LOW BACKACHE – PATHOPHYSIOLOGY AND MANAGEMENT (INCLUDING FAILED BACK SYNDROME)

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LOW BACKACHE

PREVALENCE AND MAGNITUDE OF THE PROBLEM

- LBA is extremely prevalent with lifetime prevalence of 60-90%
- Annual incidence -5%
- One of the most common reason for people to seek medical attention
- Accounts for upto 15% of sick leave from work and hence a major health and economic burden
LBA-CLINICAL SYNDROMES

- Myofascial syndrome
- Neural compression syndrome
- Mechanical (instability) syndrome
- Inflammatory syndrome
- Neuropathic syndrome
- Psychosocioeconomic syndrome
LBA-Classification according to presentation

- **ACUTE** : <6 WEEKS
  Most are non specific, only 10-20% have anatomical diagnosis, 80-90% improve within 1 month
- **SUBACUTE** : 6 WEEKS -3 MONTHS
  In 10% of cases pain present beyond 6 weeks.
- **CHRONIC** : >3 MONTHS
  Only 5% have pain beyond 3 months
  Structural diagnosis is possible in 50% cases
LBA : ETIOLOGY

• Mechanical / Musculoskeletal pain
  minor trauma
  muscle strain
  sprain

• Degenerative spine disorders
  lumbar disc herniation
  lumbar canal stenosis
  spondylolisthesis
LBA : ETIOLOGY

Non Degenerative causes

- 1. metabolic: osteoporosis, osteomalacia
- 2. inflammatory: ankylosing spondylitis, Reiter’s disease, psoariasis, enteropathic arthritis, fibromyositis, rheumatoid arthritis
- 3. infectious: pyogenic, granulomatous
- 4. neoplastic
- 5. juxtafacet cysts
LBA : ETIOLOGY

• Extra spinal causes
  1. Hip diseases : trochanteric bursitis degenerative arthritis of hip
  2. Pelvic and lower abdominal diseases : endometriosis sigmoid diverticulitis post. wall D U retro peritoneal tumor dissected aortic aneurysm
LBA – Anatomical considerations

• Pain sensitive structures of low back
  1. lumbar spine, sacrum
  2. sacro iliac articulations
  3. coccyx
  4. muscles, tendons, ligaments
  5. neural elements: cauda equina
     nerve roots
     peripheral nerves
INNERVATION

• Posterior primary ramus innervates the vertebral and para vertebral osseo musculo ligamentous structures

• Recurrent nerve of Lushka, a branch of post primary ramus, recieves sensory branches from dura, PLL, facet joint capsules, erector spinae, annulus fibrosis but not nucleus pulposus
DEGENERATIVE SPINE DISEASES (DSD)

Progressive deterioration of structures of spine:

1. disc abnormalities
2. facet joint abnormalities
3. osteophyte formation
4. spondylolisthesis
5. hypertrophy of ligamentum flavum
ETIOLOGY OF DSD

• Cumulative effects of micro trauma / macro trauma
• Osteoporosis
• Cigarette smoking
• Obesity
• Loss of abdominal and paraspinal muscle tone
PATHOPHYSIOLOGY OF DSD

• Pathological disc alterations
  1. nuclear degeneration:
     proteoglycan content of disc decreases with age
disc dessication (loss of hydration)
annular tears develop
  2. nuclear prolapse: due to increased nuclear pressure under mechanical loads
  3. nuclear fibrosis: due to mucoid degeneration and ingrowth of fibrous tissue
  4. disc resorption
  5. loss of disc space and osteophyte formation
PATHOPHYSIOLOGY OF DSD

• Concurrent changes in facet joints
  synovitis
  synovial tags in joints
  capsular tears
  capsular laxity
  degeneration of articular cartilage
  osteophyte formation and hypertrophy
  of articular facets and ligaments

These changes may produce spinal stenosis which can lead to neural compromise
PATHO PHYSIOLOGY OF SCIATICA

Incompletely understood; possible mechanisms include:

- Mechanical pressure on nerve root:
  - edema
  - altered nutrient transport
  - inhibition of axonal conduction

- Role of inflammation
  - e/o inflammatory cells in disc specimen removed at surgery
    - presence of phospholipase A2, an inflammatory mediator in disc specimen

- Experimental application of nucleus pulposus without compression of N.roots result in alteration of blood flow and N.conduction velocities
LUMBAR CANAL SENOSIS

CLASSIFICATION:

depending on location:

1. central canal stenosis: decreased AP diameter
2. foraminal stenosis
3. lateral canal stenosis: height less than 3 mm

depending on etiology

1. congenital
2. acquired
Progressive narrowing of spinal canal attributed to:

- Acquired degenerative changes such as thickened laminae
- Medially impinging arthritic facets
- Infolding of hypertrophied yellow ligament
- Hyperlordosis
- Ossification of PLL
PATHO PHYSIOLOGY OF LCS

Radiculopathy and neurogenic claudication associated with LCS are attributed to

- Direct mechanical compression
- Indirect vascular insufficiency leading to decreased oxygenation of lumbar nerve
LBA : MANAGEMENT PRINCIPLES

INITIAL CLINICAL ASSESSMENT :

Major Goal : To detect ‘RED FLAGS’ that may indicate potentially serious spinal or nonspinal pathology such as:

- fracture
- tumor
- infection
- cauda equina syndrome
AHCPR classification of back problems

• CLINICAL CATEGORY :
  1. potentially serious spinal condition
  2. sciatica
  3. nonspecific back problems
LBA : MANAGEMENT
PRINCIPLES
ACUTE BACKACHE

RED FLAGS

ABSENT
No further testing is required during first 4 weeks of symptoms

PRESENT
Investigate further : X-Rays, MRI, CT, Bone scans
LBA – TREATMENT PRINCIPLES

• CONSERVATIVE / NON SURGICAL

• SURGICAL
CONSERVATIVE MANAGEMENT OF LBA

• ANALGESICS
  - initially use NSAIDS or acetaminophen
  - opioids: for short term period only (2-3 weeks)
  - dubious role of muscle relaxants in LBA
CONSERVATIVE MANAGEMENT OF LBA

BED REST:
Objective: to reduce symptoms by
- reducing pressure on nerve roots
  by decreasing intra discal pressure which is lowest in supine semi Fowler position
- reducing movements which cause pain

AHCPR recommendations: majority will not require bed rest.
- Bed rest for 2-4 days may be an option for those with initial severe radicular symptoms
- Prolonged bed rest (> 4 days) appears to be worse for patients by producing weakness, stiffness, increased pain
CONSERVATIVE MANAGEMENT OF LBA

• ACTIVITY MODIFICATIONS:
  Risk factors: jobs requiring
  - heavy / repetitive lifting
  - asymmetrical postures
  - prolonged sitting / standing

GOAL: to achieve a tolerable level of discomfort

AHCPR recommendations:
  - temporarily limit the risk factors
  - then establish activity goals to help return to full functional status
CONSERVATIVE MANAGEMENT OF LBA

- EXERCISE

AHCPR recommendations

- use low stress aerobics during 1\textsuperscript{st} month like walking cycling

- after 1\textsuperscript{st} month – do conditioning exercises for trunk muscles

- use gradually escalating exercise grade
CONSERVATIVE MANAGEMENT OF LBA

EDUCATION

• Explain the condition to the patient
• Positive reassurance
• Proper posture, sleeping positions, lifting techniques
CONSERVATIVE MANAGEMENT
OF LBA

SPINAL MANIPULATION THERAPY

- useful in facet slippage with radiculopathy
- doubtful role in acute backache without radiculopathy
- use during initial 4 weeks only when ‘RED FLAGS’ are ruled out
CONSERVATIVE MANAGEMENT OF LBA

EPIDURAL INJECTIONS OF CORTICOSTEROIDS

- recommended only for short term relief of radicular pain when control on oral medications is inadequate
CONSERVATIVE MANAGEMENT OF LBA

Not recommended by AHCPR panel for acute LBA

• Oral steroids
• Anti depressants
• TENS
• Ultrasound
• Lumbar corsets
• Facet joint injections
• Acupuncture
SURGICAL TREATMENT OF LBA

• URGENT SURGERY is indicated in
  - cauda equina syndrome
  - progressive neurological deficits
  - profound motor weakness
  - rarely in intractable severe pain
ROUTINE SURGERY is indicated in
- 4-8 weeks of symptoms, not improving with time, and with radiologically identified abnormality that correlates with findings on history and physical findings
- <4 weeks of symptoms with potentially serious spinal conditions
SURGICAL OPTIONS OF LBA

- Central or para central PIVD
- Far lateral or foraminal PIVD
- LCS

- Standard discectomy; microdiscectomy; endoscopic disc excision; laser disc decompression; chemo papain
- Partial or total facetectomy; endoscopic technique, extra canal approach
- Simple decompressive laminectomy; laminectomy and fusion
FAILED BACK SYNDROME

• DEFINITION: The failure of lumbar spine therapy to relieve pain and incapacitation
• Multifactorial- organic, psychological and social factors
• Failure rate of lumbar discectomy is 8-25%
FBS - ETIOLOGY

• INCORRECT INITIAL DIAGNOSIS (most common cause)
  - incorrect pre op imaging
  - clinical findings not correlated with imaging
  - missed associated pre op conditions
    eg. Trochanteric bursitis, diabetic amyotrophy, hip/knee arthropathy, myofascial pain syndrome, occult pelvic malignancy
FBS - ETIOLOGY

- PERSISTANT NERVE ROOT / CAUDA EQUINA COMPRESSION:
  - residual disc material
  - recurrent disc herniation at the same level / another level
  - epidural fibrosis
  - lumbar spinal stenosis
    associated with midline fusion
    recurring over many years at the same level
    recurring at different levels
FBS - ETIOLOGY

- SEGMENTAL INSTABILITY:
  - associated with laminectomy and total facetectomy leading to spondylolisthesis
  - post op scoliosis
  - lateral rotational instability
  - Macnab’ consider ‘traction spurs’ as an indication of segmental instability
  - Transitional syndrome; seen in spinal fusions
FBS - ETIOLOGY

- Permanent nerve root injury – deafferentiation pain
- Adhesive arachnoiditis – related to sub arachnoid bleed; best cure is prevention
- Discitis - present 2-4 weeks after surgery
- Non anatomical factors:
  - poor patient motivation
  - primary gains; avoidance of unpleasant tasks
  - secondary gains
  - psycho social factors
FBS-MANAGEMENT GUIDELINES

• Proper clinical and radiological assessment to ascertain one of the above mentioned causes
• Rehabilitation programmes to be started early
• Pharmacological management
  - NSAIDS
  - Anti depressants
• Psycho social management
FBS-MANAGEMENT GUIDELINES

• SURGICAL MANAGEMENT:
  Success rate of re-operation 25-80%
  Indicated in 2 clinico anatomical conditions
    1. neural compressive process : LCS
       PIVD
    2. lumbar segmental instability
FBS-MANAGEMENT GUIDELINES

NEUROPATHIC PAIN SURGERIES

- NEUROABLATIVE PROCEDURES
  - DORSAL RHIZOTOMIES
  - ANTEROLATERAL CORDOTOMIES (RESULTS POOR; NO DEFINITE ROLE)

- NEURO AUGMENTATIVE PROCEDURES
  - IMPLANTED SPINAL CORD STIMULATORS
  - DEEP BRAIN STIMULATION

- MPLANTED INTRA SPINAL DRUG INFUSION THERAPIES

NEUROPATHIC PAIN
PROCEDURES-SCS

North et al. (Neurosurgery 1993) reported that in carefully selected patients suffering from end stage FBS and treated with implantable spinal cord stimulation – 50% pain relief in long term with substantial improvement in QUALITY OF LIFE.

Bees et al. (J. pain sym and management 1997) has shown better response to spinal cord stimulation than to re-operation.