CHAPTER 17

ORTHOPAEDIC CONDITIONS

OSTEOARTHRITIS (OA) KNEE

Osteoarthritis of the knee is an end result of the degeneration of articular cartilage.

SALIENT FEATURES

- Pain, stiffness after rest, difficulty in climbing stairs, difficulty in getting up from squatting position, grating sensations and off and on episodes of flare and swelling. Erythema and palpable warmth are possible but rare. Genu varum deformity and/or fixed flexion contracture in severe cases.
- Classical radiological triad—joint space narrowing, peripheral osteophyte formation and subchondral sclerosis.

Treatment

Nonpharmacological

Supportive adjunctive therapy is essential to improve functional adaptation and to diminish pain:

- Weight reduction (if overweight); cold fomentation for acutely swollen knee, however, hot fomentation may give symptomatic relief to some chronic patients.
- Supervised non-traumatic muscle conditioning and rehabilitation regimens, e.g. isometric quadriceps strengthening exercise (all vigorous exercises to be avoided in acutely swollen/painful knee).
- Compressive bandage or crepe bandage for effusion.
- Assistive devices like cane (to be held in the hand contralateral to more painful side), walker for patients with severe deformities or unsteady gait.

Pharmacological

1. Topical applications—containing salicylates, capsaicin, nicotinates, menthol, camphor, NSAIDs in various combinations may provide symptomatic relief. (**Caution**: Avoid hot fomentation immediately after topical applications).
2. Non-steroidal anti-inflammatory drugs (NSAIDs) for pharmacological pain palliation. The choice of NSAID depends upon dosing convenience, physician and patients comfort, price and the past experience on its frequency and severity of side

effects as all are equipotent in full therapeutic dose (Avoid intra-articular or oral steroids).

Table 17.1. Commonly used NSAIDs for OA knee

A. Acute painful situation/moderate pain (for initial 7-14 days), preferably take NSAIDs after meals.

- Tab. Paracetamol 500 mg 4-6 hourly (maximum daily dose 4000 mg).
  Or
- Tab. Ibuprofen 400-600 mg 2 or 3 times a day (maximum daily dose 3200 mg).
  Or
- Tab. Diclofenac sodium 50 mg 3 times a day or 75 mg 2 times a day (maximum daily dose 200 mg).
  Or
- Tab. Nimesulide 100 mg 2 times a day (maximum daily dose 400 mg).
  Or

Tab. Aspirin 350 mg 2 tablets 4-6 hourly (maximum daily dose 5000 mg).

B. For mild to moderate pain/chronic pain control (for 3-6 weeks and then SOS).

1. All above medicines in reduced frequency of dosages.
   Or
2. Alternative forms—Tab. Diclofenac sodium 100 mg/75 mg sustained release once a day.
   Or
   Tab. Piroxicam 20 mg once a day.
   Or
   Tab. Nimesulide 100 mg 2 times a day.

All patients do not uniformly respond to a particular NSAID. It is not unusual for several different NSAIDs to be tried before a suitably effective and well-tolerated agent is identified for a particular patient.

(**Caution:** NSAIDs may cause dose-related gastric irritation, nausea, vomiting and dyspepsia; GI ulceration, perforation and haemorrhage. However, one-third remain asymptomatic. NSAIDs can interfere with antihypertensive therapy due to salt and water retention).

In case of epigastric burning, nausea or vomiting either discontinue or switch over to safer NSAID or administer Cap. Omeprazole 20 mg half an hour before breakfast.

In patients on prolonged therapy with NSAIDs monitor haemoglobin, stool for occult blood as these drugs may also cause leucopenia, thrombocytopenia and agranulocytosis.

Refer the patient to an orthopaedic surgeon in case of persistent swelling, presence of constitutional symptoms or mechanical symptoms like locking or frequent giving away sensations. Surgical intervention may be required for severe deformities, contractures and advanced disease with intractable pain, severe enough to affect independent performance of activities of daily living, for prolonged periods.

Patient education

- There is no curative pharmacological agent for osteoarthritis knee and the disease is irreversible.

- Nonpharmacological treatment has a major role to play in treatment.
- Take minimal possible medications that provide symptomatic relief and to wait for 1-2 weeks for drug to show its effect.
- Topical applications do not penetrate into the joint through skin directly.
- Intra-articular steroid injections give only temporary relief and risks of repeated intra-articular injections far outweigh their advantages.
- To avoid activities which exacerbate pain like sitting cross legged or squatting on floor.
- To use ramp instead of stairs wherever feasible.
- Not to do vigorous exercises with acutely inflamed knee.
- To report back, if recurrent effusions in knee or systemic symptoms. Former may be caused by mechanical disorder along with OA knee like loose body or meniscal tear. Later situation could be caused by diseases of knee other than OA.

References

1. Acetabular Bone Destruction Related to Non-steroidal Antiinflammatory Drugs. Lancet 1985; 2: 11-14.
2. Osteoarthritis. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 2828-2836.
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RHEUMATOID ARTHRITIS (RA)

Rheumatoid arthritis is characterized by persistent inflammatory synovitis (usually involving small and large peripheral joints in symmetrical fashion) causing cartilage destruction and bone erosion leading to changes in joint integrity. The revised criterion of American College of Rheumatology (1987) aids in diagnosis and classification (Fig. 17.1).

Treatment

Since the aetiology of RA is unknown, therapy remains empirical and palliative, aimed at relieving the signs and symptoms of the disease.

Nonpharmacological

In acute pain, rest and splint. Otherwise, do exercises directed at maintaining muscle strength and joint mobility without exacerbating joint inflammation. A variety of orthotic (splints) and assistive devices (cane, walker) can be helpful in supporting and aligning deformed joints to reduce pain and improve function.

Pharmacological (Fig. 17.1)

Early RA treatment improves the rate of clinical response and ultimate outcome. Early, aggressive therapy is required for patients with serious disease and/or poor prognostic factors. Treatment must be individualized, based on physicians' and patients' preference, and medical contraindications, among others.

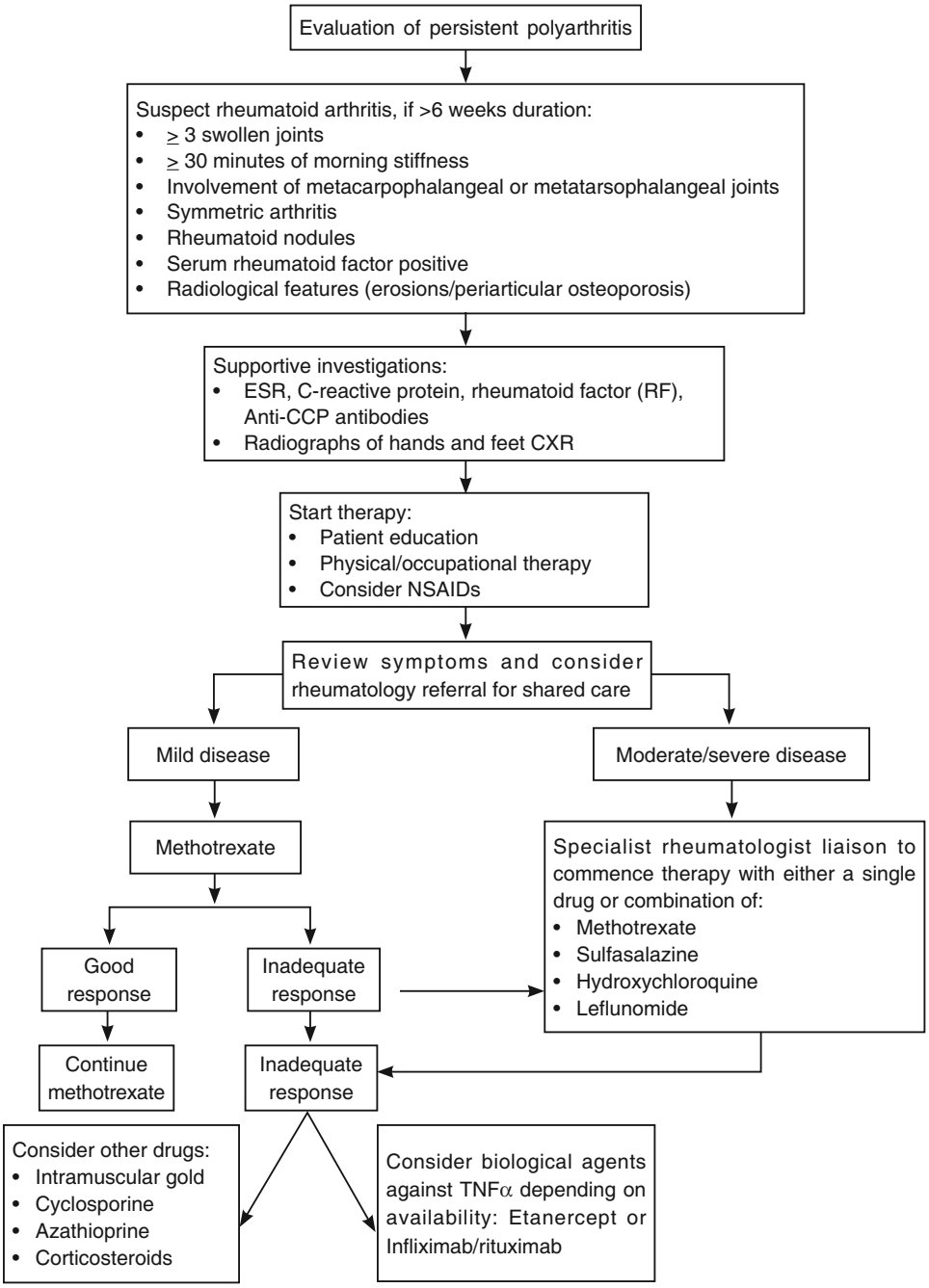

Fig. 17.1. Management of rheumatoid arthritis.

Note: As biologic agents can increase the risk of infections such as tuberculosis and reactivation of viral hepatitis, screening for the presence of latent tuberculosis and chronic viral hepatitis carrier state is recommended before initiating therapy.

1. In acute inflammation, any of the NSAIDs as given in section on osteoarthritis may be given except Paracetamol. The anti-inflammatory action of the NSAIDs may take 2-4 weeks to become evident.
   Reduced NSAID dosages have to be used in the elderly and in patients with impaired renal function. Concomitant use of more than one NSAID only increases toxicity, and has no additional benefit. Patient not responding to one NSAID may still show a good response to another.
2. Topical applications—containing salicylates, capsaicin, nicotinates, menthol, camphor and NSAIDs in various combinations may provide symptomatic relief.
   Refer to a specialist (physician) at a higher centre. Begin DMARD early in the disease. Prediction of response to a particular disease modifying antirheumatic drug (DMARD) is not possible. It takes 4-6 weeks to show its effect.
3. Tab Methotrexate 7.5 to 15 mg every week as single dose. Concomitant Folic acid 5 mg/week as single dose 12 hours before or after methotrexate reduces side effects.
   (**Caution:** Nausea, mouth sores, liver damage, increase in incidence of chest infection, macrocytic anaemia. Regular monitoring of CBC and LFT is required. Avoid alcohol during therapy).
   Suboptimal treatment response is defined as failure to achieve remission after 3 months of MTX at its maximally tolerated dose. Such patients should receive step-up therapy, i.e., combination therapy of MTX plus another agent.
4. Only in patients with severe disease, affecting activities of daily living and not responding to adequate trial of NSAIDs and DMARD for sufficient duration:
   Tab. Prednisolone 40-60 mg/day for 2-4 weeks. Review periodically and possibly taper down slowly over 3 months. If required for a longer duration, administer at doses of 5-10 mg/day.
   Intra-articular corticosteroids: Methylprednisolone acetate, 20-80 mg may be needed in selected cases with predominantly monoarticular arthritis of a large joint.
5. Patients with RA should be screened for risk factors for CV disease and for osteoporosis. Once detected, these conditions should be managed as appropriate.
6. Patients should be regularly monitored for side effects. Investigations such as chest radiograph, complete blood counts, lymphocyte count, liver and renal function tests, and lipid level should be assessed at regular intervals.
7. Refer the patient to a higher centre, if no response to medical therapy after 4-8 weeks, severe extra-articular symptoms, deformities or contractures present, patient is crippled/or not able to carry out activities of daily living despite adequate medical treatment.

Surgical

Synovectomy in patients with predominantly monoarticular involvement, not responding to conservative therapy, might be helpful. Reconstructive surgery is indicated for disorganized joints.

Patient education

- The disease can be controlled but no curative agent is known. There can be remissions and exacerbations.
- At the onset of disease, it is difficult to predict the natural history of an individual patient's illness.
- No characteristic features of patients have emerged that predict responsiveness to a particular DMARD.
- Lifestyle modification may be required depending on the degree of disability; cessation of smoking.
- Regular mild exercises as prescribed by the doctor help in prevention of deformity, maintain range of motion of the joints and muscle strength.
- Magic drug for rheumatic arthritis might contain steroids. Better to consult a qualified doctor before taking it.

References

1. Rheumatoid Arthritis. In: Harrison's Principles of Internal Medicine. Fauci, Braunwald, Kasper et al (eds), 18th Edition, McGraw Hill Company Inc., New York, 2012; pp. 2738-2752.
2. Rheumatoid Arthritis. In: Conn's Current Therapy. Robert E. Rakel (ed), WB Saunders Company, Philadelphia, 1999.
3. 2012 Update of the 2008 American College of Rheumatology Recommendations for the Use of Disease-Modifying Antirheumatic Drugs and Biologic Agents in the Treatment of Rheumatoid Arthritis. Arthritis Care & Research 2012; 64, pp. 625–639.
4. Management of Rheumatoid Arthritis: Consensus Recommendations from The Hong Kong Society of Rheumatology. Clin Rheumatol 2011; 30: 303-312.

CERVICAL AND LUMBAR SPONDYLOSIS

Spondylosis is a clinical syndrome resulting from degeneration of intervertebral discs and facet joints.

SALIENT FEATURES

- Pain and stiffness with decreased range of movement of gradual onset. Occasional acute flare ups of pain with muscle spasm. Neck pain may radiate to occiput, scapular area and down to one or both arms (may be associated with paraesthesias). Back pain is usually diffuse and may radiate up to knees through back of thighs.
- Radiological narrowing of one or more intervertebral spaces, spur formation (osteophytes) and subchondral sclerosis are the hallmark.

Treatment

This guideline covers the early treatment and management of persistent or recurrent low back pain, defined as non-specific low back pain that has lasted for more than 6 weeks, but for less than 12 months.

Nonpharmacological

- In acute painful situation rest, moist heat in cold weather and light massage (improves tone, circulation and elasticity) to paraspinal muscles. Cervical traction in the position of maximum comfort to neck (5-10 pounds) for 10-15 minutes. Ultrasonic exposure on painful trigger points in cervical and shoulder muscles. Removable soft cervical collar/back corset/back belt for symptomatic relief. (**Caution:** No exercise in acute painful situation).
- In chronic pain, mobilization and strengthening exercises, moist heat.
- In low back pain, advise patients to stay physically active and do exercise. A structured exercise programme tailored to the person comprising up to a maximum of eight sessions over a period of up to 12 weeks.
- Group supervised exercise programme, in a group of up to 10 people.
- A one-to-one supervised exercise programme may be offered, if a group programme is not suitable for a particular person. Exercise programmes may include the following elements: aerobic activity, movement instruction, muscle strengthening, postural control, stretching.

Pharmacological

Same as described for osteoarthritis of knee taking into account the individual risk of side effects and patient preference. When paracetamol alone provides insufficient pain relief, give another non-steroidal anti-inflammatory drugs (NSAIDs).

No opioids, cyclooxygenase 2 (COX-2) inhibitors or tricyclic antidepressants are recommended.

In cases of neck pain with vertigo:

- One should avoid working with tools and machines, and refrain from driving vehicles.
- Besides other drug, add drugs which control vertigo, i.e. Cinnarazine 25 mg thrice a day to a maximum of 150 mg/day in divided doses.

Patient education

- In cervical spondylosis, avoid prolonged desk work, if must, then intermittent rest for a minute or two every hour is required and proper writing, typing, sitting posture (avoid low table, use tilt table) and care of the neck.
- Try to avoid carrying heavy bags on shoulders.
- In lumbar spondylosis, explain the patient how to manage weight since extra weight puts greater stress on the back muscles and to maintain proper body alignment while standing with feet slightly apart. When standing for long periods, use a small stool to keep one foot up with knee bent.
- Do not tense up or concentrate on standing up straight, just stand naturally.
- Care of back while sitting by using well designed fully adjustable chair to provide plenty of support to the lower back. If chair is uncomfortable, use a rolled up towel or small pillow to support the back. When sitting for long periods rest your feet on

low stool and use arm rests to support weight of your body. Try not to sit in the same position for long periods.

- To lift weight cautiously by keeping the back as much upright (vertical) and straight (not hunched over) as one can. Not to bend over at waist to pick up the object, instead squat, get under or next to object not on top of it. Lift with your leg muscles rather than back or abdominal muscles. Hold the object close to your body while lifting and carrying and do not twist your body.
- To sleep safely on a medium firm bed. While sleeping supine legs should be supported with pillows. Not to sleep on your stomach. Sleeping on your side with knees bent and hips tilted forward is probably the best.
- Refer to a higher centre in case of severe pain that disturbs sleep/not responding to conservative treatment for more than 2 weeks/associated with severe restriction of neck or back movements or torticollis or sciatic pain or constitutional symptoms/ neurological symptoms with back or neck pain.

SPRAINS

An injury to a ligament(s), by sudden unnatural or excessive movement of a joint, is termed as a sprain. Symptoms are pain, swelling, discoloration of the skin, especially bruising and impaired joint function.

SALIENT FEATURES

- Mild or grade I sprains—partial tearing of ligament fibres, minimal swelling and no joint instability.
- Moderate or grade II sprains—pain, oedema, ecchymosis, joint tenderness with some loss of joint motion but no joint instability.
- Severe or grade III sprains—gross instability of the joint with complete tearing of all fibres, marked swelling and severe pain.

Treatment

Nonpharmacological

- Check sensation and circulation distal to the injury. Obtain X-rays of the involved region to rule out a fracture. Stress X-rays may show abnormal opening of the joint in a grade III sprain.
- Protection, support and rest.
- Restrict the movement of the affected area.
- Apply cold compresses immediately (this will help to reduce swelling).
- Avoid using ice directly on the skin.
- Elevation of the limb above the level of the heart—especially at night while sleeping.
- In a grade I sprain, apply a compression bandage for a period of 5-7 days; patient may be allowed to bear weight after a week.

- In a grade II sprain, splintage (slab later on converted to cast) may be used to restrict joint motion, but the patient has to remain non-weight bearing for 4-6 weeks.

Pharmacological

1. Tab. Ibuprofen 400 mg 3 times a day for 5-7 days.
   Or
   Tab. Diclofenac sodium 50 mg 3 times a day for 5-7 days.
   Or
   Tab. Nimesulide 100 mg 2 times a day for 5-7 days.
   Refer the patient to an orthopaedic surgeon, if a fracture is suspected or if there has been a serious injury (grade III sprain with instability) or persistent pain (delayed recovery of grade I or II sprain), there is an audible popping sound and immediate difficulty in using the joint and distal neurovascular status is doubtful.

Patient education

- Don't massage the area and also no hot fomentation in acute stage; it will increase the swelling.
- To give rest to the injured area until the pain subsides (usually 7 to 10 days for mild sprains and 3 to 5 weeks for severe sprains).
- Avoid activities that cause pain or swelling.
- Practice moderation in physical activities.
- If the pain and swelling decreases within 48 hours after a sprain, move the affected joint in all directions.
- To avoid high-heeled shoes (for ankle sprains).

Reference

1. Apley's System of Orthopaedics and Fractures, 6th edition, Butterworths and Co. London., 1982.

ACUTE PYOGENIC OSTEOMYELITIS

Acute osteomyelitis is acute infection of the bone, commonly seen in children less than 10 years of age.

SALIENT FEATURES

- Diagnosis considered, if any of the following two criteria are present: classic symptom of localized pain, fever (with or without chills and rigours), swelling in the metaphyseal area, warmth, and limited range of motion of the adjacent joint; pus aspirated from the bone; positive bone or blood culture for pyogenic organism; radiographic changes typical of acute osteomyelitis (soft tissue swelling, periosteal reaction, lytic areas in the metaphysis).
- The X-ray changes usually appear 7-10 days after the onset of illness.

Treatment

Nonpharmacological

Rest, splintage to the part, elevation of the limb and sponging for fever. If aspiration is positive for pus, drain the pus (must be performed by an orthopaedic surgeon).

Postoperative duration of splintage depends upon extent of damage to the bone. Usual duration is 4-6 weeks. Gradually mobilize the limb and permit gradual weight bearing thereafter. In case of extensive destruction, bone might require support for a few months.

Pharmacological

Broad-spectrum intravenous antibiotics are started depending upon most likely organism present. Commonest bacterial pathogen is *Staphylococcus aureus* (40-80% of cases). The antibiotic later on may be changed depending upon culture report or response to therapy. Intravenous administration of antibiotics is continued till favourable clinical response is achieved, followed by oral antibiotics. Total duration of antibiotic(s) administration ranges from 4-6 weeks.

1. Inj. Cloxacillin 50-100 mg/kg/day in four divided doses for 1-2 weeks.
2. Inj. Gentamicin 5-7.5 mg/kg/day in 2 divided doses for 1-2 weeks or Inj. Amikacin 15 mg/kg/day in 2-3 divided doses, if resistant *Pseudomonas aeruginosa*.
   Or
   Inj. Ceftriaxone 100 mg/kg/day in 2 divided doses for 1-2 weeks (maximum dose 2 g/day).
   Or
   Inj. Cefotaxime 100-200 mg/kg/day by IV infusion or IM or IV in 2-4 divided doses for 1-2 weeks.
   Or
   If patient is hypersensitive to penicillins and cephalosporins,
   Inj. Clindamycin 40 mg/kg/day in 4 divided doses for 1-2 weeks.
   Or
   If Methicillin resistant *Staph. aureus* suspected, Inj. Vancomycin by IV infusion 500 mg over at least 60 minutes every 6 hours or 1g over at least 100 minutes every 12 hours; neonates up to 1 week, 15 mg/kg initially then 10 mg/kg every 12 hours; infants 1-4 weeks, 15 mg/kg initially then 10 mg/kg every 8 hours; children over 1 month, 10 mg/kg every 6 hours.
3. Oral/Inj. Paracetamol for fever (see section on Fever in Chapter 1).
4. Monitor therapy by clinical response. Favourable response characterized by decrease in swelling and fever, improvement in general well being and movements of limb, fall in ESR and C-Reactive protein (better indicator than ESR because CRP closely follows the clinical response). After 7-10 days of symptoms, repeat the X-ray to assess the extent of destruction and damage to bone. Oral therapy usually started 1-2 weeks of IV antibiotic therapy, if response is favourable. The choice of oral antibiotic largely depends on culture and sensitivity report. In the absence of culture report, give oral:

Syr./Cap. Cloxacillin 50-100 mg/kg/day in 4 divided doses for 3-4 weeks.
(Monitor compliance as it has bitter taste).
Or
Syr./Cap. Cephalexin 25-50 mg/kg/day in 4 divided doses for 3-4 weeks.
Or
Inj. Clindamycin 25-40 mg/kg/day in 4 divided doses for 3-4 weeks.

Refer the patient to an orthopaedic surgeon, if aspiration yields pus from bone or acute osteomyelitis suspected in an adult/diabetic/haemodialysis patient/IV drug user/ patient with orthopaedic implant/immunocompromised host.

Patient education

- Antibiotic therapy may be required for a few weeks depending upon the response.
- Plaster (or any other splintage) might be required for prolonged periods.
- Not to make the child walk (in case of lower limb bone involvement) unless permitted.

References

1. A Comparative Study of Osteomyelitis and Purulent Arthritis with Special Reference to Aetiology and Recovery. Infection, 1984; 12: 75.
2. Osteomyelitis and Suppurative Arthritis. In: Nelson's Textbook of Paediatrics. Berhman, Kliegman, Jenson et al (eds), 19th Edition, W.B. Saunder Company, Philadelphia, 2011; pp. 2394-2398.
3. Bone and Joint Sepsis. In: Lovell and Winter's Paediatric Orthopaedics. Morissy RT, Weinstein SL (eds), Vol. 4, Lippincott - Raven, Philadelphia, 1996.

ACUTE SEPTIC ARTHRITIS

Acute septic arthritis is inflammation of joint caused by pyogenic microorganisms, usually seen in children <10 years. The key to early diagnosis and favourable outcome remains high index of suspicion since delay in diagnosis leads to permanent damage to the joint. Hip and knee joints are the commonest joints to be affected.

SALIENT FEATURES

- Inability to move the affected joint, refusal to walk or limp, hip pain referred to knee, acute local signs of inflammation (warm and painful joint with effusion) and clinical signs of sepsis (fever, malaise); however, more than two-thirds of infants with septic arthritis are afebrile.
- Neonates present with pseudoparalysis of extremities, discomfort while changing the diaper, unhappy or out of sorts but rarely appear to be ill or moribund.
- Ultrasound examination of suspected septic hip joint greatly aids in diagnosis.

Treatment

Refer the patient immediately to an orthopaedic surgeon.

Nonpharmacological

- Keep the joint in position of comfort.
- Aspiration of the joint for Gram staining, culture and sensitivity.
- If aspirate is purulent, drainage of the joint on an emergency basis.
- Drain the joint even if the joint aspiration is doubtful in the presence of a strong clinical suspicion, because the risks of negative arthrotomy are far too less than not draining an infected joint having pus. The latter situation may be disastrous for the joint resulting in lifelong permanent disability to the patient.
- After drainage, splint the joint with a POP slab or skin traction to relieve pain and prevent contractures till the patient is afebrile, pain free and the joint is clinically quiescent. Intermittent mobilization is permitted to preserve the range of movement of the joint.

Pharmacological

The choice of antibiotics, duration of therapy and monitoring of the therapy are same as mentioned in the section on acute pyogenic osteomyelitis.

References

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