STATION 1 – PEDIATRICS INTERACTIVE

Down Syndrome (Trisomy 21) – Picture Recognition & Clinical Features

BLOCK N OSPE – PEDIATRICS

CANDIDATE INSTRUCTIONS

8 minutes. Look at photograph of child/infant with Down syndrome.
Identify the condition, list clinical diagnostic features, and state inheritance pattern.
Counsel parents regarding prognosis and management.

HIGH-YIELD CLINICAL FEATURES (SPECIAL SIGNS)

FLAT FACIAL PROFILE – midface hypoplasia
UPSLANTING PALPEBRAL FISSURES (mongoloid slant)
EPICANTHAL FOLDS – inner canthus skin fold
FLAT OCCIPUT (brachycephaly)
SINGLE PALMAR CREASE (simian crease) – 50%
WIDE-SPACED 1st TOE (sandal gap)
HYPOTONIA – "floppy baby"
BRACHYDACTYLY – short broad hands
CLINODACTYLY – incurved 5th finger
PROTRUDING TONGUE – macroglossia relative to small oral cavity

INHERITANCE PATTERN

95% NON-DISJUNCTION (meiotic error, risk increases with maternal age >35)
4% ROBERTSONIAN TRANSLOCATION (t(14;21) or t(21;21)) – familial, not age-related
1% MOSAICISM – milder phenotype

CRITICAL ASSOCIATIONS (MUST KNOW)

CONGENITAL HEART DISEASE – 50% (AVSD, VSD, ASD, PDA)
DUODENAL ATRESIA – "double bubble" on X-ray
HIRSCHSPRUNG DISEASE
ATLANTOAXIAL INSTABILITY – avoid neck hyperextension
LEUKEMIA RISK – 10-20× increased (ALL/AML)
ALZHEIMER DISEASE – by age 40-50
HYPOTHYROIDISM – annual TSH screening

MANAGEMENT PEARLS

Early intervention programs (PT/OT/speech)
Cardiac evaluation – echo at birth
Thyroid screening – annually
Hearing/vision screening
Genetic counseling – recurrence risk 1% or translocation risk

STATION 2 – PEDIATRICS INTERACTIVE

Hemophilia Scenario – Diagnosis, Investigation & Parent Counseling

BLOCK N OSPE – PEDIATRICS

CANDIDATE INSTRUCTIONS

8 minutes. Scenario: 3-year-old boy with joint swelling after minor trauma, history of prolonged bleeding after circumcision.
Take focused history, discuss differential diagnosis, investigations, and counsel parents about treatment and prognosis.

HIGH-YIELD DIAGNOSTIC FEATURES

X-LINKED RECESSIVE – males affected, females carriers
HEMOPHILIA A (FVIII deficiency) – 80% of cases
HEMOPHILIA B (FIX deficiency, Christmas disease) – 20%
SPONTANEOUS BLEEDING – when factor <1%
HEMARTHROSIS – knee > elbow > ankle (target joints)
MUSCLE HEMATOMAS – iliopsoas (femoral nerve palsy)
PROLONGED BLEEDING – post-circumcision, dental extraction

SPECIAL SIGN: ILIOPSOAS HEMATOMA

FLEXED, EXTERNALLY ROTATED HIP (psoas sign)
FEMORAL NERVE PALSY – numbness quadriceps, weak knee extension
PSEUDO-TUMOR – chronic bone hematoma with new bone formation

INVESTIGATIONS

PROLONGED aPTT – normal PT/INR, normal bleeding time
FACTOR ASSAYS – FVIII or FIX level (<40% = deficiency)
MIXING STUDY – corrects with normal plasma (vs inhibitor)
GENETIC TESTING – intron 22 inversion in severe Hemophilia A

MANAGEMENT

RECOMBINANT FACTOR CONCENTRATES – FVIII or FIX
PROPHYLAXIS – 25-40 IU/kg 3× weekly (prevent arthropathy)
DEMOPRESSIN (DDAVP) – mild Hemophilia A (releases vWF → ↑FVIII)
TRANEXAMIC ACID – adjunct for mucosal bleeding
RICE – Rest, Ice, Compression, Elevation for hemarthrosis
NO IM INJECTIONS, NO ASPIRIN

PARENT COUNSELING POINTS

X-linked inheritance – 50% sons affected, 50% daughters carriers
Normal lifespan with proper treatment
Home therapy training – early factor administration
Avoid contact sports – swimming/cycling OK
Medical alert bracelet
Vaccinate against Hepatitis A/B (historical risk from plasma products)

STATION 3 – PEDIATRICS STATIC

Thalassemia Scenario – Diagnosis, Treatment & Investigation

BLOCK N OSPE – PEDIATRICS

CANDIDATE INSTRUCTIONS

8 minutes. Scenario: Child with pallor, hepatosplenomegaly, facial deformities (chipmunk facies).
Identify diagnosis, discuss investigations, management, and complications.

HIGH-YIELD CLINICAL FEATURES

CHIPMUNK FACIES – maxillary overgrowth from bone marrow expansion
FRONTAL BOSSING
HEPATOSPLENOMEGALY – extramedullary hematopoiesis
SEVERE ANEMIA – Hb 3-7 g/dL (β-thalassemia major)
FAILURE TO THRIVE
Jaundice – hemolysis

INVESTIGATIONS

CBC – severe microcytic hypochromic anemia, ↓MCV/MCH
PERIPHERAL SMEAR – target cells, basophilic stippling, nucleated RBCs
HEMOGLOBIN ELECTROPHORESIS – ↑HbF, ↓/absent HbA (β-thal major)
SERUM FERRITIN – iron overload monitoring
DNA ANALYSIS – mutation detection for prenatal diagnosis

MANAGEMENT

REGULAR TRANSFUSIONS – maintain Hb >9-10 g/dL (hypertransfusion regime)
IRON CHELATION – Desferrioxamine (SC) or Deferasirox (oral) or Deferiprone
SPLENECTOMY – if hypersplenism/severe transfusion requirements
FOLIC ACID SUPPLEMENTATION
HSCT (BONE MARROW TRANSPLANT) – only curative option
GENE THERAPY – emerging

COMPLICATIONS (EXAM FAVORITES)

HEMOSIDEROSIS – heart (dilated cardiomyopathy), liver (fibrosis/cirrhosis), endocrine (diabetes, hypothyroidism, hypoparathyroidism, delayed puberty)
INFECTIONS – post-splenectomy (encapsulated organisms)
GALLSTONES – pigment stones from hemolysis
THROMBOSIS – especially post-splenectomy

STATION 4 – PEDIATRICS INTERACTIVE

Fever with Jaundice – GPE Performance

BLOCK N OSPE – PEDIATRICS

CANDIDATE INSTRUCTIONS

8 minutes. Child presented with fever and jaundice.
Perform complete general physical examination with focus on liver, spleen, lymph nodes, and signs of chronic liver disease.
Formulate differential diagnosis.

HIGH-YIELD GPE FINDINGS

ICTERUS – scleral jaundice (first sign), palmar, mucosal
HEPATOMEGALY – smooth (viral hepatitis) vs nodular (malignancy)
SPLENOMEGALY – suggests chronic process (malaria, hemolysis, portal hypertension)
LYMPHADENOPATHY – viral infections, leukemia, lymphoma
ASCITES – chronic liver disease
STIGMATA OF CLD – spider nevi, palmar erythema, gynecomastia, testicular atrophy, caput medusae

DIFFERENTIAL DIAGNOSIS

INFECTIOUS: Viral hepatitis (A/B/C/E), Leptospirosis, Malaria (blackwater fever), Sepsis, EBV/CMV
HEMOLYTIC: G6PD deficiency, Hereditary spherocytosis, Autoimmune hemolysis
OBSTRUCTIVE: Biliary atresia, Choledochal cyst
METABOLIC: Wilson disease, Neonatal hemochromatosis
MALIGNANCY: Leukemia, Neuroblastoma (liver metastasis)

STATION 5 – PEDIATRICS INTERACTIVE

Septic Arthritis – X-ray Interpretation & Management

BLOCK N OSPE – PEDIATRICS

CANDIDATE INSTRUCTIONS

8 minutes. Look at X-ray showing joint pathology in child without trauma but with joint swelling.
Identify condition, give differential diagnosis, and discuss management.
Scenario: Child with fever, refusal to bear weight, joint held in flexion.

X-RAY FINDINGS IN SEPTIC ARTHRITIS

EARLY (0-7 days): Soft tissue swelling, joint space widening (effusion), fat pad displacement
LATE (7-14 days): Joint space narrowing (cartilage destruction), subchondral bone loss/erosion, sclerosis
ULTRASOUND: Joint effusion (diagnostic tap guidance)

DIFFERENTIAL DIAGNOSIS (2 MAIN)

1. TRANSIENT SYNOVITIS (TOXIC SYNOVITIS)
– Post-viral, afebrile/low-grade fever, no systemic toxicity
– Self-limiting, ESR/CRP mildly elevated
– **Kocher's criteria** to differentiate

2. ACUTE HEMATOGENOUS OSTEOMYELITIS
– Bone pain > joint pain, metaphyseal tenderness
– X-ray changes appear later (10-14 days)

KOCHER'S CRITERIA (CRITICAL)

4 Predictors of Septic Arthritis:
1. Non-weight bearing
2. ESR >40 mm/hr
3. Fever >38.5°C
4. WBC >12,000

Probability: 0=3%, 1=40%, 2=93%, 3=93%, 4=99%

MANAGEMENT

URGENT SURGICAL DRAINAGE – arthrotomy/arthroscopy (within 24 hours)
EMPIRIC ANTIBIOTICS – Staph aureus coverage (Flucloxacillin/Vancomycin if MRSA)
Age <3 months: Add Gram-negative coverage
SYNOVIAL FLUID ANALYSIS – WBC >50,000, Gram stain, culture
IV ANTIBIOTICS 2-3 WEEKS → Oral 3-4 weeks
PHYSIOTHERAPY – prevent contractures

STATION 6 – PEDIATRICS STATIC

Osteogenesis Imperfecta – Definition, Causes & Management

BLOCK N OSPE – PEDIATRICS

CANDIDATE INSTRUCTIONS

8 minutes. Define osteogenesis imperfecta, state causes, and discuss management.
Identify key clinical features and complications.

DEFINITION

GENETIC DISORDER OF COLLAGEN TYPE I causing brittle bones, blue sclerae, and connective tissue fragility.
INCIDENCE: 1:10,000–20,000

HIGH-YIELD CLINICAL FEATURES (SPECIAL SIGNS)

BLUE SCLERAE – pathognomonic (thin collagen reveals choroid)
MULTIPLE FRACTURES – with minimal trauma
BONE DEFORMITIES – bowing of long bones
SHORT STATURE
DENTINOGENESIS IMPERFECTA – amber/brown translucent teeth
HEARING LOSS – otosclerosis (onset 20-30 years)
LIGAMENTOUS LAXITY – joint hypermobility
TRIANGULAR FACE – macrocephaly with triangular shape

TYPES (SILENCE CLASSIFICATION)

TYPE I – Mildest, blue sclerae, hearing loss, AD inheritance
TYPE II – Lethal perinatal, in utero fractures, beaded ribs, AR inheritance
TYPE III – Severe progressive deformity, sclerae lighten with age
TYPE IV – Moderate severity, variable sclerae

MANAGEMENT

BISPHOSPHONATES – Pamidronate (↓fracture rate, ↑BMD)
ORTHOPEDIC SURGERY – intramedullary rodding (Fassier-Duval)
PHYSIOTHERAPY – swimming, avoid contact sports
HEARING AIDS – for otosclerosis
GENETIC COUNSELING
PRENATAL DIAGNOSIS – ultrasound, DNA testing

STATION 7 – DERMATOLOGY INTERACTIVE

Scabies – Diagnosis, Lesions, Treatment & Counseling

BLOCK N OSPE – DERMATOLOGY

CANDIDATE INSTRUCTIONS

8 minutes. Scenario: Patient with intense itching, worse at night.
Identify diagnosis, describe characteristic lesions (burrows), discuss medications, and counsel the patient.

HIGH-YIELD DIAGNOSTIC FEATURES

INTENSE PRURITUS – worse at night, after hot bath
BURROWS – pathognomonic, linear/serpiginous, 2-10 mm, grayish-white
DISTRIBUTION – finger webs, wrists, axillae, periumbilical, genitalia, buttocks
SPARES – face/scalp (except infants)
PAPULES, VESICLES, EXCORIATIONS – secondary to scratching
NODULAR SCABIES – persistent pruritic nodules in genitalia/axillae

SPECIAL SIGN: THE BURROW

LOCATION: Finger webs (classic site)
APPEARANCE: Short, wavy, grayish line with tiny black dot (mite) at end
DIAGNOSIS: Mineral oil scraping → microscopy shows mite, eggs, or feces (scybala)

TREATMENT

FIRST LINE: PERMETHRIN 5% CREAM
– Apply neck-down (include scalp in infants/elderly)
– Leave 8-14 hours, wash off
– Repeat in 7 days

ALTERNATIVES:
– Ivermectin 200 µg/kg PO (2 doses, 7-14 days apart) – for crusted scabies or topical failure
– Benzyl benzoate 25% (cheaper, more irritating)
– Crotamiton 10% (less effective)

ORAL ANTIHISTAMINES – for pruritus (may persist 2-4 weeks post-treatment)
TOPICAL STEROIDS – for nodular scabies

COUNSELING POINTS (CRITICAL)

TREAT ALL HOUSEHOLD CONTACTS simultaneously (even if asymptomatic)
WASH CLOTHING/BEDDING – hot water (>50°C) or seal in plastic bag 72 hours
ITCHING MAY PERSIST 2-4 weeks after successful treatment (post-scabetic itch)
RETURN IF: New burrows, widespread rash, or no improvement after 2 treatments
CRUSTED SCABIES – highly contagious, needs isolation and combination therapy

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STATION 8 – DERMATOLOGY STATIC

Pemphigus Vulgaris – Diagnosis, Signs & Treatment

BLOCK N OSPE – DERMATOLOGY

CANDIDATE INSTRUCTIONS

8 minutes. Look at photograph showing severe mucocutaneous blistering.
Identify diagnosis, describe characteristic signs, discuss two diagnostic tests, differentiate from Bullous Pemphigoid, and outline treatment.

HIGH-YIELD CLINICAL FEATURES

FLACCID BULLAE – thin-walled, easily ruptured
EROSIONS – painful, non-healing, crusted
MUCOSAL INVOLVEMENT – oral erosions in 50-70% (often first sign)
POSITIVE NIKOLSKY SIGN – pathognomonic
ASBOE-HANSEN SIGN – extension of blister with pressure
ASSOCIATION – Ashkenazi Jews, HLA-DR4, HLA-DR14, myasthenia gravis, thymoma

SPECIAL SIGNS (MUST DEMONSTRATE)

NIKOLSKY SIGN – lateral pressure on blister causes extension of erosion (epidermis easily detached)
ASBOE-HANSEN SIGN (BULLA SPREAD SIGN) – pressure on blister fluid pushes blister into adjacent normal skin
MECHANISM: Acantholysis (loss of keratinocyte adhesion) due to anti-desmoglein 1 & 3 antibodies

TWO DIAGNOSTIC TESTS

1. **Tzanck Smear** – cytology of blister base shows rounded detached keratinocytes (acantholytic cells/Tzanck cells)
2. **Direct Immunofluorescence (DIF)** – "chicken-wire" or "fish-net" pattern of IgG/C3 in intercellular spaces
3. **Indirect Immunofluorescence (IIF)** – circulating anti-desmoglein antibodies
4. **ELISA** – anti-Dsg1 and anti-Dsg3 antibody titers (monitor disease activity)

DIFFERENTIATION: PEMPHIGUS vs BULLOUS PEMPHIGOID

Feature	Pemphigus Vulgaris	Bullous Pemphigoid
Blisters	Flaccid, easily ruptured	Tense, resistant to rupture
Nikolsky sign	**POSITIVE**	**NEGATIVE**
Mucosal involvement	Common (50-70%)	Rare (10-15%)
Autoantibody target	Desmoglein 1 & 3 (desmosomes)	BP180, BP230 (hemidesmosomes)
Histology	Intraepidermal (suprabasal) split	Subepidermal blister
DIF pattern	Chicken-wire intercellular	Linear at basement membrane
Age	Middle-aged (40-60)	Elderly (>60)
Mortality	High if untreated (5-15%)	Lower, but significant

TREATMENT

FIRST LINE: SYSTEMIC CORTICOSTEROIDS – Prednisone 1-2 mg/kg/day
STEROID-SPARING AGENTS:
– Azathioprine (monitor TPMT activity)
– Mycophenolate mofetil
– Cyclophosphamide (severe cases)

BIOLOGICS: Rituximab (anti-CD20) – highly effective, increasingly first-line
IVIG – for refractory cases
PLASMAPHERESIS – rapid reduction of antibodies
WOUND CARE – aggressive hydration, infection prevention

STATION 9 – DERMATOLOGY STATIC

TEN (Toxic Epidermal Necrolysis) – Identification, Type & Treatment

BLOCK N OSPE – DERMATOLOGY

CANDIDATE INSTRUCTIONS

8 minutes. Look at photograph showing widespread skin detachment.
Identify condition, state type of drug reaction, and discuss emergency management.

HIGH-YIELD CLINICAL FEATURES

WIDESPREAD EPIDERMAL NECROSIS – >30% BSA (distinguishes from SJS <10%)
POSITIVE NIKOLSKY SIGN – large sheets of epidermis detach with lateral pressure
MUCOSAL INVOLVEMENT – severe erosions (at least 2 sites: oral, conjunctival, genital)
PAINFUL ERYTHEMA – precedes blistering
FULL-THICKNESS SKIN LOSS – resembles scalding
SYSTEMIC SYMPTOMS – fever, malaise, myalgias (prodrome 1-3 days)

SPECIAL SIGN: NIKOLSKY IN TEN

EXTENSIVE DETACHMENT – gentle pushing causes epidermal sheet separation
MECHANISM: Extensive keratinocyte necrosis via Fas-FasL mediated apoptosis
SCORTEN SCORE – prognostic (age >40, malignancy, BSA >10%, HR >120, glucose >252, bicarb <20, BUN >28)

CLASSIFICATION (SJS/TEN SPECTRUM)

SJS (Stevens-Johnson Syndrome) – <10% BSA detachment
SJS-TEN OVERLAP – 10-30% BSA
TEN (Toxic Epidermal Necrolysis) – >30% BSA
TYPE IV HYPERSENSITIVITY REACTION – delayed cell-mediated (cytotoxic T-cells)

COMMON TRIGGERS

DRUGS (90%):
– Sulfonamides (TMP-SMX)
– Anticonvulsants (Carbamazepine, Phenytoin, Lamotrigine)
– Allopurinol
– NSAIDs (oxicams)
– Nevirapine
Mycoplasma pneumoniae (SJS, especially children)

EMERGENCY MANAGEMENT (BURN UNIT)

DISCONTINUE OFFENDING DRUG – immediately
FLUID RESUSCITATION – like burns (Parkland formula), maintain urine output 0.5-1 mL/kg/hr
NUTRITIONAL SUPPORT – NG feeding early
TEMPERATURE CONTROL – thermoregulatory dysfunction
WOUND CARE – non-adherent dressings, silver sulfadiazine (avoid if sulfa allergy)
PAIN MANAGEMENT – aggressive opioid analgesia
EYE CARE – ophthalmology consult, lubrication, prevent synechiae
INFECTION PREVENTION – sepsis is leading cause of death
CONSIDER IVIG or CYCLOSPORINE – controversial, may help
AVOID CORTICOSTEROIDS – increase infection risk (controversial)

STATION 10 – DERMATOLOGY STATIC

Psoriasis – With Hand X-ray Findings

BLOCK N OSPE – DERMATOLOGY

CANDIDATE INSTRUCTIONS

8 minutes. Look at photograph of skin lesions and X-ray of hands.
Identify diagnosis, describe X-ray findings, and discuss management.

HIGH-YIELD CLINICAL FEATURES

WELL-DEMARCATED ERYTHEMATOUS PLAQUES – with silvery-white scale
AUSPITZ SIGN – pinpoint bleeding when scale removed
KEOBNER PHENOMENON – new lesions at sites of trauma
DISTRIBUTION – extensor surfaces (elbows, knees), scalp, lumbosacral, nails
NAIL CHANGES – pitting, oil spots, onycholysis, subungual hyperkeratosis
TYPES: Plaque (90%), Guttate, Inverse, Pustular, Erythrodermic

SPECIAL SIGNS

AUSPITZ SIGN – removal of scale reveals tiny bleeding points (exposed dermal papillae capillaries)
KEOBNER/ISOMORPHIC RESPONSE – linear lesions along scratch lines
OIL DROP SIGN – yellow-brown discoloration under nail plate

PSORIATIC ARTHRITIS X-RAY FINDINGS (HAND)

"PENCIL-IN-CUP" DEFORMITY – proximal phalanx tapered (pencil), distal phalanx expanded (cup) – pathognomonic
JOINT SPACE NARROWING – asymmetric distribution
BONE EROSIONS – "mouse ears" or "whiskering"
PERIOSTEAL REACTION – fluffy periostitis
ANKYLOSIS – joint fusion
DISTAL INTERPHALANGEAL (DIP) JOINT PREDILECTION – unlike RA
SACROILIITIS – bilateral asymmetric (unlike AS which is bilateral symmetric)

DIFFERENTIATION: PSORIATIC ARTHRITIS vs RHEUMATOID ARTHRITIS

Feature	Psoriatic Arthritis	Rheumatoid Arthritis
Distribution	Asymmetric, oligoarticular	Symmetric, polyarticular
Joint involvement	DIP joints affected	DIP spared, PIP/MCP
Enthesitis	Common	Rare
Dactylitis	"Sausage digits"	Rare
Skin/nail	Psoriasis present	Rheumatoid nodules
RF	Negative	Positive (80%)
X-ray	Pencil-in-cup, periostitis	Marginal erosions, uniform JSN

MANAGEMENT

TOPICAL: Corticosteroids, Vitamin D analogs (Calcipotriol), Coal tar, Dithranol
PHOTOTHERAPY: UVB, PUVA
SYSTEMIC: Methotrexate (first line), Cyclosporine, Acitretin

BIOLOGICS: TNF-α inhibitors (Adalimumab, Etanercept), IL-17 inhibitors (Secukinumab), IL-23 inhibitors
TREATMENT TARGET: PASI 75 (75% improvement in Psoriasis Area Severity Index)

STATION 11 – DERMATOLOGY STATIC

Shingles (Herpes Zoster) – Picture, Management & Complications

BLOCK N OSPE – DERMATOLOGY

CANDIDATE INSTRUCTIONS

8 minutes. Look at photograph of unilateral vesicular rash.
Identify diagnosis, discuss management, and state complications.

HIGH-YIELD CLINICAL FEATURES

UNILATERAL DERMATOMAL DISTRIBUTION – does not cross midline
PAINFUL VESICULAR RASH – grouped vesicles on erythematous base
PRODROME – pain, burning, paresthesia 2-3 days before rash
CRUSTING – 7-10 days, contagious until crusted
THORACIC DERMATOMES – most common (T3-L3)
OPHTHALMIC ZOSTER – V1 distribution (Hutchinson's sign)
RAMSAY HUNT SYNDROME – facial palsy + ear vesicles + hearing loss

SPECIAL SIGN: HUTCHINSON'S SIGN

VESICLES ON TIP OF NOSE – indicates nasociliary branch of V1 involvement
HIGH RISK OF OCULAR INVOLVEMENT – keratitis, uveitis, ophthalmoplegia
URGENT OPHTHALMOLOGY REFERRAL

MANAGEMENT

ANTIVIRALS (START WITHIN 72 HOURS):
– Acyclovir 800 mg 5× daily × 7-10 days
– Valacyclovir 1 g TID (better bioavailability)
– Famciclovir 500 mg TID
PAIN CONTROL:
– NSAIDs, Acetaminophen
– Neuropathic agents (Gabapentin, Pregabalin, TCAs)
– Opioids if severe
TOPICAL: Calamine, Burrow's solution, Silvadene for secondary infection
PREVENTION: Shingrix vaccine (recombinant zoster vaccine) for >50 years

COMPLICATIONS

POST-HERPETIC NEURALGIA (PHN) – most common, pain >90 days after rash, risk increases with age
DISSEMINATED ZOSTER – >20 vesicles outside primary dermatome, immunocompromised
OPHTHALMIC COMPLICATIONS – keratitis, scleritis, uveitis, acute retinal necrosis, vision loss
NEUROLOGIC – meningitis, encephalitis, myelitis, Guillain-Barré, stroke (VZV vasculopathy)
SKIN – secondary bacterial infection, scarring
MOTOR NEUROPATHY – segmental paresis

STATION 12 – DERMATOLOGY STATIC

Dermatomyositis & Polymyositis – Picture & Management

BLOCK N OSPE – DERMATOLOGY

CANDIDATE INSTRUCTIONS

8 minutes. Look at photographs showing characteristic rash and muscle weakness.
Identify conditions, differentiate them, and discuss management.

HIGH-YIELD CLINICAL FEATURES

HELIOTROPE RASH – violaceous eyelid rash with edema (pathognomonic for DM)
GOTTRON'S PAPULES – violaceous papules over MCP/PIP/PIP joints (DM)
SHAWL SIGN – erythema over shoulders, upper back, neck (DM)
V-SIGN – anterior neck and chest erythema (DM)
MECHANIC'S HANDS – hyperkeratotic fissured fingers (DM)
PROXIMAL MUSCLE WEAKNESS – symmetric, progressive (both PM and DM)
DYSPHAGIA – pharyngeal muscle involvement

SPECIAL SIGNS (PATHOGNOMONIC)

HELIOTROPE RASH – lilac discoloration of upper eyelids with periorbital edema
GOTTRON'S PAPULES – flat-topped violaceous papules over extensor surfaces of hand joints
GOTTRON'S SIGN – macular violaceous erythema over same areas
CALCINOSIS CUTIS – calcium deposits in skin (juvenile DM)

DIFFERENTIATION: DERMATOMYOSITIS vs POLYMYOSITIS

Feature	Dermatomyositis (DM)	Polymyositis (PM)
Skin rash	Present (heliotrope, Gottron's)	Absent
Age	Bimodal (children & adults)	Adults >30
Gender	Female predominance	Female predominance
Malignancy risk	High (ovarian, breast, lung, GI)	Moderate
Pathology	Perivascular inflammation, complement deposition	Endomysial inflammation, CD8+ T-cells
Anti-Jo-1	Common (antisynthetase syndrome)	Common

INVESTIGATIONS

CK (CREATINE KINASE) – elevated 5-50× normal
ALDOLASE – muscle-specific
AUTOANTIBODIES:
– Anti-Jo-1 (antisynthetase) – 20-30%, interstitial lung disease
– Anti-Mi-2 – DM-specific, good prognosis
– Anti-MDA5 – amyopathic DM, rapidly progressive ILD
– Anti-SRP – severe necrotizing myopathy
EMG – myopathic changes
MUSCLE BIOPSY – definitive
MRI – muscle edema
MALIGNANCY SCREENING – CT chest/abdomen/pelvis, mammography, tumor markers

MANAGEMENT

HIGH-DOSE CORTICOSTEROIDS – Prednisone 1 mg/kg/day, taper slowly
STEROID-SPARING: Methotrexate, Azathioprine, Mycophenolate
REFRACTORY: IVIG, Rituximab, Cyclophosphamide (if ILD)
SUN PROTECTION – photosensitive rash
PHYSIOTHERAPY – prevent contractures
MALIGNANCY SURVEILLANCE – annually for 3-5 years

STATION 13 – DERMATOLOGY STATIC

Urticaria – Recognition & Management

BLOCK N OSPE – DERMATOLOGY

CANDIDATE INSTRUCTIONS

8 minutes. Identify wheals/hives, discuss acute vs chronic, triggers, and treatment.
Recognize anaphylaxis features.

HIGH-YIELD FEATURES

WHEALS (HIVES) – raised, erythematous, pruritic, blanching
TRANSIENT – individual lesions <24 hours
ANGIOEDEMA – deeper dermal/subcutaneous swelling (lips, eyelids, genitals)
DERMOGRAPHISM – linear wheal after skin stroking
PRESSURE URTICARIA – delayed swelling after pressure
CHOLINERGIC URTICARIA – small papules with exercise/heat/stress

TRIGGERS

ACUTE (<6 WEEKS): Foods (nuts, shellfish, eggs), drugs (NSAIDs, antibiotics), infections, insect stings, latex
CHRONIC (>6 WEEKS): Autoimmune (anti-FcεRI), chronic idiopathic (CIU), thyroid disease, infections (H. pylori, hepatitis), physical stimuli

MANAGEMENT

H1 ANTIHISTAMINES – Cetirizine, Loratadine, Fexofenadine (up to 4× dose in chronic)
H2 BLOCKERS – Ranitidine (adjunct)
OMALIZUMAB – anti-IgE for chronic refractory
CYCLOSPORINE – refractory cases
CORTICOSTEROIDS – short course for severe acute only
EPINEPHRINE – anaphylaxis (0.3-0.5 mg IM)

STATION 14 – DERMATOLOGY STATIC

Skin Lesions – Primary & Secondary

BLOCK N OSPE – DERMATOLOGY

CANDIDATE INSTRUCTIONS

8 minutes. Identify and classify various skin lesions into primary and secondary.
Describe morphology accurately.

PRIMARY LESIONS (Initial, Unchanged)

MACULE – flat, <1 cm, color change only (freckle)
PATCH – flat, >1 cm (vitiligo, café-au-lait)
PAPULE – raised, solid, <1 cm (mole)
PLAQUE – raised, flat-topped, >1 cm (psoriasis)
NODULE – solid, deep, 0.5-2 cm (lipoma)
TUMOR – solid, deep, >2 cm
VESICLE – fluid-filled, <1 cm (herpes)
BULLA – fluid-filled, >1 cm (pemphigus)
PUSTULE – pus-filled (acne)
WHEAL – transient edema (urticaria)
CYST – encapsulated fluid (epidermoid)

SECONDARY LESIONS (Evolved, Traumatized)

SCALE – flake of keratin (dandruff, psoriasis)
CRUST – dried exudate (scab)
EROSION – superficial loss of epidermis (moist, heals without scar)
ULCER – full-thickness loss of epidermis + dermis (scars)
EXCORIATION – linear erosion from scratching
FISSURE – linear crack into dermis (cheilitis, tinea pedis)
LICHENIFICATION – thickened skin with accentuated markings (chronic eczema)
ATROPHY – thinning of skin (steroid use, aging)
SCAR – fibrous tissue replacement (keloid if extends beyond)
KELOID – hypertrophic scar beyond original wound
COMEDONE – plugged pilosebaceous unit (blackhead/whitehead)

STATION 15 – SURGERY INTERACTIVE

Burn Patient – Pre-operative Management

BLOCK N OSPE – SURGERY

CANDIDATE INSTRUCTIONS

8 minutes. Scenario: Patient with thermal burns.
Calculate burn size (BSA), determine depth/degree, calculate fluid requirements, and outline pre-operative preparation.

BURN DEGREE/DEPTH CLASSIFICATION

FIRST DEGREE (SUPERFICIAL) – epidermis only, erythema, pain, no blisters, heals 3-6 days (sunburn)
SECOND DEGREE (PARTIAL THICKNESS) – epidermis + dermis
– **Superficial partial:** pink, moist, blisters, blanching, very painful, heals 2-3 weeks
– **Deep partial:** white/red, dry, less pain, may need grafting
THIRD DEGREE (FULL THICKNESS) – entire skin depth + appendages, white/charred/leathery, painless (nerve destruction), requires grafting
FOURTH DEGREE – into muscle/bone

SPECIAL SIGN: ESCHAR

LEATHERY, INSENSATE, TIGHT TISSUE – circumferential burns act as tourniquet
ESCHAROTOMY – emergency release of constricting eschar on chest/limbs to prevent compartment syndrome/restrict ventilation

BSA CALCULATION (RULE OF NINES)

ADULT:
– Head 9%, Each arm 9%, Each leg 18%, Anterior trunk 18%, Posterior trunk 18%, Perineum 1%
CHILD (MODIFIED):
– Head 18%, Each leg 14% (larger head, smaller legs)
PALMAR METHOD: Patient's palm (including fingers) = 1% BSA
LUND-BROWDER CHART – most accurate for children

FLUID RESUSCITATION (PARKLAND FORMULA)

FORMULA: 4 mL × weight (kg) × %TBSA burned
ADMINISTRATION:
– 1/2 in first 8 hours (from time of burn, not admission)
– 1/2 in next 16 hours
PLUS MAINTENANCE FLUIDS (especially children)
EXAMPLE: 70 kg, 40% burn = 11,200 mL total
– 5,600 mL in first 8 hours = 700 mL/hr
– 5,600 mL in next 16 hours = 350 mL/hr
MONITOR: Urine output 0.5-1 mL/kg/hr (adults), 1-2 mL/kg/hr (children)

PRE-OPERATIVE MANAGEMENT

AIRWAY – Intubate if inhalation injury, facial burns, or anticipated massive resuscitation
BREATHING – 100% O2, CO monitoring, chest escharotomy if restrictive
CIRCULATION – 2 large-bore IVs, Foley catheter, arterial line
ESCHAROTOMY – if circumferential limbs/chest
TETANUS PROPHYLAXIS
PAIN CONTROL – IV opioids (avoid IM/subcutaneous in shock)
NUTRITION – Early NG feeding (hypermetabolic state)
TEMPERATURE CONTROL – warm environment (loss of thermoregulation)
LABS – CBC, electrolytes, creatinine, BUN, glucose, ABG, carboxyhemoglobin, type & cross

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STATION 16 – MEDICINE INTERACTIVE

SLE (Systemic Lupus Erythematosus) – GPE & Facial Findings

BLOCK N OSPE – MEDICINE

CANDIDATE INSTRUCTIONS

8 minutes. Look at photograph of female face with characteristic rash.
Perform GPE focusing on SLE manifestations, identify facial findings, and state investigations.

HIGH-YIELD GPE FINDINGS

Malar Rash – butterfly erythema over cheeks and bridge of nose, spares nasolabial folds
Discoid Rash – scarring, photosensitive plaques
Photosensitivity
Oral/Nasal Ulcers – painless
Alopecia – non-scarring, patchy
Raynaud's Phenomenon – triphasic color change
Arthritis – non-erosive, symmetric
Serositis – pleural/pericardial rub
Neurological – psychosis, seizures
Renal – hypertension, edema, active urine sediment

SPECIAL SIGNS

Malar/Butterfly Rash – flat or raised erythema, photosensitive, spares nasolabial folds (vs dermatomyositis which involves them)
DISCORD LUPUS – scarring, hyperpigmented, follicular plugging, atrophy
LIVEDO RETICULARIS – net-like pattern, associated with antiphospholipid syndrome
LIBMAN-SACKS ENDOCARDITIS – vegetations on both sides of valve (verrucous)

INVESTIGATIONS

ANA – sensitive (>95%) but not specific
Anti-dsDNA – specific (95%), correlates with disease activity/nephritis
Anti-Smith (Sm) – specific (99%), not activity
Antiphospholipid antibodies – lupus anticoagulant, anti-cardiolipin, β2-glycoprotein I
Complement levels – C3, C4 low during flares
ESR/CRP – ESR elevated, CRP may be normal (unless serositis/infection)
Urinalysis – proteinuria, active sediment (RBC casts)
Renal biopsy – classify lupus nephritis (ISN/RPS)
CBC – anemia, leukopenia, thrombocytopenia
Coombs test – hemolytic anemia

TREATMENT

SUN PROTECTION – essential
ANTIMALARIALS – Hydroxychloroquine (all patients, reduces flares)
CORTICOSTEROIDS – flares (0.5-1 mg/kg)
IMMUNOSUPPRESSANTS:
– Mycophenolate mofetil (lupus nephritis)
– Cyclophosphamide (severe nephritis/CNS)
– Azathioprine (maintenance)
BIOLOGICS – Belimumab (anti-BLyS)
ANTICOAGULATION – if antiphospholipid syndrome

STATION 17 – MEDICINE INTERACTIVE

Rheumatoid Arthritis – Hand Examination & Diagnosis

BLOCK N OSPE – MEDICINE

CANDIDATE INSTRUCTIONS

8 minutes. Perform hand examination on patient with rheumatoid arthritis.
Identify characteristic deformities, differentiate from osteoarthritis, discuss investigations and treatment.

HIGH-YIELD HAND DEFORMITIES (SPECIAL SIGNS)

SWAN NECK DEFORMITY – PIP hyperextension + DIP flexion (most common)
BOUTONNIÈRE DEFORMITY – PIP flexion + DIP hyperextension (central slip rupture)
ULNAR DEVIATION – metacarpal drift ulnarly at MCP joints
Z-DEFORMITY OF THUMB – IP flexion, MCP hyperextension
BOUTONNIÈRE vs **SWAN NECK** – know the difference!
RHEUMATOID NODULES – extensor surfaces (elbow, forearm), subcutaneous
SPINDLE-SHAPED SWELLING – PIP joints (symmetric)
DORSAL SUBLUXATION – ulnar styloid, "piano key" movement

SPECIAL SIGNS TO DEMONSTRATE

SWAN NECK – "Neck of swan" appearance from PIP hyperextension
BOUTONNIÈRE – "Buttonhole" appearance from PIP protruding through extensor hood
ULNAR DEVIATION – fingers point toward ulna when MCP flexed
RHEUMATOID NODULES – firm, non-tender, over pressure points

DIFFERENTIATION: RA vs OSTEOARTHRITIS

Feature	Rheumatoid Arthritis	Osteoarthritis
Pathology	Autoimmune synovitis	Degenerative cartilage loss
Distribution	Symmetric, MCP, PIP, wrist, MTP	Asymmetric, DIP, PIP, 1st CMC, knee, hip
Morning stiffness	>1 hour	<30 minutes
Swelling	Soft (synovial)	Hard (bony/osteophytes)
Deformities	Swan neck, boutonnière, ulnar deviation	Heberden's (DIP), Bouchard's (PIP) nodes
Systemic features	Fatigue, fever, weight loss, nodules	Absent
Inflammatory markers	ESR/CRP elevated	Normal
RF/ACPA	Positive	Negative
X-ray	Marginal erosions, uniform JSN, periarticular osteopenia	Osteophytes, asymmetric JSN, subchondral sclerosis

INVESTIGATIONS

RHEUMATOID FACTOR (RF) – 70-80% positive (not specific)
ANTI-CCP (ACPA) – 95% specific, early diagnosis
ESR/CRP – elevated, monitor disease activity
CBC – anemia of chronic disease, thrombocytosis
X-RAY HANDS/FEET – erosions, joint space narrowing, periarticular osteopenia
ULTRASOUND/MRI – synovitis, early erosions
SYNOVIAL FLUID – inflammatory (WBC 2000-50,000)

TREATMENT

TREAT-TO-TARGET – remission or low disease activity
DMARDs – Methotrexate (first line), Sulfasalazine, Leflunomide, Hydroxychloroquine
BIOLOGICS – TNF inhibitors (Adalimumab, Etanercept), IL-6 (Tocilizumab), Anti-CD20 (Rituximab), CTLA4-Ig (Abatacept)
JAK INHIBITORS – Tofacitinib, Baricitinib
CORTICOSTEROIDS – bridge therapy, intra-articular
NSAIDs – symptom control only
SURGERY – Synovectomy, joint replacement, tendon repair

STATION 18 – MEDICINE STATIC

Ankylosing Spondylitis – X-ray Identification & Treatment

BLOCK N OSPE – MEDICINE

CANDIDATE INSTRUCTIONS

8 minutes. Look at X-ray of spine/pelvis.
Identify condition, describe 2 key findings, and discuss treatment.

X-RAY FINDINGS (SPECIAL SIGNS)

BAMBOO SPINE – bridging syndesmophytes fuse vertebrae (late finding)
SQUARING OF VERTEBRAE – loss of normal concavity of anterior vertebral body
SHINY CORNERS (ROMANUS LESIONS) – sclerosis at vertebral corners (early)
SYNDESMOPHYTES – ossification of outer annulus fibrosus (vs osteophytes which are peripheral)
SACROILIITIS – bilateral, symmetric, erosions → sclerosis → fusion
DAGGER SIGN – single radiodense line from ossification of supraspinous and interspinous ligaments
TROLARD SIGN – ossification of interspinous ligaments
APOPHYSEAL JOINT FUSION

TWO KEY FINDINGS TO STATE

1. BAMBOO SPINE – complete fusion of vertebral bodies by syndesmophytes, loss of lumbar lordosis
2. SACROILIITIS – bilateral symmetric involvement (hallmark), "pseudo-widening" early, fusion late

CLINICAL FEATURES

INFLAMMATORY BACK PAIN – <40 years onset, insidious, >3 months, morning stiffness >30 min, improves with exercise not rest, nocturnal pain
LIMITED LUMBAR FLEXION – positive Schober's test
REDUCED CHEST EXPANSION – <5 cm at 4th intercostal space
PERIPHERAL ARTHRITIS – hips, shoulders (50%)
ENTHESITIS – Achilles, plantar fascia
UVEITIS – acute anterior, unilateral, recurrent
ASSOCIATIONS – HLA-B27 (90%), psoriasis, IBD, reactive arthritis

TREATMENT

EXERCISE – crucial (swimming, extension exercises)
PHYSIOTHERAPY – maintain posture, prevent fusion in flexed position
NSAIDs – first line, continuous use may slow radiographic progression
TNF INHIBITORS – Adalimumab, Etanercept, Infliximab (if NSAIDs fail)
IL-17 INHIBITORS – Secukinumab
DMARDs – Sulfasalazine (peripheral joints only, not axial)
SURGERY – Hip replacement, spinal osteotomy (rare)

STATION 19 – MEDICINE STATIC

Anemias – Macrocytic vs Microcytic Classification

BLOCK N OSPE – MEDICINE

CANDIDATE INSTRUCTIONS

8 minutes. Classify anemias based on MCV.
Discuss causes of macrocytic and microcytic anemias, and their investigations.

MICROCYTIC ANEMIA (MCV <80 fL)

TICS mnemonic:
T – Thalassemia
I – Iron deficiency
C – Chronic disease (anemia of chronic inflammation)
S – Sideroblastic anemia

IRON DEFICIENCY – most common, low ferritin, high TIBC, pencil cells
THALASSEMIA – normal/high ferritin, target cells, basophilic stippling, normal TIBC
DIFFERENTIATION – Mentzer Index (MCV/RBC): <13 thalassemia, >13 iron deficiency

MACROCYTIC ANEMIA (MCV >100 fL)

Megaloblastic (MCV often >110):
– **B12 DEFICIENCY**: Pernicious anemia (anti-intrinsic factor antibodies), gastrectomy, ileal disease, vegan diet
– **FOLATE DEFICIENCY**: Poor intake (alcoholics), increased demand (pregnancy, hemolysis), methotrexate

Non-megaloblastic (MCV 100-110):
– Liver disease
– Alcoholism
– Hypothyroidism
– Myelodysplastic syndrome
– Reticulocytosis (hemolysis/bleeding)
– Drugs (AZT, phenytoin)

SPECIAL SIGNS IN MEGALOBLASTIC ANEMIA

HYPERSEGMENTED NEUTROPHILS – >5 lobes (diagnostic)
PENCIL CELLS – iron deficiency
TARGET CELLS – thalassemia, liver disease
HOWELL-JOLLY BODIES – B12 deficiency, splenectomy
ROMANOWSKY EFFECT – macro-ovalocytes
B12 DEFICIENCY NEUROLOGICAL – subacute combined degeneration (posterior columns + lateral corticospinal tracts): loss of vibration/proprioception, ataxia, spasticity, dementia

INVESTIGATIONS

IRON STUDIES: Ferritin, Serum iron, TIBC, Transferrin saturation
HEMOGLOBIN ELECTROPHORESIS – thalassemia
B12 AND FOLATE LEVELS
ANTI-INTRINSIC FACTOR ANTIBODIES – pernicious anemia
SCHILLING TEST – B12 absorption (rarely done now)
BONE MARROW – megaloblastic changes (giant metamyelocytes, hypersegmented neutrophils)
MMA AND HOMOCYSTEINE – elevated in B12 deficiency (both), folate deficiency (homocysteine only)

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STATION 20 – MEDICINE STATIC

G6PD Deficiency – Recognition & Management

BLOCK N OSPE – MEDICINE

CANDIDATE INSTRUCTIONS

8 minutes. Scenario: Patient with acute hemolysis after fava bean ingestion or oxidative drug.
Identify diagnosis, discuss triggers, investigations, and management.

HIGH-YIELD FEATURES

X-LINKED RECESSIVE – males affected, females carriers
MOST COMMON ENZYME DEFICIENCY – 400 million worldwide
TYPES: African (milder), Mediterranean (severe), Asian (variable)
HEMOLYSIS TRIGGERED BY:
– **FAVA BEANS** (favism)
– **OXIDATIVE DRUGS**: Primaquine, Dapsone, Sulfonamides, Nitrofurantoin, Methylene blue, Naphthalene (mothballs)
– **INFECTIONS**
– **ACIDOSIS**

SPECIAL SIGN: BITE CELLS/DEGMACYTES

BITE CELLS – "bitten" appearance from removal of Heinz bodies by spleen
HEINZ BODIES – denatured hemoglobin (supravital stain, not visible on routine smear)
BLISTER CELLS – vacuolated RBCs

INVESTIGATIONS

CBC – anemia, reticulocytosis
PERIPHERAL SMEAR – bite cells, blister cells, Heinz bodies (supravital stain)
G6PD ASSAY – quantitative spectrophotometric analysis (false negative during acute hemolysis – wait 2-3 weeks)
HEMOGLOBINURIA – dark urine, hemosiderinuria
BILIRUBIN – unconjugated hyperbilirubinemia
HAPTOGLOBIN – low

MANAGEMENT

STOP OFFENDING AGENT
TRANSFUSION – if severe anemia/hemodynamic compromise
FOLIC ACID – supplementation
AVOID TRIGGERS – education crucial
NEWBORN SCREENING – in endemic areas
GENETIC COUNSELING

STATION 21 – MEDICINE STATIC

PNH (Paroxysmal Nocturnal Hemoglobinuria)

BLOCK N OSPE – MEDICINE

CANDIDATE INSTRUCTIONS

8 minutes. Scenario: Patient with hemolytic anemia, pancytopenia, and thrombosis.
Identify diagnosis, pathophysiology, and management.

HIGH-YIELD FEATURES

ACQUIRED CLONAL HEMATOPOIETIC STEM CELL DISORDER – PIGA gene mutation
DEFICIENCY OF GPI-ANCHORED PROTEINS – CD55 (DAF), CD59 (MIRL)
INTRAVASCULAR HEMOLYSIS – complement-mediated
CLASSIC TRIAD:
1. Hemolytic anemia
2. Pancytopenia (bone marrow failure)
3. Thrombosis (especially hepatic/Budd-Chiari, cerebral, mesenteric)

SPECIAL SIGN: NOCTURNAL HEMOGLOBINURIA

DARK URINE IN MORNING – hemoglobinuria worse at night (respiratory acidosis during sleep activates complement)
IRON DEFICIENCY – from chronic hemoglobinuria (iron loss in urine)

INVESTIGATIONS

FLOW CYTOMETRY – gold standard, deficiency of CD55 and CD59 on RBCs, WBCs, platelets
HAM'S TEST – acid hemolysis test (historical)
SUCROSE LYSIS TEST – screening (less specific)
LDH – elevated (intravascular hemolysis)
HEMOSIDERINURIA – iron-laden epithelial cells in urine
BONE MARROW – hypocellular to hypercellular, may show AA features

MANAGEMENT

ECULIZUMAB – anti-C5 monoclonal antibody, prevents hemolysis and thrombosis (standard of care)
RAVULIZUMAB – long-acting C5 inhibitor
PEGCETACOPLAN – C3 inhibitor (for extravascular hemolysis)
ANTICOAGULATION – for thrombosis, consider prophylaxis
IRON AND FOLATE SUPPLEMENTATION
TRANSFUSIONS – for severe anemia
ALLOGENEIC STEM CELL TRANSPLANT – only curative option
VACCINATION – against N. meningitidis, H. influenzae, S. pneumoniae (before eculizumab – increased infection risk)

STATION 22 – MEDICINE STATIC

Multiple Myeloma

BLOCK N OSPE – MEDICINE

CANDIDATE INSTRUCTIONS

8 minutes. Scenario: Elderly patient with bone pain, anemia, and renal failure.
Identify diagnosis, discuss CRAB features, investigations, and treatment.

HIGH-YIELD FEATURES (CRAB)

C – ↑ Calcium (hypercalcemia)
R – Renal insufficiency (myeloma kidney – light chain casts)
A – Anemia (bone marrow infiltration)
B – Bone lesions (lytic lesions, pathologic fractures)
PLUS:
RECURRENT INFECTIONS – hypogammaglobulinemia
HYPERVISCOSITY – IgA/IgM types, visual disturbances, bleeding
AMYLOIDOSIS – AL type, restrictive cardiomyopathy, nephrotic syndrome, macroglossia

SPECIAL SIGNS

ROULEAUX FORMATION – RBC stacking on peripheral smear (high protein)
PUNCHED-OUT LYTIC LESIONS – skull X-ray "raindrop skull"
PEPPER-POT SKULL – multiple small lytic lesions
SPINAL CORD COMPRESSION – emergency, from vertebral collapse
BENCE JONES PROTEINURIA – free light chains in urine

INVESTIGATIONS

SERUM PROTEIN ELECTROPHORESIS (SPEP) – M-spike (monoclonal gammopathy)
URINE PROTEIN ELECTROPHORESIS (UPEP) – Bence Jones protein
SERUM FREE LIGHT CHAINS – kappa/lambda ratio (>100 or <0.01)
BONE MARROW BIOPSY – >10% clonal plasma cells
SKELETAL SURVEY – lytic lesions (CT/PET more sensitive)
MRI – spinal cord compression, smoldering myeloma
BETA-2 MICROGLOBULIN AND ALBUMIN – staging (ISS/R-ISS)
CYTOGENETICS/FISH – t(4;14), t(14;16), del(17p) – high risk

TREATMENT

AUTOLOGOUS STEM CELL TRANSPLANT – eligible patients
INDUCTION – Bortezomib + Lenalidomide + Dexamethasone (VRd)
MAINTENANCE – Lenalidomide
BISPHOSPHONATES – Zoledronic acid (reduce skeletal events)
RADIATION – for solitary plasmacytoma or pain control
SUPPORTIVE:
– Erythropoietin for anemia
– Prophylactic antibiotics
– Hydration for renal protection
– Spinal cord compression → high-dose steroids + radiation
RELAPSED/REFRACTORY – Daratumumab (anti-CD38), Carfilzomib, Pomalidomide, Selinexor

STATION 23 – MEDICINE STATIC

Sickle Cell Anemia

BLOCK N OSPE – MEDICINE

CANDIDATE INSTRUCTIONS

8 minutes. Scenario: African patient with painful crisis, anemia, and splenomegaly in childhood (autosplenectomy later).
Discuss pathophysiology, complications, and management.

HIGH-YIELD FEATURES

AUTOSOMAL RECESSIVE – Glu6Val mutation in β-globin (E6V)
SICKLING – low O2, acidosis, dehydration → HbS polymerization → sickle shape
VASO-OCCLUSIVE CRISIS – painful, ischemia
HEMOLYSIS – chronic extravascular
FUNCTIONAL ASPLENIA – autosplenectomy by age 5 (Howell-Jolly bodies)
HYDROXYUREA – increases HbF, reduces crises

SPECIAL SIGNS

DACTYLITIS (HAND-FOOT SYNDROME) – first manifestation in infants, symmetric swelling
HOWELL-JOLLY BODIES – nuclear remnants in RBCs (hyposplenism)
TARGET CELLS – codocytes
SICKLE CELLS – drepanocytes (sickle-shaped)
PRIAPISM – prolonged painful erection
AVASCULAR NECROSIS – femoral head (harp sign on X-ray)

COMPLICATIONS

PAINFUL VASO-OCCLUSIVE CRISIS – most common
ACUTE CHEST SYNDROME – fever, chest pain, hypoxia, infiltrate (leading cause of death)
STROKE – children (screen with TCD)
SPLENIC SEQUESTRATION – sudden splenic enlargement, hypovolemia
APLASTIC CRISIS – parvovirus B19
HEMOLYTIC CRISIS
INFECTIONS – encapsulated organisms (Strep pneumoniae, Hib, N. meningitidis)
PULMONARY HYPERTENSION
LEG ULCERS
GALLSTONES – pigment stones

MANAGEMENT

HYDRATION – aggressive IV fluids
OXYGEN – if hypoxic
ANALGESIA – opioids (patient-controlled)
ANTIBIOTICS – if infection suspected
TRANSFUSION – simple or exchange (stroke prevention, acute chest, priapism)
HYDROXYUREA – increases HbF, reduces crises, hospitalizations, transfusion needs
L-GLUTAMINE – reduces oxidative stress
Crizanlizumab – anti-P-selectin, reduces crises
Voxelotor – HbS polymerization inhibitor
GENE THERAPY – emerging curative options
PREVENTION:
– Penicillin prophylaxis (birth-5 years)
– Pneumococcal/Hib/Meningococcal vaccines
– Folic acid
– Avoid triggers (cold, dehydration, altitude)

STATION 24 – MEDICINE INTERACTIVE

Leukemia & Lymphoma Scenario – Differential & Treatment

BLOCK N OSPE – MEDICINE

CANDIDATE INSTRUCTIONS

8 minutes. Scenario: Patient with generalized lymphadenopathy, fever, night sweats, weight loss.
Give differentials for Hodgkin vs non-Hodgkin lymphoma, discuss investigations and treatment.

DIFFERENTIAL DIAGNOSIS (GENERALIZED LYMPHADENOPATHY)

MALIGNANT:
– Hodgkin Lymphoma (HL)
– Non-Hodgkin Lymphoma (NHL)
– Chronic Lymphocytic Leukemia (CLL)
– Acute Leukemia (ALL/AML)
– Metastatic carcinoma

INFECTIOUS:
– Infectious mononucleosis (EBV)
– CMV, HIV, Toxoplasmosis
– Tuberculosis
– Secondary syphilis

AUTOIMMUNE:
– SLE
– Rheumatoid arthritis (Felty syndrome)
– Sarcoidosis

OTHER:
– Drug reaction (phenytoin)
– Castleman disease
– Storage diseases (Gaucher)

HODGKIN LYMPHOMA vs NHL

Feature	Hodgkin Lymphoma	Non-Hodgkin Lymphoma
Age	Bimodal (15-35, >50)	Median 65
Presentation	Contiguous spread	Non-contiguous, extranodal
Mediastinal mass	Common	Less common
Constitutional B symptoms	40%	Variable
Pruritus, alcohol pain	Characteristic	Rare
Reed-Sternberg cells	Present (CD15+, CD30+)	Absent
Inflammatory background	Rich	Variable
EBV association	50%	Some subtypes (Burkitt)
Cure rate	High (>80%)	Variable

INVESTIGATIONS

EXCISIONAL LYMPH NODE BIOPSY – gold standard (not FNA)
IMMUNOHISTOCHEMISTRY – CD30, CD15, PAX5, CD20, CD3
BONE MARROW BIOPSY – staging
PET-CT – staging, response assessment
CBC, LDH, ESR – prognostic
HIV, Hepatitis B/C – before chemotherapy

TREATMENT (HODGKIN LYMPHOMA)

EARLY STAGE (I-II): ABVD × 2-4 cycles + involved site radiation
ADVANCED STAGE (III-IV): ABVD × 6 cycles (or escalated BEACOPP)
ABVD REGIMEN:
– A – Adriamycin (Doxorubicin)
– B – Bleomycin
– V – Vinblastine
– D – Dacarbazine
RELAPSED/REFRACTORY: High-dose chemotherapy + autologous stem cell transplant, Brentuximab vedotin, Pembrolizumab/Nivolumab (PD-1 inhibitors)

STATION 25 – MEDICINE INTERACTIVE

Anesthesia Fitness Assessment – Diabetic & Hypertensive Patient

BLOCK N OSPE – MEDICINE

CANDIDATE INSTRUCTIONS

8 minutes. Scenario: Patient with diabetes and hypertension scheduled for surgery.
Take focused history to assess fitness for anesthesia. Identify key risk factors and optimization strategies.

HIGH-YIELD HISTORY POINTS

DIABETES HISTORY:
– Type 1 or 2, duration, current treatment (insulin/oral)
– Recent HbA1c (target <7-8% for elective surgery)
– Hypoglycemia episodes/awareness
– Complications: Retinopathy, nephropathy (creatinine/eGFR), neuropathy (autonomic), CAD/PVD
– Current glucose control (fasting and random levels)

HYPERTENSION HISTORY:
– Duration, severity, current medications
– End-organ damage: LVH, CKD, retinopathy, stroke/TIA
– Control (home BP readings)
– Target <140/90 (or <130/80 if high risk)

CARDIAC RISK:
– Exercise tolerance (METs), angina, dyspnea, orthopnea
– Prior MI, stents, CABG, valve disease
– Heart failure

AIRWAY ASSESSMENT:
– Mallampati score, thyromental distance, neck mobility
– Obesity/OSA (diabetes association)

OTHER:
– Anticoagulants/antiplatelets
– Allergies
– Previous anesthesia complications
– Smoking/alcohol

CRITICAL PRE-OP OPTIMIZATION

GLUCOSE MANAGEMENT:
– Target 80-180 mg/dL perioperatively
– Hold metformin 48 hours if using contrast or if eGFR <30
– Hold SGLT2 inhibitors 3 days before (euglycemic DKA risk)
– Insulin: Reduce long-acting by 20-25% night before, hold short-acting morning of surgery
– Check glucose q1-2h perioperatively

HYPERTENSION:
– Continue beta-blockers (don't withdraw)
– Continue ACE-I/ARB if stable, may hold morning of if concern for hypotension
– Optimize if BP >180/110 (delay elective)

CARDIAC:
– Consider stress testing if high risk + poor functional capacity
– Continue aspirin for cardiac stents, discuss anticoagulation

ASA PHYSICAL STATUS CLASSIFICATION

ASA I – Healthy
ASA II – Mild systemic disease (controlled DM/HTN)
ASA III – Severe systemic disease (uncontrolled DM, angina, prior MI)

ASA IV – Severe systemic disease constant threat to life
ASA V – Moribund
E – Emergency (added to any)

STATION 26 – MEDICINE STATIC

Blood Disorder Classification – Platelets vs Coagulation Factors

BLOCK N OSPE – MEDICINE

CANDIDATE INSTRUCTIONS

8 minutes. Classify bleeding disorders into platelet-related and coagulation factor-related.
Discuss clinical differentiation and key investigations.

PLATELET DISORDERS (PRIMARY HEMOSTASIS)

THROMBOCYTOPENIA:
– Decreased production: Aplastic anemia, leukemia, megaloblastic, marrow infiltration
– Increased destruction: ITP, TTP, HUS, DIC, drug-induced, infection
– Sequestration: Hypersplenism

PLATELET DYSFUNCTION:
– Congenital: von Willebrand disease (also factor-related), Glanzmann thrombasthenia, Bernard-Soulier
– Acquired: Uremia, aspirin/NSAIDs, myeloproliferative disorders

CLINICAL FEATURES:
– **PETECHIAE** – pathognomonic
– **PURPURA, ECCHYMOSIS** – superficial
– **MUCOSAL BLEEDING** – epistaxis, gingival, menorrhagia
– **IMMEDIATE BLEEDING** after trauma
– **HEMARTHROSIS RARE**

COAGULATION FACTOR DISORDERS (SECONDARY HEMOSTASIS)

HEREDITARY:
– Hemophilia A (FVIII)
– Hemophilia B (FIX)
– von Willebrand disease (vWF)

ACQUIRED:
– Vitamin K deficiency (II, VII, IX, X)
– Liver disease (all factors except VIII)
– DIC (consumption)
– Anticoagulants (warfarin, heparin, DOACs)

CLINICAL FEATURES:
– **DEEP TISSUE BLEEDING**
– **HEMARTHROSIS** – hallmark
– **MUSCLE HEMATOMAS**
– **RETROPERITONEAL BLEED**
– **DELAYED BLEEDING** after trauma/surgery
– **PETECHIAE RARE**

DIFFERENTIATION TABLE

Feature	Platelet Disorder	Coagulation Disorder
Petechiae	Yes (characteristic)	No
Superficial bruising	Common	Uncommon
Deep hematomas	Rare	Common
Hemarthrosis	Rare	Characteristic
Mucosal bleeding	Common	Less common
Bleeding after cuts	Immediate, prolonged	Delayed

Feature	Platelet Disorder	Coagulation Disorder
BT	Prolonged	Normal
PT	Normal	Prolonged (extrinsic/common)
aPTT	Normal	Prolonged (intrinsic/common)
Platelet count	Low/abnormal function	Normal

INVESTIGATIONS

SCREENING TESTS:
– Platelet count
– PT (extrinsic pathway – VII)
– aPTT (intrinsic pathway – XII, XI, IX, VIII)
– Fibrinogen
– Bleeding time (rarely used now)

MIXING STUDY – distinguishes factor deficiency from inhibitor
FACTOR ASSAYS – specific levels
VWF LEVELS – antigen, activity (ristocetin cofactor), multimers

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STATION 27 – ORTHOPEDICS INTERACTIVE

Rheumatoid Hand Examination

BLOCK N OSPE – ORTHOPEDICS

CANDIDATE INSTRUCTIONS

8 minutes. Perform systematic hand examination on patient with rheumatoid arthritis.
Identify specific deformities and differentiate from osteoarthritis.

EXAMINATION SEQUENCE

INSPECTION:
– Symmetry (RA is symmetric)
– Swelling (spindle-shaped at PIP)
– Skin (nodules, atrophy, steroid effects)
– Deformities (ulnar deviation, swan neck, boutonnière)

PALPATION:
– Temperature (warm in active disease)
– Synovial thickening (boggy, doughy)
– Tenderness at MCP, PIP, wrist
– Ulnar styloid (piano key sign)

MOVEMENT:
– Range of motion (active and passive)
– Grip strength
– Function (button test, pencil test)

SPECIAL TESTS/SIGNS

PIANO KEY SIGN – dorsal subluxation of ulnar styloid, moves up and down like piano key
BOOK TEST – inability to hold book between palms with extended fingers (indicates MCP involvement)
TABLETOP TEST – inability to lay hand flat on table (indicates advanced disease)
SWAN NECK – PIP hyperextension, DIP flexion
BOUTONNIÈRE – PIP flexion, DIP hyperextension (central slip rupture)
Z-DEFORMITY OF THUMB – IP flexion, MCP hyperextension, adduction

DIFFERENTIATION: RA vs OA

DISTRIBUTION:
– RA: MCP, PIP, wrist, MTP (symmetric)
– OA: DIP (Heberden's), PIP (Bouchard's), 1st CMC, knee, hip (asymmetric)

DEFORMITIES:
– RA: Ulnar deviation, swan neck, boutonnière, subluxation
– OA: Bony enlargement, angulation, no subluxation

INFLAMMATION:
– RA: Synovitis, prolonged morning stiffness
– OA: Minimal, brief stiffness

NODES:
– RA: Subcutaneous nodules (extensor surfaces)
– OA: Bouchard's (PIP), Heberden's (DIP) – bony osteophytes

STATION 28 – ORTHOPEDICS INTERACTIVE

Knee Examination

BLOCK N OSPE – ORTHOPEDICS

CANDIDATE INSTRUCTIONS

8 minutes. Perform complete knee examination including inspection, palpation, movement, and special tests.
Identify common pathologies.

EXAMINATION SEQUENCE

INSPECTION (standing, walking, supine):
– Gait (antalgic, varus, valgus)
– Swelling (effusion, synovial thickening)
– Quadriceps wasting (chronic pathology)
– Scars, sinuses, skin changes
– Alignment (varus/valgus deformity)

PALPATION:
– Temperature
– Tenderness: Joint line, patella, tibial tuberosity, collateral ligaments
– Effusion: Bulge test, patellar tap
– Popliteal fossa (Baker's cyst)

MOVEMENT:
– Flexion (0-135°)
– Extension (0°, hyperextension 5-10°)
– Fixed flexion deformity

SPECIAL TESTS: See below

SPECIAL TESTS (CRITICAL)

EFFUSION TESTS:
– **Bulge test**: Milk fluid from medial to lateral, tap lateral → bulge medially (small effusion)
– **Patellar tap**: Push patella down onto femur → tapping sensation (large effusion)

LIGAMENT STABILITY:
– **Collateral ligaments**: Apply varus/valgus stress at 0° and 30° flexion
– **Anterior drawer**: 90° flexion, pull tibia forward (ACL)
– **Posterior drawer**: Push tibia backward (PCL)
– **Lachman test**: 20-30° flexion, pull tibia forward (most sensitive for ACL)
– **Pivot shift**: Flexion with valgus and internal rotation → subluxation reduces (ACL tear)

MENISCAL TESTS:
– **McMurray's test**: Flex fully, rotate tibia, extend → pain/click (meniscal tear)
– **Apley's grind test**: Prone, knee flexed 90°, compress and rotate
– **Thessaly test**: Standing on one leg, flex 20°, rotate

PATELLOFEMORAL:
– **Patellar grind**: Push patella into femur while contracting quads
– **Apprehension test**: Lateral displacement → patient apprehension (instability)

COMMON PATHOLOGIES

OSTEOARTHRITIS – Pain on weight-bearing, reduced ROM, crepitus, varus deformity
RHEUMATOID ARTHRITIS – Synovitis, effusion, symmetric, valgus deformity
MENISCAL TEAR – Joint line pain, locking, giving way, positive McMurray's
ACL TEAR – Instability, positive Lachman/drawer/pivot shift, hemarthrosis
PCL TEAR – Posterior sag, positive posterior drawer
PATELLOFEMORAL PAIN – Anterior knee pain, stairs, grind test positive

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STATION 29 – ORTHOPEDICS INTERACTIVE

Shoulder Examination

BLOCK N OSPE – ORTHOPEDICS

CANDIDATE INSTRUCTIONS

8 minutes. Perform complete shoulder examination including rotator cuff assessment and special tests.

EXAMINATION SEQUENCE

INSPECTION:
– Wasting (supraspinatus, deltoid, spinati)
– Scars, deformity, swelling
– Scapular position (winging)

PALPATION:
– AC joint, sternoclavicular joint
– Subacromial space
– Bicipital groove
– Greater/lesser tuberosity

MOVEMENT:
– Active vs passive ROM
– Forward flexion (0-180°), Abduction (0-180°)
– External rotation (0-90°), Internal rotation (T10-L5)
– Painful arc (60-120° abduction – impingement)

SPECIAL TESTS: See below

SPECIAL TESTS (CRITICAL)

IMPINGEMENT TESTS:
– **Neer's test**: Force flexion while stabilizing scapula → pain (impingement)
– **Hawkins-Kennedy**: Flex 90°, internally rotate → pain (subacromial impingement)
– **Empty can test**: Abduct 90°, forward flex 30°, thumb down → resist abduction (supraspinatus)

ROTATOR CUFF:
– **Drop arm test**: Abduct to 90°, patient unable to hold (supraspinatus tear)
– **External rotation lag sign**: Elbow at side, externally rotate 20°, patient can't hold (infraspinatus)
– **Lift-off test**: Hand behind back, push away from back (subscapularis)
– **Belly-press test**: Hand on belly, press inward (subscapularis)

INSTABILITY:
– **Apprehension test**: Abduct 90°, externally rotate → apprehension (anterior instability)
– **Relocation test**: Posterior force relieves apprehension
– **Sulcus sign**: Inferior traction → sulcus below acromion (inferior instability)

BICEPS:
– **Speed's test**: Resisted forward flexion with supinated arm → pain (bicipital tendinitis)
– **Yergason's test**: Elbow flexed 90°, resisted supination → pain (biceps tendon)

STATION 30 – ORTHOPEDICS INTERACTIVE

Any Joint Examination (Generic Approach)

BLOCK N OSPE – ORTHOPEDICS

CANDIDATE INSTRUCTIONS

8 minutes. Demonstrate systematic examination of any joint (hip, ankle, elbow, wrist).
Apply Look, Feel, Move, Special tests framework.

GENERIC JOINT EXAMINATION FRAMEWORK

1. LOOK (INSPECTION):
– Gait (if lower limb)
– Skin (scars, rashes, swelling, erythema)
– Muscle wasting
– Deformity (alignment, position)
– Functional assessment

2. FEEL (PALPATION):
– Temperature (back of hand)
– Tenderness (systematic, anatomical landmarks)
– Swelling (effusion, synovium, bony)
– Crepitus
– Stability (collateral ligaments)

3. MOVE (RANGE OF MOTION):
– Active (patient moves)
– Passive (examiner moves)
– Compare sides
– Note pain, restriction, end-feel (hard, soft, springy)

4. SPECIAL TESTS:
– Specific to joint (see below)
– Neurovascular assessment (distal to joint)

SPECIFIC JOINT HIGHLIGHTS

HIP:
– Thomas test (fixed flexion deformity)
– Trendelenburg test (abductor weakness)
– FABER/Patrick's

SPECIFIC JOINT HIGHLIGHTS (DETAILED)

HIP EXAMINATION:
– **Inspection:** Gait (Trendelenburg/antalgic), leg length, scars, muscle wasting (gluteals, quadriceps)
– **Palpation:** Greater trochanter (bursitis), groin (hernia, lymph nodes), sciatic nerve
– **Movement:** Flexion (0-120°), Extension (0-15°), Abduction (0-45°), Adduction (0-30°), Internal rotation (0-35°), External rotation (0-45°)
– **Thomas Test:** Flex one hip fully → opposite hip flexes if fixed flexion deformity present
– **Trendelenburg Test:** Stand on affected leg → pelvis drops on opposite side (gluteus medius weakness)
– **FABER/Patrick's Test:** Flexion, ABduction, External Rotation → pain suggests hip or SI joint pathology
– **Leg Length:** True (ASIS to medial malleolus) vs Apparent (umbilicus to medial malleolus)

ANKLE/FOOT EXAMINATION:
– **Inspection:** Alignment (varus/valgus), arches (flat foot/cavus), deformities (hallux valgus, claw toes), skin (corns, calluses, ulcers)
– **Palpation:** Medial/lateral malleoli, Achilles tendon, tarsal tunnel, navicular, 5th metatarsal base, MTP joints
– **Movement:** Dorsiflexion (0-20°), Plantarflexion (0-45°), Inversion (0-35°), Eversion (0-15°)
– **Thompson Test:** Squeeze calf → no plantarflexion = Achilles rupture
– **Anterior Drawer:** Ankle instability (anterior talofibular ligament)
– **Talar Tilt:** Inversion stress → calcaneofibular ligament
– **Windlass Test:** Passive dorsiflexion of great toe → pain in plantar fascia (plantar fasciitis)
– **Tinel's Sign:** Tap tarsal tunnel → paresthesia (tarsal tunnel syndrome)

ELBOW EXAMINATION:
– **Inspection:** Carrying angle (5-15° valgus in females, 5-10° in males), swelling (effusion vs olecranon bursitis), deformity

– **Palpation:** Olecranon, medial/lateral epicondyles (golfer's/tennis elbow), radial head, ulnar nerve (cubital tunnel)
– **Movement:** Flexion (0-150°), Extension (0°), Pronation (0-90°), Supination (0-90°)
– **Valgus Stress Test:** 0° and 30° flexion → medial collateral ligament
– **Varus Stress Test:** Lateral collateral ligament
– **Mills Test:** Extend elbow, pronate, flex wrist → lateral epicondyle pain (tennis elbow)
– **Cozen's Test:** Resisted wrist extension with elbow extended → tennis elbow
– **Tinel's at Elbow:** Ulnar nerve compression (cubital tunnel)

WRIST EXAMINATION:
– **Inspection:** Swelling (dorsal/volar), deformity (dinner fork - Colles), muscle wasting (thenar/hypothenar)
– **Palpation:** Anatomical snuffbox (scaphoid), distal radius/ulna, carpal bones, pisiform, hook of hamate
– **Movement:** Flexion (0-80°), Extension (0-70°), Radial deviation (0-20°), Ulnar deviation (0-30°)
– **Finkelstein's Test:** Thumb in fist, ulnar deviation → pain over 1st dorsal compartment (De Quervain's tenosynovitis)
– **Phalen's Test:** Maximal wrist flexion 60 seconds → paresthesia (carpal tunnel syndrome)
– **Tinel's at Wrist:** Tap carpal tunnel → median nerve paresthesia
– **Allen Test:** Occlude radial and ulnar arteries, release one at a time → assess collateral circulation
– **Watson's Test (Scaphoid Shift):** Pressure on scaphoid tubercle, ulnar deviation → clunk (scapholunate instability)

NEUROVASCULAR ASSESSMENT

MOTOR: Test muscles innervated by nerves crossing the joint
SENSORY: Dermatomes and peripheral nerves distal to joint
CAPILLARY REFILL: <2 seconds
PULSES: Distal to joint
COMPARTMENT SYNDROME CHECK: Pain out of proportion, pain on passive stretch, paresthesia, pallor, pulselessness, paralysis (late)

STATION 31 – ORTHOPEDICS STATIC

Neck of Femur Fracture – X-ray & Management

BLOCK N OSPE – ORTHOPEDICS

CANDIDATE INSTRUCTIONS

8 minutes. Look at X-ray of hip in elderly patient post-fall.
Identify fracture type (intracapsular vs extracapsular), classify, and discuss management options.

ANATOMY & CLASSIFICATION

INTRACAPSULAR (SUBCAPITAL/TRANSCERVICAL/BASICERVICAL):
– Within hip joint capsule
– Disrupts retinacular blood supply (medial/lateral circumflex femoral arteries)
– High risk of avascular necrosis (AVN) and non-union
– **Garden Classification:**
I: Incomplete/impacted valgus
II: Complete, undisplaced
III: Complete, partially displaced
IV: Complete, fully displaced

EXTRACAPSULAR (INTERTROCHANTERIC/SUBTROCHANTERIC):
– Outside joint capsule
– Better blood supply → lower AVN risk
– **Evans/Jensen Classification:** Stable vs unstable (reverse obliquity)
– **AO/OTA Classification:** 31-A1 (stable), A2 (unstable), A3 (subtrochanteric)

SPECIAL SIGNS & CLINICAL FEATURES

SHORTENED, EXTERNALLY ROTATED LEG – classic presentation (iliopsoas unopposed)
SHETLAND'S PONY SIGN – apparent lengthening in impacted fractures (rare)
UPWARD Gaze SIGN – patella points upward due to external rotation

BRYANT'S TRIANGLE – altered in hip pathology (anterior superior iliac spine, greater trochanter, 90° angle)
NELATON'S LINE – anterior superior iliac spine to ischial tuberosity should pass through greater trochanter
SHOEMAKER'S LINE – line from anterior superior iliac spine through greater trochanter should intersect umbilicus (normally) or above (hip pathology)

RADIOLOGICAL ASSESSMENT

X-RAY VIEWS: AP pelvis (compare sides), lateral hip, full length femur
LOOK FOR:
– Fracture line (subcapital, transcervical, basicervical, intertrochanteric)
– Displacement (Garden classification)
– Pauwels angle (angle of fracture line to horizontal):
I: <30° (stable)
II: 30-50°
III: >50° (unstable, shear forces)
– Cortical discontinuity
– Bone quality (osteoporosis)
– **Occult fracture:** MRI if X-ray negative, high clinical suspicion

MANAGEMENT

INTRACAPSULAR:
– **Young/active, undisplaced (Garden I/II):** Internal fixation with cannulated screws or sliding hip screw
– **Displaced in elderly (>65/70):** Hemiarthroplasty (unipolar/bipolar) or Total Hip Replacement (THR) if pre-existing arthritis/high activity
– **Displaced in young:** Urgent reduction and internal fixation (preserve femoral head)

EXTRACAPSULAR:
– **Sliding Hip Screw (SHS)** – Dynamic Hip Screw (DHS)
– **Intramedullary Nail** – Gamma nail, PFNA (proximal femoral nail antirotation) – better for unstable/reverse obliquity
– **Cephalomedullary nails** – for subtrochanteric extension

GENERAL PRINCIPLES:
– **Surgery within 24-48 hours** – reduces mortality, complications
– **Medical optimization** – correct anticoagulation, electrolytes, hydration
– **Thromboprophylaxis** – LMWH, mechanical
– **Rehabilitation** – early mobilization, weight-bearing as tolerated
– **Osteoporosis treatment** – bisphosphonates, calcium, vitamin D
– **Fall prevention**

COMPLICATIONS

AVASCULAR NECROSIS – 10-45% intracapsular, higher with displacement
NON-UNION – 10-30% intracapsular
IMPLANT FAILURE/CUT-OUT – poor reduction, osteoporosis
DEEP VEIN THROMBOSIS/PULMONARY EMBOLISM
INFECTION
DISLOCATION – hemiarthroplasty/THR
LEG LENGTH DISCREPANCY
MORTALITY – 10-30% at 1 year (medical complications)

STATION 32 – ORTHOPEDICS STATIC

Supracondylar Humerus Fracture – Management

BLOCK N OSPE – ORTHOPEDICS

CANDIDATE INSTRUCTIONS

8 minutes. Look at X-ray of child's elbow.
Identify supracondylar fracture, classify (Gartland), discuss emergency management and complications.

ANATOMY & EPIDEMIOLOGY

MOST COMMON ELBOW FRACTURE IN CHILDREN (60%)
AGE: 3-10 years (peak 5-7)
MECHANISM: Fall on outstretched hand (FOOSH)
– **Extension type (95%):** Distal fragment displaced posteriorly
– **Flexion type (5%):** Distal fragment displaced anteriorly
ANATOMICAL CONSIDERATIONS:
– Thin cortex, hypermobile joints
– Eight ossification centers (CRITOE: Capitellum, Radial head, Internal/medial epicondyle, Trochlea, Olecranon, External/lateral epicondyle)
– Brachial artery and median nerve anterior to fracture
– Radial and ulnar nerves also at risk

SPECIAL SIGNS & CLINICAL FEATURES

S-DEformity (SAGGING) – obvious deformity in displaced fractures
PAIN AND SWELLING – elbow region
REFUSAL TO MOVE ARM
POSTERIOR FAT PAD SIGN – visible on lateral X-ray (always abnormal, indicates hemarthrosis)
ANTERIOR FAT PAD SIGN – "sail sign" – may be normal but prominent in fracture
NEUROVASCULAR COMPROMISE – check radial pulse, capillary refill, median nerve function (anterior interosseous: OK sign), ulnar nerve, radial nerve

GARTLAND CLASSIFICATION

TYPE I: Undisplaced, intact posterior cortex
– Long-arm cast 3-4 weeks
– Close follow-up (risk of displacement)

TYPE II: Displaced, posterior cortex intact (hinge)
– Closed reduction, percutaneous pinning (CRPP) with K-wires
– Long-arm cast

TYPE III: Completely displaced, no cortical contact
– Urgent closed reduction and percutaneous pinning (CRPP)
– Open reduction if unstable/unreducible

TYPE IV (Added later): Unstable in flexion and extension (circumferential periosteal disruption)
– CRPP, often requires open reduction

EMERGENCY MANAGEMENT

ASSESS AIRWAY, BREATHING, CIRCULATION – rule out other injuries
NEUROVASCULAR ASSESSMENT – document pre-reduction status
IV ACCESS AND ANALGESIA – morphine, ketamine if needed
REDUCTION TECHNIQUE (Extension type):
– Traction in extension
– Counter-traction
– Flex elbow while maintaining traction (flexion beyond 90°)
– Pronate forearm (corrects medial/lateral displacement)

– Check pulse after reduction
PERCUTANEOUS PINNING – 2-3 lateral K-wires, or cross pins (medial and lateral)
POST-OPERATIVE:
– Long-arm cast with elbow flexed 90°
– Neurovascular monitoring
– Elevate to reduce swelling
– Pin removal 3-4 weeks
– Cast removal 4-6 weeks

COMPLICATIONS (CRITICAL)

IMMEDIATE/EARLY:
– **VOLKMANN'S ISCHEMIC CONTRACTURE** – compartment syndrome of forearm (brachial artery injury/spasm)
– **Median nerve injury** – anterior interosseous branch (OK sign weakness)
– **Radial nerve injury**
– **Ulnar nerve injury** – iatrogenic with medial pins
– **Compartment syndrome** – 5 Ps: Pain, Pallor, Pulselessness, Paresthesia, Paralysis (late)

LATE:
– **Cubitus varus (gunstock deformity)** – most common cosmetic complication
– **Cubitus valgus**
– **Elbow stiffness/loss of ROM**
– **Myositis ossificans** – heterotopic ossification
– **AVN of trochlea** – rare
– **Malunion**

VOLKMANN'S ISCHEMIC CONTRACTURE

PATHOPHYSIOLOGY: Brachial artery injury or spasm → forearm compartment ischemia → muscle necrosis → fibrosis → contracture
CLINICAL FEATURES:
– Severe pain (out of proportion)
– Pain on passive finger extension
– Swollen, tense forearm
– Decreased sensation
– Weak or absent pulse (late sign!)
MANAGEMENT: Emergency fasciotomy if compartment syndrome confirmed (compartment pressure >30 mmHg or within 30 mmHg of diastolic)
PREVENTION: Proper reduction, avoid hyperflexion (>100-110°), maintain perfusion

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STATION 33 – ORTHOPEDICS STATIC

RA Hand X-ray – Swan Neck Deformity & Ulnar Deviation

BLOCK N OSPE – ORTHOPEDICS

CANDIDATE INSTRUCTIONS

8 minutes. Look at X-ray of hands in patient with rheumatoid arthritis.
Identify specific deformities and radiological features.

RADIOLOGICAL FEATURES OF RA (DETAILED)

EARLY CHANGES:
– **Periarticular osteopenia** – earliest finding, around joints
– **Soft tissue swelling** – symmetric, fusiform
– **Joint space widening** – from effusion/synovitis
– **Marginal erosions** – bare areas (no cartilage), 2nd-3rd MCP, 3rd PIP, ulnar styloid
– **Subluxation** – early signs

LATE CHANGES:
– **Uniform joint space narrowing** – cartilage loss (vs OA which is asymmetric)
– **Central erosions**
– **Gross osteopenia**
– **Subluxations and dislocations**:
• **Swan neck deformity:** PIP hyperextension, DIP flexion
• **Boutonnière deformity:** PIP flexion, DIP hyperextension
• **Ulnar deviation:** MCP joints
• **Z-deformity of thumb:** IP flexion, MCP hyperextension
• **Volar subluxation:** MCP joints
– **Ankylosis** – late, fibrous or bony
– **Secondary osteoarthritis**

SPECIFIC DEFORMITIES ON X-RAY

SWAN NECK DEFORMITY:
– Lateral view: PIP joint hyperextended, DIP joint flexed
– AP view: PIP may appear normal or slightly flexed
– Mechanism: Intrinsic muscle tightness/tendon imbalance
– Function: Poor grip, difficulty flexing PIP

BOUTONNIÈRE DEFORMITY:
– PIP joint flexed (volar subluxation of lateral bands)
– DIP joint hyperextended (lateral bands dorsal to axis)
– Mechanism: Central slip rupture, triangular ligament disruption
– Early: Correctable, Late: Fixed

ULNAR DEVIATION:
– Metacarpal heads subluxated ulnarly
– Proximal phalanges deviated ulnarly at MCP joints
– Often with volar subluxation
– Mechanism: Synovitis stretches capsule, intrinsic tightness, extensor tendon displacement
– Radial deviation at wrist common accompaniment
– **Piano key sign** on clinical exam

DIFFERENTIATION FROM OSTEOARTHRITIS

Feature	Rheumatoid Arthritis	Osteoarthritis
Distribution	Symmetric, MCP, PIP, wrist	Asymmetric, DIP, PIP, 1st CMC
Osteopenia	Periarticular, generalized	Absent, subchondral sclerosis
Joint space	Uniform narrowing	Asymmetric narrowing

Feature	Rheumatoid Arthritis	Osteoarthritis
Erosions	Marginal, bare areas, central	Osteophytes, subchondral cysts
Deformities	Subluxation, ulnar deviation, swan neck	Bony enlargement, angulation
Soft tissue	Fusiform swelling	Minimal swelling
Alignment	Axial deviation	Maintained

STATION 34 – ORTHOPEDICS INTERACTIVE

Ortho Instruments – Identification & Uses

BLOCK N OSPE – ORTHOPEDICS

CANDIDATE INSTRUCTIONS

8 minutes. Identify common orthopedic instruments, state their uses, and demonstrate proper handling.

BASIC INSTRUMENTS

SCALPELS & DISSECTION:
– **#10 blade:** Large skin incisions
– **#11 blade:** Stab incisions, tendon release
– **#15 blade:** Precise dissection, hand surgery
– **#20 blade:** Amputations, large joints

RETRACTORS:
– **Langenbeck (Langenbeck retractor):** Self-retaining, sharp or blunt, superficial retraction
– **Hohmann retractor:** Bone lever, protects soft tissues, various sizes for different bones
– **Gelpi retractor:** Self-retaining, pointed tips, deep retraction
– **Weitlaner retractor:** Self-retaining, ratchet, superficial to medium
– **Charnley retractor:** Hip surgery
– **Cobra/Cobra head retractor:** Total hip replacement

FORCEPS:
– **Adson forceps:** Fine, toothed, skin handling
– **Lane forceps:** Heavy, toothed, fascia/deep tissue
– **McIndoe forceps:** Atraumatic, dissection
– **Allis tissue forceps:** Grasp fascia, tendons (traumatic, interlocking teeth)
– **Babcock forceps:** Atraumatic, bowel/soft tissue

SCISSORS:
– **Mayo scissors:** Heavy, fascia, sutures
– **Metzenbaum scissors:** Fine, delicate dissection
– **Stevens tenotomy scissors:** Very fine, tendon sheath, eye surgery
– **Spencer stitch scissors:** Suture removal

HEMOSTATS:
– **Halsted mosquito:** Small vessels, fine
– **Crile forceps:** Medium vessels, transverse serrations
– **Kelly forceps:** Larger vessels, longitudinal serrations at tip
– **Rochester-Pean:** Heavy, large vessels
– **Kocher forceps:** Heavy, traumatic, teeth at tip (fascia, aponeurosis)
– **Needle holders:** Mayo-Hegar (general), Olsen-Hegar (with scissors), Crile-Wood (fine)

BONE INSTRUMENTS

PERIOSTEAL ELEVATORS:
– **Watson-Cheyne (Wagner):** Broad, flat, elevate periosteum
– **Key elevator:** Sharp, small, interdigital spaces
– **Cobb elevator:** Spinal surgery
– **Freer elevator:** Double-ended, sharp/blunt, septal/nasal

BONE CUTTING:
– **Bone cutter (Liston):** Straight or curved, cutting bone
– **Bone nibbler (Rongeur):** Double-action, remove bone fragments, enlarge foramin
– **Luer bone rongeur:** Fine, delicate
– **Stille bone rongeur:** Heavy
– **Gigli saw:** Wire saw, amputations, osteotomies
– **Satterlee saw:** Plaster removal
– **Cast saw:** Oscillating, remove casts
– **Osteotomes:** Wedged blade, cut/reshape bone (Smith-Petersen)
– **Chisels:** Straight blade, cut bone
– **Gouges:** Curved, scoop bone, spine surgery
– **Curettes:** Spoon-shaped, scrape bone (cysts, tumors)

BONE HOLDING:
– **Reduction forceps (Bone holding forceps):** Large, grasp bone fragments
– **Lane bone holding forceps:** Self-centering
– **Verbrugge bone holding forceps:** Large bones
– **Lowman bone clamp:** Claw-like, trochanteric fractures
– **Patella forceps:** Hold patella
– **Pointed reduction forceps (Weber):** Interfragmentary compression
– **Pelvic reduction forceps (Jungbluth/Jungbluth clamp):** Pelvic fractures

DRILLS & WIRES:
– **Hand drill (Brace):** Manual drilling
– **AO/ASIF drill:** Powered, orthopedic drilling
– **Steinmann pins:** Large, skeletal traction, provisional fixation
– **Kirschner wires (K-wires):** Small, 0.6-2mm, temporary fixation, guide wires
– **Cerclage wire:** Circumferential bone fixation
– **Tension band wire:** Convert tension to compression (olecranon, patella)

PLATES & SCREWS

SCREWS:
– **Cortical screws:** Self-tapping or non-self-tapping, shaft, diaphysis
– **Cancellous screws:** Larger pitch, metaphysis, epiphysis
– **Malleolar screws:** Partially threaded, syndesmosis
– **Cannulated screws:** Hollow, over guidewire, precise placement
– **Locking screws:** Threaded head, fixed angle construct
– **Interference screws:** ACL reconstruction

PLATES:
– **Dynamic compression plate (DCP):** Oval holes, compression by eccentric screw placement
– **LC-DCP (Limited Contact):** Reduced plate-bone contact, preserves periosteal blood supply
– **Locking compression plate (LCP):** Combines compression and locking, stable in osteoporotic bone
– **Reconstruction plates:** Contourable, pelvic, acetabulum
– **Condylar plates:** 95°, blade plate, distal femur
– **Dynamic condylar screw (DCS):** Sliding screw, distal femur, intertrochanteric
– **Dynamic hip screw (DHS):** Sliding hip screw, proximal femur
– **Tubular plates:** Thin, metacarpals, pediatric
– **T-plates and L-plates:** Periarticular
– **Buttress plates:** Prevent displacement (tibial plateau)
– **Neutralization plates:** Protect lag screw
– **Bridge plates:** Indirect reduction, comminuted fractures

ARTHROPLASTY & SPECIAL

HIP:
– **Cement restrictor:** Distal femoral plug
– **Cement gun:** Deliver bone cement
– **Acetabular reamers:** Hemispherical, prepare acetabulum
– **Femoral broaches:** Prepare femoral canal
– **Head impactor:** Seat femoral head
– **Cup positioner:** Align acetabular component

KNEE:
– **Femoral sizer:** Determine femoral component size
– **Tibial cutting guide:** Align tibial resection
– **Femoral cutting guide:** Multiple valgus angles
– **Spacer blocks:** Check extension/flexion gaps
– **Trials:** Provisional components

ARTHROSCOPY:
– **Arthroscope:** 30° or 70° viewing angle
– **Shaver:** Motorized debridement
– **Graspers:** Remove loose bodies
– **Punch:** Meniscal resection
– **Radiofrequency probe:** Chondroplasty, meniscal shrinkage

STATION 35 – ORTHOPEDICS STATIC

External Fixator – Identification, Uses & Complications

BLOCK N OSPE – ORTHOPEDICS

CANDIDATE INSTRUCTIONS

8 minutes. Identify external fixator components, discuss indications, uses, and potential complications.

COMPONENTS IDENTIFICATION

PINS/WIRES:
– **Half-pins (Schanz screws):** 4-6mm diameter, threaded tip, engage both cortices, connect to clamps
– **Transfixion wires (K-wires):** 1.8-2.5mm, pass through bone and soft tissue, tensioned (Ilizarov)
– **olive wires:** Wire with central olive, prevents migration
– **Drill bits:** For pin insertion

CLAMPS:
– **Single pin clamps:** Hold one pin, connect to rod
– **Multi-pin clamps:** Hold 2-3 pins
– **Universal joints:** Allow angular adjustment
– **Tensioning device:** For Ilizarov wires

CONNECTING RODS/BARS:
– **Carbon fiber rods:** Radiolucent, strong
– **Stainless steel rods:** Strong, radiopaque
– **Telescopic rods:** Adjustable length (transport)
– **Threaded rods:** Fine adjustment

FRAMES:
– **Unilateral frame (Monolateral):** Pins on one side, simple, temporary
– **Circular frame (Ilizarov):** Rings connected by rods/wires, 3D stability, gradual correction
– **Hybrid frame:** Proximal ring, distal half-pins
– **Spatial frame (Taylor Spatial Frame):** Hexapod, computer-assisted gradual correction in 6 axes

INDICATIONS & USES

TRAUMA:
– **Open fractures (Gustilo III):** Temporary or definitive stabilization
– **Severe soft tissue injury:** Allows wound access, monitoring
– **Polytrauma:** Damage control orthopedics, rapid stabilization
– **Compartment syndrome:** Allows monitoring, prevents cast constriction
– **Vascular injury:** Stabilize while repairing vessels

RECONSTRUCTIVE:
– **Leg lengthening (Ilizarov):** Distraction osteogenesis
– **Deformity correction:** Angular, rotational, translational
– **Non-union:** With or without compression
– **Arthrodesis:** Fusion
– **Bone transport:** For segmental defects

SPECIAL SITUATIONS:
– **Infection:** Stabilize without internal metal
– **Burns:** Maintain position
– **Periprosthetic fractures:** Around joint replacements
– **Pediatric:** Does not cross physis, allows growth

COMPLICATIONS (CRITICAL)

PIN TRACT INFECTION – Most common (10-80%)
– Grade I: Local erythema
– Grade II: Purulent discharge, pain
– Grade III: Osteomyelitis, loosening

– **Prevention:** Daily pin care, chlorhexidine, loose dressing
– **Treatment:** Oral antibiotics (Grade I-II), removal/replacement (Grade III)

PIN LOOSENING – Bone resorption from thermal necrosis or infection
– Requires pin exchange

NEUROVASCULAR INJURY – Pin placement
– Safe corridors essential
– Avoid pins through muscle compartments

REFLEX SYMPATHETIC DYSTROPHY (CRPS) – Complex regional pain syndrome

MALUNION/NON-UNION – Poor reduction, inadequate stability

JOINT STIFFNESS – Wire transfixion through muscle/tendon
– Half-pins preferred near joints

RE-FRACTURE – After frame removal, stress risers at pin sites
– Gradual weight-bearing, protective bracing

PSYCHOLOGICAL – Prolonged treatment, frame intolerance

PRINCIPLES OF APPLICATION

BIOMECHANICS:
– **Near-far pin placement:** Maximum stability
– **Increase pin diameter:** Increases stiffness
– **Decrease bone-rod distance:** Increases stiffness
– **Multiple rods:** Increases stiffness
– **Pre-tension wires:** Increases stiffness (Ilizarov)

INSERTION TECHNIQUE:
– Pre-drill with sharp drill (not blunt)
– Low speed, intermittent pressure (prevent thermal necrosis)
– Cool with saline irrigation
– Avoid soft tissue tethering
– Incise skin, spread soft tissue, place pin
– Tension wires to 100-130 kg (Ilizarov)

STATION 36 – SURGERY INTERACTIVE

Burn Patient – Pre-operative Management (Detailed)

BLOCK N OSPE – SURGERY

CANDIDATE INSTRUCTIONS

8 minutes. Comprehensive assessment of burn patient including depth, extent, fluid calculation, and pre-operative optimization for grafting.

BURN DEPTH ASSESSMENT (DETAILED)

SUPERFICIAL (1ST DEGREE):
– Epidermis only
– Erythema, pain, no blisters
– Blanches with pressure
– Heals 3-6 days, no scarring
– Examples: Sunburn, minor scald

SUPERFICIAL PARTIAL THICKNESS (2ND DEGREE):
– Epidermis + superficial dermis (papillary)
– Blisters, moist, weeping
– Bright pink, blanches
– Very painful (intact nerve endings)
– Heals 1-3 weeks, minimal scarring
– Hair follicles intact

DEEP PARTIAL THICKNESS (2ND DEGREE):
– Epidermis + deep dermis (reticular)
– May or may not have blisters
– Mottled, waxy white, cherry red
– Does not blanch (thrombosed vessels)
– Decreased sensation (damaged nerves)
– Heals >3 weeks, significant scarring, contractures
– May need grafting

FULL THICKNESS (3RD DEGREE):
– Entire epidermis and dermis
– White, charred, leathery, translucent
– Thrombosed vessels visible
– Insensate (nerve destruction)
– No blanching
– Requires grafting (no healing from margins)
– Hair follicles destroyed

4TH DEGREE:
– Into muscle, tendon, bone
– Often requires amputation

SPECIAL SIGNS

ESCHAR – Leathery, inelastic, circumferential burn
– Acts as tourniquet on limbs → compartment syndrome
– Restricts chest wall movement → respiratory compromise
– **Requires escharotomy** – longitudinal incisions through eschar to fascia
– No anesthesia needed (full thickness, insensate)
– Release at mid-axillary lines, along limbs

INHALATION INJURY SIGNS:
– Facial burns, singed nasal hairs, soot in mouth/nares
– Hoarseness, stridor, cough
– Carbonaceous sputum
– History: Closed space fire, explosion
– **Management:** Early intubation (before edema), 100% O2, carboxyhemoglobin levels

BURN SIZE CALCULATION

RULE OF NINES (ADULT):
– Head and neck: 9%
– Each upper limb: 9%
– Each lower limb: 18%
– Anterior trunk: 18%
– Posterior trunk: 18%
– Perineum: 1%

LUND-BROWDER (CHILDREN):
– Adjusts for age (larger head, smaller legs)
– 0 years: Head 19%, Each leg 13%
– 5 years: Head 16%, Each leg 15%
– 10 years: Head 13%, Each leg 17%
– 15 years: Adult proportions

PALMAR METHOD:
– Patient's palm (including fingers) = 1% BSA
– Useful for scattered burns

IMPORTANT: Only count partial and full thickness (2nd, 3rd, 4th degree)
– 1st degree not included in resuscitation calculations

FLUID RESUSCITATION

PARKLAND FORMULA (24 HOURS):
– 4 mL × weight (kg) × %TBSA burned
– **First 8 hours:** 1/2 total (from time of burn)
– **Next 16 hours:** 1/2 total

EXAMPLE: 70 kg, 40% TBSA = 11,200 mL
– Hours 0-8: 5,600 mL = 700 mL/hr
– Hours 8-24: 5,600 mL = 350 mL/hr

MODIFIED BROOKE FORMULA:
– 2 mL × kg × %TBSA (some use 3 mL)
– Less fluid, reduces edema

FLUID TYPE: Lactated Ringer's (Hartmann's) preferred
– Avoid excessive normal saline (hyperchloremic acidosis)
– Colloids (albumin) after 24 hours

MONITORING:
– Urine output: 0.5-1 mL/kg/hr (adults), 1-2 mL/kg/hr (children)
– MAP >65 mmHg
– Heart rate <120
– Base deficit, lactate clearance
– Avoid over-resuscitation (compartment syndromes, ARDS)

PRE-OPERATIVE OPTIMIZATION

AIRWAY:
– Intubate if: Inhalation injury, facial burns, anticipated massive resuscitation, GCS <8
– Fiberoptic if difficult airway anticipated
– Avoid nasal intubation (sinus infection risk, base of skull fracture)

BREATHING:
– 100% O2 initially (treat CO poisoning)
– Carboxyhemoglobin half-life: Room air 4 hours, 100% O2 40 minutes, Hyperbaric 20 minutes
– Chest escharotomy if restrictive
– Bronchodilators for inhalation injury

CIRCULATION:
– 2 large-bore IVs (14-16G)
– Central line if >20% TBSA, difficult access
– Arterial line for monitoring
– Foley catheter (monitor urine output)
– NG tube (ileus common)

ESCHAROTOMY:

– Indications: Circumferential limb with vascular compromise, circumferential chest with respiratory restriction, circumferential neck
– Technique: Mid-axial or medial/lateral lines, through eschar to fat, avoid neurovascular structures
– No anesthesia (full thickness)

TEMPERATURE:
– Maintain >36°C (impaired thermoregulation)
– Warm environment, warmed fluids, Bair hugger

LABORATORY:
– CBC, electrolytes, creatinine, BUN, glucose
– ABG, carboxyhemoglobin, cyanide (suspect if lactate out of proportion)
– Coagulation profile
– Type and cross (blood loss during excision)
– CK (rhabdomyolysis)

ADDITIONAL:
– Tetanus prophylaxis
– Analgesia (IV opioids, ketamine)
– Anxiolytics
– Early enteral nutrition (within 6-12 hours)
– Stress ulcer prophylaxis (H2 blockers/PPIs)
– Thromboprophylaxis
– Eye care (lubrication, tarsorrhaphy if severe facial)

SURGICAL MANAGEMENT TIMELINE

DAY 0-1: Resuscitation, escharotomy, wound care
DAY 1-3: Excision of deep burns (tangential or fascial), grafting
EARLY EXCISION AND GRAFTING: Reduces infection, shortens hospital stay, improves survival
BIOLOGIC DRESSINGS: Allograft, xenograft, synthetic (Integra) if insufficient autograft
MESHER GRAFT: Expand 1:1.5 to 1:6 for coverage

STATION 37 – SURGERY INTERACTIVE

Pre-operative & Post-operative Care (Comprehensive)

BLOCK N OSPE – SURGERY

CANDIDATE INSTRUCTIONS

8 minutes. Discuss comprehensive pre-operative assessment and post-operative care for major surgery patient.

PRE-OPERATIVE ASSESSMENT (DETAILED)

HISTORY:
– Presenting complaint and indication for surgery
– Past medical history (cardiac, respiratory, renal, hepatic, endocrine, hematologic)
– Previous surgery and anesthesia complications (malignant hyperthermia, difficult intubation, prolonged paralysis)
– Medications (anticoagulants, antiplatelets, steroids, insulin, oral hypoglycemics, MAOIs, herbal supplements)
– Allergies (latex, antibiotics, iodine, muscle relaxants)
– Family history (anesthesia problems, bleeding disorders)
– Social history (smoking, alcohol, drugs, occupation)
– Last oral intake (fasting status)

PHYSICAL EXAMINATION:
– Vital signs (baseline BP, HR, temperature)
– General appearance (nutritional status, jaundice, cyanosis, edema)
– Airway assessment (Mallampati score, mouth opening, thyromental distance, neck mobility, jaw protrusion)
– Cardiovascular (murmurs, extra sounds, peripheral pulses, edema)
– Respiratory (breath sounds, effort, use of accessory muscles)
– Neurological (GCS, focal deficits)
– Abdomen (distension, organomegaly, scars, hernias)
– Extremities (IV sites, DVT risk)

INVESTIGATIONS:
– **Baseline:** CBC, electrolytes, creatinine, glucose, coagulation profile (PT/INR, aPTT), type and screen/cross
– **Cardiac:** ECG (age >50, cardiac history), troponin if indicated, echocardiogram if indicated
– **Chest X-ray:** Age >60, respiratory symptoms, malignancy, trauma
– **Pregnancy test:** All females of childbearing potential
– **Additional:** ABG (respiratory), LFTs (hepatic disease), urinalysis (urologic), cross-match (major surgery)
– **Specialized:** Stress test, angiography, pulmonary function tests as indicated

RISK STRATIFICATION

ASA PHYSICAL STATUS:
– I: Normal healthy
– II: Mild systemic disease (controlled HTN, DM, obesity)
– III: Severe systemic disease (angina, prior MI, renal failure, uncontrolled DM)
– IV: Severe systemic disease constant threat to life (unstable angina, sepsis, DIC)
– V: Moribund (ruptured AAA, massive trauma)
– VI: Brain dead organ donor
– E: Emergency modifier

RCRI (REVISED CARDIAC RISK INDEX):
– History of ischemic heart disease
– History of heart failure
– History of stroke/TIA
– Diabetes on insulin
– Chronic kidney disease (Cr >2.0)
– High-risk surgery (intraperitoneal, intrathoracic, suprainguinal vascular)
– Risk: 0=0.4%, 1=0.9%, 2=6.6%, ≥3=11%

METABOLIC EQUIVALENT OF TASK (MET):
– <4 MET: High risk
– ≥4 MET: Moderate risk
– Activities: 1 MET = resting, 4 MET = climbing stairs, 10 MET = strenuous sports

MEDICATION MANAGEMENT

CONTINUE:
– Cardiac: Beta-blockers (continue, avoid withdrawal), statins, antihypertensives (except ACE-I/ARB)
– Endocrine: Insulin (adjusted), thyroid meds
– Respiratory: Bronchodilators, steroids (stress dose if chronic use)
– Neurologic: Anticonvulsants, Parkinson's meds
– Psychiatric: Antidepressants (except MAOIs), antipsychotics
– Analgesics: Continue to avoid withdrawal (opioids)

HOLD/ADJUST:
– **Anticoagulants:**
• Warfarin: Stop 5 days pre-op, bridge with heparin if high thromboembolic risk
• DOACs: Stop 1-3 days depending on renal function and bleeding risk
• Aspirin: Continue for cardiac stents, stop 7 days for other surgery if bleeding risk
• Clopidogrel: Stop 5-7 days unless recent stent (<12 months)
– **ACE-I/ARB:** Hold morning of surgery (risk of hypotension)
– **Diuretics:** Hold morning of surgery
– **Metformin:** Hold 48 hours if using contrast or if eGFR <30
– **SGLT2 inhibitors:** Hold 3 days before (euglycemic DKA risk)
– **NSAIDs:** Stop 3-5 days pre-op
– **Steroids:** Stress dose if chronic use (>2 weeks in past 6 months)
– **MAOIs:** Stop 2 weeks pre-op
– **Herbal supplements:** Stop 1-2 weeks pre-op (bleeding risk)

POST-OPERATIVE CARE (COMPREHENSIVE)

IMMEDIATE POST-ANESTHESIA (PACU):
– Airway patency, oxygenation (SpO2 >94%)
– Breathing pattern, chest expansion
– Circulation: BP, HR, rhythm, urine output
– Consciousness level (Aldrete score for discharge)
– Pain control (VAS score, analgesia)
– Temperature (avoid hypothermia)
– Nausea/vomiting control
– Surgical site: Dressing, bleeding, drains
– Neurological: Movement, sensation if regional anesthesia

FLUID MANAGEMENT:
– Calculate maintenance: 4-2-1 rule (4 mL/kg/hr first 10 kg, 2 mL/kg/hr next 10 kg, 1 mL/kg/hr thereafter)
– Replace deficits: NPO period, insensible losses, third spacing
– Replace ongoing losses: Drains, NG, fistula
– Monitor: Input/output, daily weights, electrolytes, clinical assessment (mucous membranes, skin turgor, JVP)
– Goal: Euvolemia, avoid fluid overload (especially elderly, cardiac patients)

PAIN MANAGEMENT:
– Multimodal approach
– WHO analgesic ladder
– Regional techniques (epidural, nerve blocks) reduce opioid use
– PCA (Patient Controlled Analgesia) for major surgery
– Regular paracetamol, NSAIDs (if not contraindicated)
– Monitor for side effects: Respiratory depression, ileus, urinary retention, delirium (especially elderly)

NUTRITION:
– Early enteral feeding (within 24 hours) unless contraindicated
– NPO only if ileus, bowel surgery with anastomosis concern
– High protein for wound healing
– Glycemic control (target 140-180 mg/dL)
– Consider TPN only if enteral not possible for >7 days

MOBILIZATION:
– Early ambulation (day 0 or 1)
– DVT prophylaxis: Mechanical (SCDs) + pharmacological (LMWH, unfractionated heparin)
– Physiotherapy: Breathing exercises, limb exercises
– Fall risk assessment

WOUND CARE:
– Inspect dressing, drain output (character, amount)
– Remove drains when output <30-50 mL/24hr
– Suture/staple removal: Face 3-5 days, scalp 7 days, trunk 7-10 days, extremities 10-14 days, joints 14 days
– Watch for infection: Redness, warmth, swelling, purulent discharge, dehiscence

COMPLICATION MONITORING:
– **Cardiovascular:** MI, arrhythmias, heart failure, hypertension/hypotension

– **Respiratory:** Atelectasis, pneumonia, PE, ARDS
– **Renal:** AKI (especially with nephrotoxins, hypotension)
– **Neurological:** Delirium (common in elderly), stroke
– **Infectious:** SSI, UTI, pneumonia, catheter-related
– **Hematologic:** Bleeding, DVT/PE
– **Gastrointestinal:** Ileus, anastomotic leak, stress ulceration
– **Metabolic:** Electrolyte disturbances, hyperglycemia

DISCHARGE PLANNING:
– Adequate pain control on oral meds
– Wound care instructions
– Activity restrictions
– Follow-up appointments
– Return precautions
– Rehabilitation needs (PT/OT)
– Medication reconciliation

ENHANCED RECOVERY AFTER SURGERY (ERAS)

PRE-OP: Carbohydrate loading, avoid prolonged fasting, patient education
INTRA-OP: Minimally invasive, normothermia, euvolemia, avoid opioids
POST-OP: Early feeding, early mobilization, multimodal analgesia, avoid drains/tubes

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STATION 38 – SURGERY INTERACTIVE

Permanent Stoma Bag Counseling

BLOCK N OSPE – SURGERY

CANDIDATE INSTRUCTIONS

8 minutes. Counsel patient regarding formation of permanent colostomy or ileostomy.
Cover indications, types, daily care, complications, and psychosocial aspects.

STOMA TYPES & INDICATIONS

COLOSTOMY:
– **End colostomy:** Permanent (abdominoperineal resection, Hartmann's procedure)
– **Loop colostomy:** Temporary diversion (protection of distal anastomosis, obstruction, trauma)
– **Double-barrel:** Both proximal and distal ends brought out (rare)
– **Locations:** Sigmoid (left lower quadrant), Transverse (upper abdomen), Ascending (right)
– **Output:** Semi-formed to formed stool (depends on location)
– **Appliance change:** Every 3-7 days

ILEOSTOMY:
– **End ileostomy:** Permanent (total proctocolectomy for ulcerative colitis, familial adenomatous polyposis, Crohn's disease)
– **Loop ileostomy:** Temporary (protection of colorectal anastomosis)
– **Continent ileostomy (Kock pouch):** Internal reservoir, catheterizable
– **Ileal pouch-anal anastomosis (IPAA/J-pouch):** Restores continence, no external appliance
– **Location:** Right lower quadrant (terminal ileum)
– **Output:** Liquid to paste, 500-1500 mL/day, enzyme-rich (corrosive to skin)
– **Appliance change:** Every 3-5 days

UROSTOMY (ILEAL CONDUIT):
– Urinary diversion when bladder removed (cystectomy)
– Ileum used as conduit
– Location: Right lower quadrant
– Appliance with anti-reflux valve

COUNSELING POINTS (CRITICAL)

PRE-OPERATIVE MARKING:
– Stoma therapist marks optimal site pre-op
– Away from skin folds, scars, belt line
– Visible to patient
– Away from bony prominences
– Within rectus abdominis muscle (reduces hernia, prolapse)

IMMEDIATE POST-OP CARE:
– Stoma may be edematous initially (reduces over 6-8 weeks)
– Color should be pink/red (viable)
– Dark/purple/black = ischemia (emergency)
– No sensation (no nerve supply)
– Mucus and blood initially, then stool/effluent
– Appliance management by stoma therapist

DAILY STOMA CARE:
– **Empty when 1/3 full** (prevents leakage, pancaking)
– **Change appliance every 3-7 days** (colostomy) or 3-5 days (ileostomy)
– **Skin protection:** Barrier cream, powder for irritated skin
– **Measure stoma:** May change size as edema resolves
– **Cut wafer 2-3mm larger than stoma** (protects skin)
– **Shave hair** around stoma (prevents folliculitis)
– **Bathe/shower:** Can get wet, pat dry
– **Clothing:** Can wear normal clothes, avoid tight waistbands

DIETARY ADVICE:
– **Colostomy:** Normal diet, chew well, avoid foods that cause blockage (nuts, corn, popcorn, raw vegetables) if narrow stoma
– **Ileostomy:**
• High risk of dehydration (monitor urine color)

• Salt replacement (crisps, soups)
• Chew thoroughly
• Avoid high-fiber initially (blockage risk)
• Avoid foods that increase output (spicy, caffeine, alcohol, green leafy vegetables)
• Foods that thicken output: Banana, rice, pasta, marshmallows
• Monitor for blockage: Cramping, no output, vomiting

MEDICATIONS:
– Avoid enteric-coated and sustained-release (absorption issues with ileostomy)
– Liquid or immediate-release preferred
– Monitor levels (digoxin, warfarin)

ACTIVITY:
– Can exercise, swim (waterproof covers available)
– Avoid heavy lifting initially (6-8 weeks)
– Can drive when able to perform emergency stop
– Sexual activity: Possible, may need to empty bag first, special smaller bags available
– Return to work: 6-12 weeks depending on job

COMPLICATIONS TO WATCH FOR:
– **Skin irritation/excoriation:** Most common, manage with barrier products
– **Retraction:** Stoma below skin level, leakage
– **Prolapse:** Stoma lengthens (gravity, increased intra-abdominal pressure)
– **Stenosis:** Narrowing at skin or fascial level
– **Parastomal hernia:** Bulge around stoma
– **Ischemia/necrosis:** Dark color, emergency
– **Obstruction:** Cramping, vomiting, no output
– **Dehydration/electrolyte imbalance:** Especially ileostomy
– **Psychological:** Body image, depression, anxiety, social withdrawal

PSYCHOSOCIAL SUPPORT

BODY IMAGE: Allow patient to express concerns, show photos of stomas, introduce to stoma visitor
SEXUALITY: Discuss openly, most can resume normal sexual activity
SOCIAL SUPPORT: Family involvement, support groups (United Ostomy Associations)
TRAVEL: Possible, carry supplies, empty before security
EMPLOYMENT: Most jobs possible, may need modifications initially
STOMA THERAPIST: Essential referral for education and ongoing support

REVERSIBILITY

TEMPORARY STOMA: Can be reversed when distal bowel healed (usually 3-6 months)
PERMANENT STOMA: Not reversible (rectum/anus removed)
ALTERNATIVES TO PERMANENT STOMA: IPAA (J-pouch) for ulcerative colitis, continent ileostomy (Kock pouch)

STATION 39 – SURGERY INTERACTIVE

Proctoscope – Identification, Uses & Examination Steps

BLOCK N OSPE – SURGERY

CANDIDATE INSTRUCTIONS

8 minutes. Identify proctoscope, state its uses, and demonstrate steps of proctoscopy examination.

INSTRUMENT IDENTIFICATION

PROCTOSCOPE (ANOSCOPE):
– Short, rigid, metal or plastic tube
– Length: 7-10 cm
– Diameter: 2-3 cm
– Beveled or rounded tip
– Removable obturator for insertion
– Light source attachment (fiberoptic or built-in)
– May have side window for biopsy/suction
– Disposable or reusable

DIFFERENTIATION:
– **Proctoscope:** Views anal canal and distal rectum (0-10 cm)
– **Sigmoidoscope:** Rigid (25 cm) or flexible (60 cm), views rectum and sigmoid
– **Colonoscope:** Flexible, views entire colon
– **Speculum:** Two blades, self-retaining (e.g., Sims, Cusco)

INDICATIONS & USES

DIAGNOSTIC:
– Inspection of anal canal and distal rectum
– Hemorrhoids (internal/external), anal fissures
– Anal warts (condyloma acuminata)
– Anal fistula openings
– Rectal polyps
– Anal/rectal tumors
– Procidentia (rectal prolapse)
– Assessment of anal tone
– Evaluation of rectal bleeding (anorectal source)
– Biopsy of suspicious lesions

THERAPEUTIC:
– Injection sclerotherapy for hemorrhoids
– Rubber band ligation of hemorrhoids
– Drainage of perianal abscess
– Removal of foreign bodies
– Electrocoagulation of bleeding points
– Application of topical medications

SCREENING:
– Part of colorectal cancer screening (limited value alone, needs sigmoidoscopy/colonoscopy)

PROCEDURE STEPS (CRITICAL)

PREPARATION:
– Explain procedure, informed consent
– Empty rectum (enema if needed, though often not required for proctoscopy)
– Patient positioning:
• **Left lateral (Sims') position:** Most common, left side down, knees flexed toward chest
• **Knee-chest position:** Prone, knees and chest on table
• **Lithotomy position:** Supine, legs in stirrups
– Adequate lighting
– Gloves, lubricant, proctoscope with obturator, light source

– Biopsy forceps, gauze, specimen containers available

EXAMINATION STEPS:
1. **Inspection of perianal area:** Skin tags, fissures, fistula openings, hemorrhoids, masses, skin changes
2. **DRE (Digital Rectal Examination):** Lubricated gloved finger, assess sphincter tone, palpate for masses, feel prostate (males), check for blood on glove
3. **Lubricate proctoscope:** Generous lubrication on obturator and tip
4. **Insertion:** With obturator in place, gently insert through anal canal, directed posteriorly (toward umbilicus initially, then posteriorly following curve of sacrum)
5. **Remove obturator:** Once fully inserted, remove obturator to view
6. **Insufflate:** If using rigid sigmoidoscope, air insufflation to open lumen (not typically with short proctoscope)
7. **Systematic examination:** Slowly withdraw while rotating and inspecting entire circumference
8. **Look for:** Hemorrhoids (at 3, 7, 11 o'clock in lithotomy; 12, 3, 7 in left lateral), mucosal color, vascular pattern, masses, ulcers, bleeding, pus
9. **Biopsy if indicated:** Through side window or after removing scope
10. **Gentle withdrawal:** Inspect anal canal during removal
11. **Clean patient:** Remove lubricant and any stool
12. **Document:** Findings, procedure tolerance, complications

AFTERCARE:
– Patient may feel fullness or mild discomfort
– Small amount of bleeding normal if biopsy taken
– Return if heavy bleeding, severe pain, fever

COMPLICATIONS

MINOR: Discomfort, vasovagal response (bradycardia, hypotension), minor bleeding
MAJOR (RARE): Perforation (especially if diverticulosis, tumor, forceful insertion), severe bleeding, infection
CONTRAINDICATIONS: Acute abdomen, suspected perforation, severe anal pain (fissure), recent anorectal surgery

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