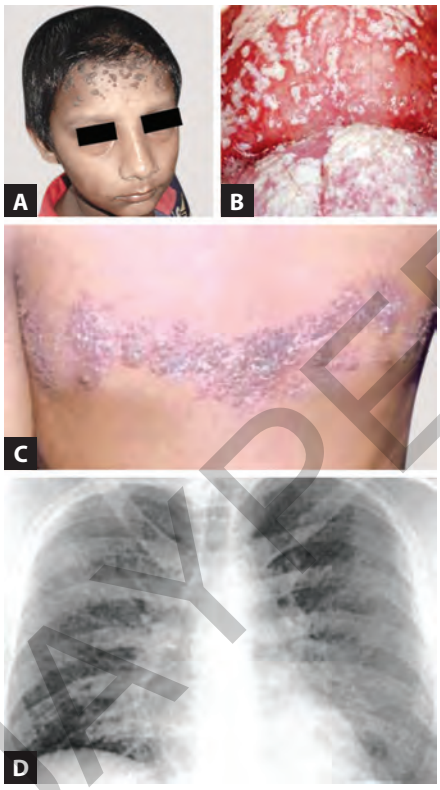
Picture	Description	Approach
Impetigo Contagiosa		
 **Figures 4.1.1.5A and B:** (A) Diffuse papulovesicular crusted lesions of impetigo contagiosa; (B) After treatment with first generation cephalosporin. *Photo Courtesy:* Prabhas Prasun Giri, Jaydeep Choudhury, Kolkata.	Papulovesicular crusted lesions of impetigo contagiosa	First generation—cephalosporins like cephalexin 50/mg/day in 4 divided doses

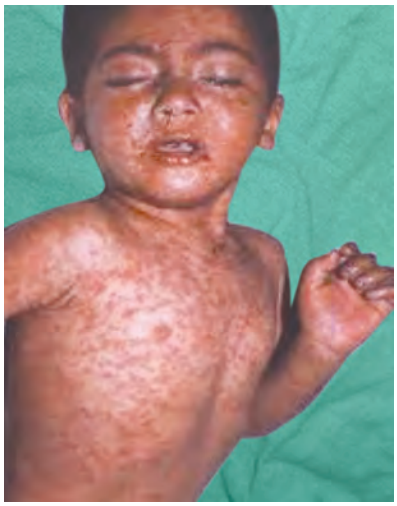
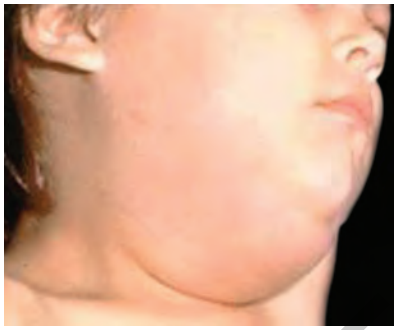
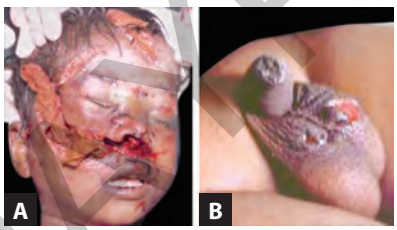
4.1.2 Viral Infections

Chickenpox

 **Figures 4.1.2.1A and B:** (A) Characteristic rash of chickenpox; (B) Neonatal chickenpox. *Photo Courtesy:* Jaydeep Choudhury, Sandipan Dhar, Kolkata.	Prodromal symptoms are fever, malaise, anorexia, and headache. The rash typically begins as crops of small, red papules which develop into clear "tear-drop" vesicles on an erythematous base. They become cloudy and dry up forming scabs which fall off in 5–15 days. Various stages of the rash may be seen at the same time. Lesions are more on the trunk, back and shoulders and are pruritic. Rarely, the rash becomes hemorrhagic. The condition generally improves within 7 days	▪ Treatment is mainly symptomatic and supportive. Paracetamol is given for fever. Aspirin should be avoided as it may increase the risk of Reye's syndrome. Antihistamines reduce pruritus ▪ Acyclovir is safe, effective, but it is not routinely recommended in uncomplicated infection. It is indicated in immunocompromised children. Varicella zoster immunoglobulin (VZIG) provides passive immunity and is indicated for postexposure prophylaxis

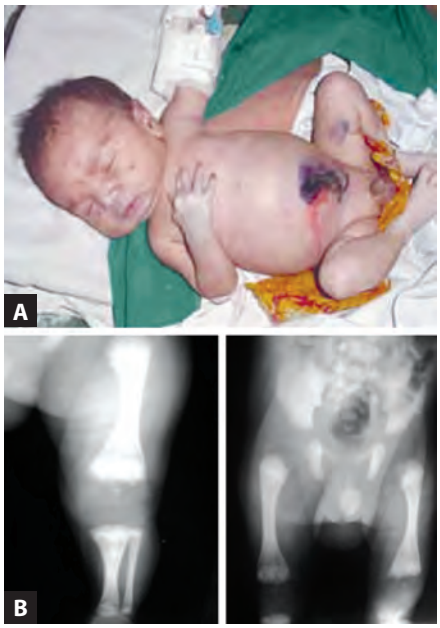
Picture	Description	Approach
Cytomegalovirus		
 **Figure 4.1.2.2:** Chorioretinitis in *Cytomegalovirus* (CMV) infection. *Photo Courtesy:* Prabhas Prasun Giri, Kolkata.	▪ *Cytomegalovirus* (CMV) infection is severe in immunocompromised. The features are pneumonitis, hepatitis, chorioretinitis with fever and leukopenia. It may be fatal ▪ Retinitis is progressive	Ganciclovir combined with immunoglobulin, either intravenous immunoglobulin (IVIG) or hyperimmune CMV-IVIG
Dengue		
 **Figures 4.1.2.3A and B:** Dengue hemorrhagic fever. *Photo Courtesy:* Arun Shah, Muzaffarpur.	*Dengue hemorrhagic fever*: ▪ *Stage I:* Fever, nonspecific symptoms, and positive tourniquet test ▪ *Stage II:* Stage I + spontaneous bleeding ▪ *Stage III:* Circulatory failure, rapid weak pulse, hypotension, and narrow pulse pressure *Dengue shock syndrome:* ▪ *Stage IV:* Profound shock with unrecordable BP	▪ Adequate fluid replacement is the backbone of severe dengue therapy. Sufficient fluid should be administered to maintain effective circulation during plasma leakage. Isotonic crystalloid solution in the fluid of choice but with hypotensive shock (decompensated shock) colloid solutions are to be used ▪ Blood transfusion is reserved for cases of severe bleeding
Enterovirus		
 **Figures 4.1.2.4A to C:** Erythematous maculopapular lesions seen in hand-foot-and-mouth disease. *Photo Courtesy:* Sandipan Dhar, Kolkata.	Hand-foot-and-mouth disease is a distinctive rash syndrome caused by enteroviruses. It is most frequently caused by coxsackievirus. Scattered vesicles are seen on the tongue, buccal mucosa, posterior pharynx, palate, gingival and lips with surrounding erythema. Maculopapular, vesicular and pustular lesions may also occur on the hands, fingers, feet, buttock, and groin. Vesicles resolve in about 1 week	Only symptomatic therapy like oral antihistaminics and calamine lotion application are required

Picture	Description	Approach
Herpes Simplex Virus		
 **Figure 4.1.2.5:** Oral herpetic lesion. *Photo Courtesy:* Priyankar Pal, Kolkata.	Aggregates of thin-walled vesicles on an erythematous base. These rupture, scab, and heal within 7–10 days without leaving a scar. Secondary bacterial infection may occur. The lesion tend to recur at the same site particularly at mucocutaneous junction. It is a common cause of gingivostomatitis in children, appear abruptly with pain and salivation	Oral acyclovir 15 mg/kg/dose five times daily for 5 days is the mainstay of therapy
Human Immunodeficiency Virus (HIV)		
 **Figures 4.1.2.6A to D:** (A) Warts in human immunodeficiency virus (HIV) infection; (B) Oral candidiasis; (C) Severe herpes zoster skin lesion; (D) Chest X-ray showing *Pneumocystis carinii* (PCP) or *Pneumocystis jiroveci* infection. *Photo Courtesy:* Sandipan Dhar, Jaydeep Choudhury, Kolkata.	▪ Human immunodeficiency virus disease progression is variable. Some develop profound immunodeficiency. HIV/acquired immunodeficiency syndrome (AIDS) can affect all the systems of the body and the manifestations may be varied. Revised World Health Organization (WHO) clinical staging of HIV/AIDS are: • *Stage 1:* Asymptomatic • *Stage 2:* Mild • *Stage 3:* Advanced • *Stage 4:* Severe ▪ The typical opportunistic infections are *Pneumocystis carinii* (PCP) or *Pneumocystis jiroveci*, oral candidiasis, and tuberculosis	Various antiretroviral drugs act on different steps in HIV replication. Combination antiretroviral therapy (ART) therapy using triple drug combination of nucleoside reverse transcriptase inhibitors (NRTI), nonnucleoside reverse transcriptase inhibitors (NNRTI) and protease inhibitors has changed the quality of life for HIV-infected children. Treatment of opportunistic infections is an integral part of therapy. Proper nutrition and immunization are also vital

Picture	Description	Approach
Measles		
 **Figure 4.1.2.7:** Characteristic rash of measles. *Photo Courtesy:* Jaydeep Choudhury, Kolkata.	Prodromal symptoms are fever, malaise, coryza, cough, and conjunctival congestion for 2–4 days. Temperature rise abruptly as rash appears on 4–6th day. The rash starts as faint erythematous maculopapules on upper lateral aspect of neck and typically behind the ears and increasingly involve face then trunks and finally to legs and arms over next 3–4 days. By the time, rash appears on feet it starts disappearing from face. Temperature also suddenly normalizes. As the rash disappears, it leaved behind brawny desquamation and brownish discoloration	Management is mainly supportive. The child may be given antipyretics, fluids and antihistaminics during acute phase. No antiviral therapy is available. The child may be isolated for the period of infectivity. There is an inverse correlation between serum retinol concentration and measles severity. A single dose of vitamin A 100,000 units orally for children 6–12 months of age and 200,000 units orally for >1 year of age children reduces mortality
Mumps		
 **Figure 4.1.2.8:** Parotid gland enlargement in mumps. *Photo Courtesy:* Jaydeep Choudhury, Kolkata.	▪ Parotitis of one or both parotid glands is the most common manifestation ▪ Earache, jaw tenderness with chewing, and dry mouth worsens over the next several days. The swelling is at the angle of the jaw, and obliterates the angle, often extending to the lower portion of the ear. Defervescence and resolution of parotid tenderness take about a week	There is no specific treatment. Symptomatic treatment includes simple analgesics
Rabies		
 **Figures 4.1.2.9A and B:** Animal bite injuries in face and scrotum—dangerous category III exposure. *Photo Courtesy:* (Late) Tapan Kumar Ghosh, Kolkata.	▪ Lacerated wound over face and scrotum in a child due to dog bite ▪ There are two distinct clinical forms of rabies: 1. *Furious type:* Seen in 80% cases, characterized by hydrophobia, euphoria, and aggressiveness leading to coma and death 2. *Dumb or paralytic type:* This is seen in 20% cases characterized by progressive onset of ascending paralysis ▪ Note the category III multiple bite wounds over face	▪ Do not suture in category III bites. If absolutely necessary, loose sutures only along with instillation or injection of rabies immunoglobulin (RIG) ▪ Nursing care, symptomatic therapy with sedatives, analgesics, proper hydration, and intensive therapy are some main steps of the treatment of rabies patients. Rabies should be prevented by vaccination (pre-exposure prophylaxis) and proper precaution following exposure by wound care, rabies immunoglobulin and vaccine administration

Picture	Description	Approach

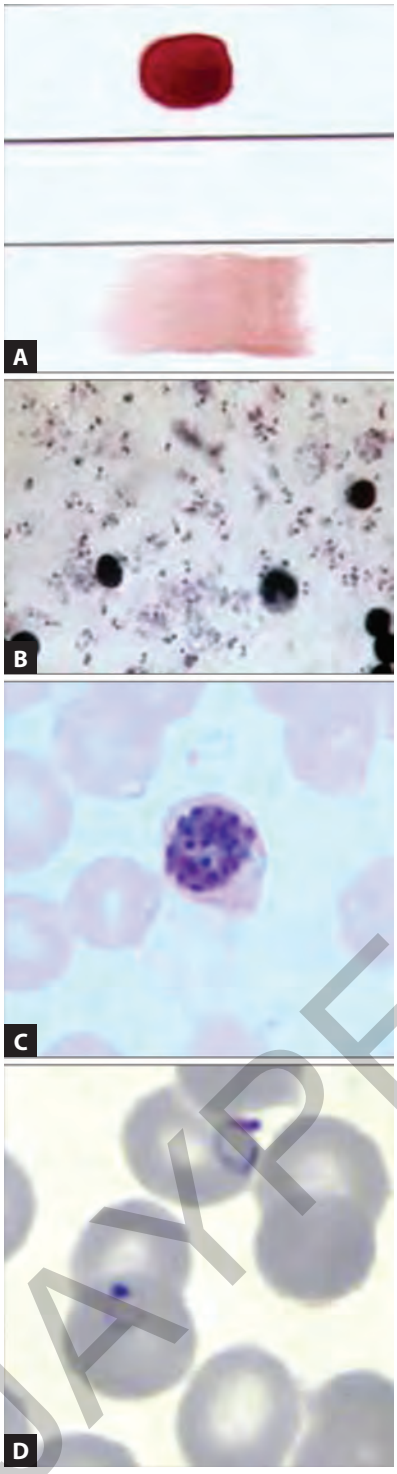
Rubella

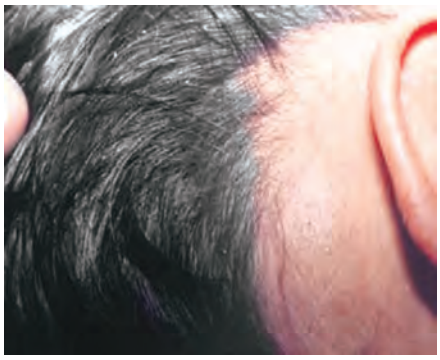
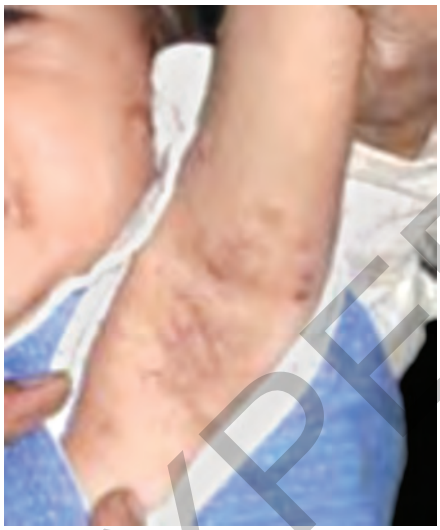
 **Figures 4.1.2.10A and B:** (A) Neonate presenting with petechiae over body; (B) X-rays of limbs show alternate longitudinal bands of sclerosis and radiolucency in metaphyses, particularly, around distal tibial metaphyses, giving rise to so called celery-stalk appearance. *Photo Courtesy:* Swapan Kumar Ray, Kolkata.	▪ Retroauricular, posterior cervical and postoccipital lymphadenopathy. Discrete rose-colored spots on the soft palate (Forchheimer spots) may be seen initially. Skin rash starts on face and spreads rapidly over trunk and is discrete maculopapular but quite variable in size and confluence ▪ In pregnant women, rubella virus can cross the placenta and infect the developing embryo or the fetus resulting in various congenital malformations. Classically, the congenital rubella syndrome (CRS) includes a triad of malformations—cataract, sensorineural hearing loss and congenital heart disease, most commonly patent ductus arteriosus (PDA)	No specific antiviral therapy is available for rubella. Antipyretics are used for symptomatic relief

Picture	Description	Approach

4.1.3 Parasites

Malaria

Picture	Description	Approach
 **Figures 4.1.3.1A to D:** (A) Preparation of thick and thin blood film; (B) Thick film showing numerous malaria parasites; (C) Schizont in a thin blood smear; (D) *Plasmodium falciparum* ring form. *Photo Courtesy:* Ritabrata Kundu, Kolkata.	Both thin and thick smear should be prepared. Thickness of the thick film should be uniform, which may be ascertained by the legibility of printed text seen through the slide. Thick films are nearly 10 times more sensitive for diagnosis of malaria as larger amount of blood is there in a given area as compared to thin film. Thick film is also used for parasite load detection and thin film is used for species identification. Smears should be prepared soon after blood collection, which ensures better adherence of the films to the slide and causes minimal distortion of parasites and red cells. Stage of parasite can also be ascertained in the peripheral blood. In general, prognosis worsens with predominance of more mature parasite stage. If >50% of the peripheral blood parasite are at the tiny ring stage (diameter of the nucleus <50% of the diameter of the rim of cytoplasm), then prognosis is relatively good. Presence of pigment containing asexual parasite of *Plasmodium falciparum* indicates bad prognosis. The presence of malaria pigment in polymorphonuclear leukocyte is a diagnostic of malaria. A minimum of 100 fields should be examined before concluding the slide to be negative	Treatment regimes are to be tailored (with chloroquine or artemisinin combination therapy) according to the species and specifically according to the resistance pattern of the region under consideration

Picture	Description	Approach
Pediculus Humanus Capitis		
 **Figure 4.1.3.2:** Infestation of the scalp with *Pediculus humanus capitis*. *Photo Courtesy:* Sandipan Dhar, Kolkata.	It is caused by infestation of the scalp with *Pediculus humanus capitis*.	Treatment consists of application of gamma-benzene hexachloride (1%) or malathion (0.5%) or permethrin (1%). Gamma-benzene hexachloride and malathion should be applied at night and left for 10–12 hours and washed off in the morning. Permethrin should also be applied for 30–45 minutes and washed off. Repeat application after a week is desirable. All family contacts and close friends should be treated to prevent reinfection
Scabies		
 **Figure 4.1.3.3:** Characteristic vesicopapular scabies lesion in axilla. *Photo Courtesy:* Sandipan Dhar, Kolkata.	Lesions of scabies in infants are more extensive vesicular and vesicopapular. Eczematization is often present and there may be multiple crusted nodules on the trunk and limbs	Permethrin (5%) is the treatment of choice in infants and children. It is even safe in infants as young as 2 months. The contact time is 6–8 hours in infants 12–14 hours in children. If needed, then it may be repeated after 2 weeks

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