Symptom Checklists

Version 171120

Clarity in Emergency Medicine

1 Abdominal - Flank Pain

Pain between the lower border of the chest and the pelvis. If pain in the middle of the back, see 4-Back Pain.

BACKGROUND

M
- Current medications?
- NSAIDs?

A
- Allergies?

P
- Past medical history?
- Prior abdominal operations / procedures?

L
- Life circumstances?

E
- Alcohol: how often? How much?

S
- Smoking: amount? Prior smoking?

HISTORY

O
- When did the pain start? What were you doing?
- Time till max intensity: sec? min? hr?

P
- Pain location? Size of the painful area?
- Radiation?

Q
- Burning, aching, sharp?

R
- Worse with deep inspiration?
- Worse with movement?

S
- VAS (1-10)? How pain affects daily function?

T
- Constant or intermittent? Increasing?
- Prior similar painful episodes?

+
- PO: nausea, vomiting?
- PR: diarrhea, constipation?
- PU: dysuria?
- PV (for fertile women): last period? Discharge?

PHYSICAL

Vitals
- RR, SpO2%, HR, BP, Temp?

Heart
- S3/S4, murmurs?
- Regular?

Lung
- Basal rales?

Abdo
- Inspection
- Auscultation
- Palpation

Testis
- Inspection / palpation (men < 25 years)

TESTS

- WBC & CRP
- Urine dipstick
- Pregnancy test (for fertile women)
- EKG (> 50 years)
- Ultrasound abdominal aorta (> 60 years)

CONSIDER IF UNCLEAR:

The cause of abdominal - flank pain may remain unclear after routine bedside information is obtained. Admission for observation and/or abdominal CT should be considered for these patients in the following situations:

1. Abdominal pain + shock
2. Severe abdominal pain with sudden onset
3. Decreased functional ability
4. Generalised peritonitis
5. Suspected bowel obstruction
6. Inflammed right lower quadrant

1 Abdominal - Flank Pain: Clinical Syndromes & Diagnostic Rules

ABDOMINAL PAIN & CHOCK

Abdominal pain with the following:

- Tachycardia and/or hypotension
- Elevated lactate, base deficit

Potential diagnoses:

- Ruptured abdominal aortic aneurysm
- Ruptured ectopic pregnancy
- Perforation (e.g. ulcer, diverticulus) and sepsis
- Severe pancreatitis, cholangitis

SEVERE & SUDDEN ABDOMINAL PAIN

- Sudden onset of diffuse abdominal pain
- Severe pain that does not respond to analgesics
- Peritoneal findings are absent

Potential diagnoses:

- Mesenteric ischemia
- Aortic dissection
- Perforated ulcer
- Ovarian torsion, testicular torsion

DECREASED FUNCTIONAL ABILITY

Patients (often elderly patients) who are sufficiently affected by their abdominal pain that they cannot function at home.

GENERALIZED PERITONITIS

- Pain worsens with movement
- Diffuse tenderness

Rigidity or rebound tenderness

Potential diagnoses:

- Perforated ulcer
- Perforated diverticulitis
- Perforated appendicitis
- Cholecystitis, pancreatitis

BOWEL OBSTRUCTION

Pain with several of the following:

- Prior abdominal surgery
- Diffuse, crampy pain, intermittent spikes
- Vomiting, decreased bowel movements, absent flatus
- Swollen abdomen
- Constant, hyperactive, "metallic" abdominal sounds
- The abdomen is diffusely tender in the absence of peritoneal findings

RIGHT LOWER QUADRANT

- Right lower quadrant (RLQ) pain
- RLQ peritonitis OR elevated WBC/CRP

Potential diagnoses:

- Acute appendicitis
- Salpingitis
- Ovarial pathology
- Mesenteric adenitis
- Sigmoiditis

APPENDICITIS INFLAMMATORY RESPONSE SCORE

Criteria	Points
RLQ pain	1
Vomiting	1
Peritonitis	1, 2 or 3
WBC count	1 (10-14.9), 2 (≥ 15)
% Neutrofils	1 (70-84%), 2 (≥ 85%)
CRP	1 (10-49), 2 (≥ 50)
Temp ≥ 38.5°	1

Probability: 0-4 low, 5-8 indet., 9-12 high

APPENDICITIS vs SALPINGITIS

In fertile women:

Criteria	Salpingitis
Absent pain migration	OR 4.2
Bilateral tenderness	OR 16.7
No nausea or vomiting	OR 8.4
All of the above	99%

2 Allergic Reaction

Suspected allergic reaction (rash, pruritus, swelling etc).

BACKGROUND

- **M**
  - Recently taken/terminated medications/substances?
  - Recent NSAID use?
- **A**
  - Known allergies to medications, food, other?
- **P**
  - Past medical history?
  - Recent medical test (e.g. with contrast agent)?
- **L**
  - Life circumstances?
- **E**
  - Alcohol: how often? How much?
- **S**
  - Smoking: amount? Prior smoking?

HISTORY

- **O**
  - When did the symptoms start? What were you doing?
  - Time till max intensity: sec? min? hr?
- **P**
  - Which body parts are affected?
- **Q**
  - Rash? Swelling? Itch? Pain?
- **R**
  - Effect of measures if taken (e.g. corticosteroids, antihistamine)?
- **S**
  - Effect on daily function?
- **T**
  - Constant, intermittent, increasing symptoms?
  - Prior similar episodes?
- **+**
  - Food intake?
  - Insect bite?
  - New soap / washing detergent?

PHYSICAL

- **A**
  - Hoarse? Stridor?
  - Lip- tongue swelling?
- **B**
  - SpO2%
  - Respiratory rate?
  - Lung auscultation?
  - Chest wall examination
- **C**
  - Pulse/blood pressure
  - Heart rate
- **D**
  - Level of consciousness?
- **E**
  - Front side of the body
  - Back side of the body
  - Temperature?

CONSIDER:

1. Anaphylaxis
2. Angioedema

2 Allergic Reaction: Clinical Diagnostic Clues

ANAPHYLAXIS

Anaphylaxis is a severe, systemic hypersensitivity reaction that affects airway, breathing and/or circulation and is usually associated with skin (e.g. urticarial) and/or mucosal symptoms (Soar 2010). Anaphylaxis is highly likely in any one of the following three contexts (Sampson 2006):

1. Acute onset of an illness (minutes to several hours) with involvement of the skin, mucosal tissue, or both (eg, generalized hives, pruritus or flushing, swollen lips-tongue-uvula) and at least one of the following:
   - Respiratory compromise (eg, dyspnea, wheeze-bronchospasm, stridor, reduced PEF, hypoxemia)
   - Reduced BP or associated symptoms of end-organ dysfunction (eg, hypotonia [collapse], syncope, incontinence)
2. Two or more of the following that occur rapidly after exposure to a *likely* allergen for that patient (minutes to several hours):
   - Involvement of the skin-mucosal tissue (eg, generalized hives, itch-flush, swollen lips-tongue-uvula)
   - Respiratory compromise (eg, dyspnea, wheeze-bronchospasm, stridor, reduced PEF, hypoxemia)
   - Reduced BP or associated symptoms (eg, hypotonia [collapse], syncope, incontinence)
   - Persistent gastrointestinal symptoms (eg, crampy abdominal pain, vomiting)
3. Reduced BP after exposure to *known* allergen for that patient (minutes to several hours):
   - Infants and children: low SBP (age specific) or > 30% decrease in SBP
   - Adults: SBP of less than 90 mm Hg or > 30% decrease from that person's baseline.

ANGIOEDEMA

Angioedema results from the fast onset of increased vascular permeability in subcutaneous or submucosal tissue. Symptoms and signs include:

- Swelling of the face (eyelids, lips, tongue), extremities and genitalia
- Swelling of the larynx, resulting in throat tightness, dyspnea, dysphonia, dysphagia
- Swelling of the intestine, resulting in abdominal pain, nausea and vomiting
- Urticaria, flushing, generalized pruritus, bronchospasm and/or hypotension are present in the setting of histamine-induced angioedema but absent in the setting of bradykinin-induced angioedema (e.g. ACE-inhibitor induced, hereditary or acquired C1-inhibitor deficiency)

3 Altered Consciousness

Decreased level of consciousness or confusion. If trauma to the head, see 17. If suspected poisoning, see 13.

BACKGROUND

M
- Current medications?
- Recent changes?

A
- Allergies?

P
- Past medical history?

L
- Life circumstances?

E
- Alcohol: how often? How much?

S
- Smoking: amount? Prior smoking?

HISTORY

O
- When did the problem start? Activity at the time?
- Time till max intensity: sec? min? hr?

Q
- Decreased or altered consciousness?

S
- Effect on daily function?

T
- Time course? Diurnal fluctuation?
- Prior similar episodes?

+
- Pain?
- Fever/chills?

PHYSICAL

A
- Trauma to the head?
- Tongue bite?

B
- SpO2%
- Respiratory rate?
- Lung auscultation?
- Chest wall examination

C
- Pulse/blood pressure
- Heart rate
- QRS width, regularity?

D
- Level of consciousness?
- Eye / pupil examination
- Focal neurological deficits arm/leg?
- Glucose?

E
- Front side of the body
- Back side of the body
- Temperature?

TESTS

- Acid-base: pH, pCO_2, HCO_3/BE
- Electrolytes: Na, K, Ca
- Hg, WBC, CRP, Trombocytes, INR
- Creatinin
- Liver function tests
- EKG if > 50 years

CONSIDER IF UNCLEAR:

1. Stroke including basilar thrombosis
2. Sepsis, meningitis
3. Herpes encephalitis
4. Non-convulsive status
5. Wernicke's encephalopathy

3 Altered Consciousness: Clinical Syndromes

METABOLIC CAUSE

The presence of the following three findings suggests a metabolic cause of coma (Sn 96%):

- Age ≤ 50 years
- SBT ≤ 150 mm Hg
- Lack of focal neurological findings

BACTERIAL MENINGITIS

95% of adults with community-acquired bacterial meningitis had ≥ 2 of the following:

- Headache
- Fever
- Neck stiffness
- Change in mental status

WERNICKE'S ENCEPHALOPATHY

The classic triad of encephalopathy, ocular abnormalities and gait ataxia is present in only 17% of cases. Caine et al recommend the following operational criteria to identify patients with Wernicke's encephalopathy: ≥ 2 of:

- **Dietary deficiencies** (e.g. chronic alcohol abuse, anorexia nervosa, gastrointestinal surgery including bariatric surgery, hyperemesis of pregnancy, prolonged intravenous feeding without proper supplementation)
- **Altered mental status** (e.g. confusion, apathy, inattentiveness, inability to concentrate, disorientation) **or mild memory impairment**
- **Oculomotor abnormalities** (e.g. nystagmus, symmetrical or asymmetrical palsy of both lateral recti or the other ocular msucles, conjugated-gaze palsies)
- **Cerebellar dysfunction** (incoordination of gait or truncal ataxia)

4 Back Pain

Pain in the middle of the back. If lateral/anterior pain, see 5-Chest - Thoracic Pain or 1-Abdominal - Flank Pain

BACKGROUND

M
- Current medications?
- Analgesics: amount, frequency?

A
- Allergies?

P
- Past medical history? Prior cancer?
- Recent invasive procedures / medical tests?

L
- Life circumstances?

E
- Alcohol: how often? How much?

S
- Smoking: amount? Prior smoking?

HISTORY

O
- When did the pain start? What were you doing?
- Time till max intensity: sec? min? hr?

P
- Pain location? Size of the painful area?
- Radiation?

Q
- Type of pain: aching, sharp/riping?

R
- Decreased pain with analgesia?
- Decreased pain when lying down?
- Increased pain upon flexion, extension, walking?

S
- VAS (1-10)? Effect on daily function?

T
- Constant or intermittent? Increasing?
- Prior similar painful episodes?

+
- Leg weakness? Decreased perineal/leg sensation?
- Altered urination / defecation?
- Fever / chills?

PHYSICAL

Vitals
- RR, SpO2%, HR, BP, Temp?

Back
- Inspection
- Palpation

Neuro
- Leg strength & gait
- Leg sensation
- Patella reflex & Babinski
- Romberg

TESTS

- CRP
- Ultrasound abdominal aorta if > 60 years

CONSIDER:

1. Ruptured abdominal aortic aneurysm
2. Aortic dissection
3. Cauda equina / conus medullaris
4. Cancer, osteomyelitis, discitis
5. Fracture

4 Back Pain: Clinical Diagnostic Rules

ACUTE LOW BACK PAIN

Forseen and Corey recommend categorizing patients with acute low back pain (< 4 weeks of symptoms) into three categories for the sake of further management, with radiology (e.g. MRI, bone scan) and lab tests restricted to patients with serious conditions.

Serious condition*	Presence of ≥ 1 "red flag": • Age > 50 years • Steroid use • Intravenous drug use • History of cancer • Immunosuppression • Osteoporosis • Trauma history • Unintentional weight loss • Progression of symptoms • Focal neurologic deficit
Spinal stenosis / radiculopathy	• Spinal stenosis: low back or radicular pain that increases with walking and improves with flexion (sitting or propping) • Radiculopathy: dysfunction of a nerve root associated with pain, sensory impairment, weakness, or diminished deep tendon reflexes in nerve root distribution (see 13-Neurological deficit)
Idiopathic / nonspecific	• No red flags • No signs / symptoms of spinal stenosis/radiculopathy

*Spine infection, malignancy, traumatic injury, other serious condition

LUMBAR SPINAL STENOSIS

RISK FACTORS	POINTS
History	
• Age 60-70 years	1
• Age > 70 years	2
• Absence of diabetes	1
• Neurogenic claudication	3
• Exacerbation of symptoms when standing up	2
• Symptom improvement when bending forward	3
Physical Examination	
• Symptoms induced by having patients bend forward	-1
• Symptoms induced by having patients bend backward	1
• Good peripheral artery circulation	3
• Abnormal Achilles tendon reflex	1
• Straight Leg Raise test positive for reproducing pain	-2

≥ 7 points: sensitivity 93%, specificity 72%, LR+ 3.31, LR- 0.1

5 Chest - Thoracic Pain

Pain or discomfort localized to or under the chest wall (including the back). If pain in the midline of the back, see 4

BACKGROUND

M
- Current medications?
- Birth control pill, other hormonal treatments?

A
- Allergies?

P
- Past medical history?
- Prior heart- or thromboembolic disease?

L
- Life circumstances?

E
- Alcohol: how often? How much?

S
- Smoking: amount? Prior smoking?

HISTORY

O
- When did the pain start? What were you doing?
- Time till max intensity: sec? min? hr?

P
- Pain location? Size of the painful area?
- Radiation?

Q
- Cramping, aching, sharp, riping, burning?

R
- Worse with deep inspiration?
- Worse with movement?

S
- VAS (1-10)?

T
- Constant or intermittent? Increasing?
- Prior similar painful episodes?

+
- Wind: shortness of breath?
- Walk: leg pain/swelling?
- Warm: fever/chills?

PHYSICAL

Vitals
- RR, SpO2%, HR, BP, Temp?

Heart
- S3/S4, murmurs?
- Elevated JVP?

Lung
- Rales?
- Decreased breath sounds?

MSK
- Redness? Rash?
- Tenderness on palpation?

Abdo
- Upper abdominal tenderness?

Leg
- Swelling? Edema?

TESTS

- WBC & CRP
- Troponin if > 40 years
- EKG

CONSIDER:

1. Acute coronary syndrome
2. Pulmonary embolism
3. Aortic dissection

5 Chest - Thoracic Pain: Clinical Diagnostic Rules

ACUTE CORONARY SYNDROME

Age	< 40 years	40 - 65 years	> 65 years
ACS Prevalence	0-2%	8-10%	12-19%
0 Risk Factors*	LR 0.17	LR 0.53	LR 0.96
≥ 4 Risk Factors*	LR 7.4	LR 2.1	LR 1.09

* diabetes, smoking, hypercholesterolemia, hypertension, heredity

History: high-risk features include pressure-type pain, radiation to one or both arms, worsening with exertion (but not with inspiration, position), similarity to prior ischemia.

EKG	ST Elevation	ST depression	T wave inversion
LR	22	5.3	1.8

0h-Troponin

hs-cTnT < 5 ng/L + History not high-risk + EKG non-ischemic rules-out 30-day MACE (acute myocardial infarction, unstable angina, cardiac arrest, cardiogenic shock, death, high-risk arrhythmias) with 99.2% sensitivity and a negative predictive value of 99.7%.

0h/1h-Troponin (Δ = difference)

Rule-Out 30-day MACE	Rule-In 30-day MACE
0h hs-cTnT < 12 ng/L AND 1hΔ < 3 ng/L AND History not high-risk AND EKG non-ischemic	0h hs-cTnT ≥ 52 ng/L OR 1hΔ ≥ 5 ng/L OR 0h or 1h hs-cTnT > 14 ng/L + either history high-risk or ischemic EKG

Patients for whom 30-day MACE neither ruled-in nor ruled-out: consider additional troponin testing or stress testing / myocardial imaging (as out-patient?).

AORTIC DISSECTION DETECTION (ADD) RISK SCORE

High risk conditions: Marfan syndrome, family history of aortic disease, known aortic valve disease, recent aortic manipulation, known thoracic aortic aneurysm

High risk pain features: abrupt in onset, severe in intensity, ripping or tearing

High risk examination features: evidence of perfusion deficit (pulse deficit, systolic BP differential, focal neurologic deficit in conjunction with pain), murmur of aortic insufficiency (new or not known to be old and in conjunction with pain), hypotension or shock state

ADD score: #categories featuring ≥ 1 high risk feature/condition. High risk if ADD score ≥2.

AORTIC DISSECTION & d-dimer

A negative serum D-dimer (<500 ng/dL) rules out AD if the ADD score is ≤ 1

WELLS SCORE FOR PE

See 6-Dyspnea

6 Diarrhea

Loose bowel movements.

BACKGROUND

M
- Current medications?
- Recent antibiotic use?

A
- Allergies?

P
- Past medical history?

L
- Life circumstances?

E
- Alcohol: how often? How much?

S
- Smoking: amount? Prior smoking?

HISTORY

O
- When did the diarrhea start?
- Travel history? Food prior to diarrhea onset?

Q
- Watery? Bloody? Tarry?

R
- Worsened with foot / fluid intake?

S
- Volume? Frequency?

T
- Duration?
- Prior similar episodes?

+
- Fever?
- Abdominal pain?

PHYSICAL

Vitals
- RR, SpO2%, HR, BP, Temp?

Abdo
- Inspection
- Auscultation
- Palpation

PR
- Stool colour?

TESTS

- CRP

CONSIDER:

1. Sepsis
2. Gastrointestinal bleeding
3. Invasive bacterial syndrome
4. Epidemiological features justifying presumptive antimicrobial therapy

6 Diarrhea: Clinical Diagnostic Clues

BAYESIAN APPROACH TO ACUTE INFECTIOUS DIARRHEA IN ADULTS

Goodgame recommends categorizing adults with acute infectious diarrhea (≥ 3 loose stools per day for < 14 days) into three categories for the sake of further management:

Category	Features	Infectious agent	Management
Viral or "norovirus-like" diarrhea	• No specific epidemiologic risk factor • No clinical feature suggestive of severe bacterial infection	• Norovirus • Bacteria (including e.g. Salmonella) and protozoa producing an uncomplicated gastroenteritis syndrome	• No specialized diagnostic testing or antimicrobial management • Avoid milk products • Loperamid 4 mg once and 2 mg with each liquid stool
Severe bacterial infection	• Fever > 38.5°C • Bloody diarrhea • Voluminous diarrhea • Severe abdominal pain • > 6 stools per 24 hours • Diarrhea persisting > 7 days	• Salmonella, Campylobacter, Shigella • Shiga-toxin producing E coli • Yersinia • Vibrio • Clostridium difficile	• Stool testing for bacterial (or amoebic) infection, shiga toxin • If the signs and symptoms are severe, presumptive antibiotic therapy is recommended (unless E coli O157:H7 is suspected)
Epidemiologic risk factors	• Travel	• 80% probability of bacterial etiology • Persistent diarrhea suggests a protozoa	• Presumptive antibiotic therapy combined with clinical observation
	• Hospitalized > 3 days • Antiobiotic use • Contact with health care personnel	• Clostridium difficile	• Stools for Clostridium difficile toxin • Presumptive treatment while awaiting test results is appropriate in severely ill patients
	• Immunocompromised host	• Virus, bacteria, mycobacteria, protozoa	•

HEMOLYTIC-UREMIC SYNDROME

Diarrhea occurring in the setting of hemolysis, thrombocytopenia and uremia suggests hemolytic-uremic syndrome. Most cases are caused by E coli O157:H7.

7 Dyspnea

Shortness of breath.

BACKGROUND

M
- Current medications?
- Birth control pill, other hormonal treatments?

A
- Allergies?

P
- Past medical history?
- Prior heart- or thromboembolic disease?

L
- Life circumstances? (e.g. occupation, pets)?

E
- Alcohol: how often? How much?

S
- Smoking: amount? Prior smoking?

HISTORY

O
- When did the dyspnea start? What were you doing?
- Time till max intensity: sec? min? hr?

P
- Worse when lying down?

Q
- Air hunger? Chest tightness?

R
- Worse when lying down?

S
- Effect on daily function?

T
- Constant or intermittent? Increasing?
- Prior similar episodes?

+
- Chest pain or discomfort?
- Leg pain or swelling?
- Fever / chills?
- Cough (dry or productive-sputum colour?)

PHYSICAL

Vitals
- RR, SpO2%, HR, BP, Temp?

Heart
- S3/S4, murmurs?
- Elevated JVP?

Lung
- Chest wall movements?
- Auscultation: rales? ronchi? decreased breath sounds?

Leg
- Swelling? Edema?

TESTS

- Venous blood gas (pH, pCO2, HCO3/BE)
- CRP
- EKG if > 40 years

CONSIDER:

1. Upper respiratory tract problem
2. Acute coronary syndrome
3. Pulmonary embolism
4. Pneumonia

7 Dyspnea: Clinical Diagnostic Rules & Clues

PULMONARY EMBOLISM: THE SIMPLIFIED WELLS (CANADIAN) SCORING SYSTEM

Purpose: ruling-out PE with a negative d-dimer

Inclusion: clinically suspected PE: sudden onset of dyspnea, sudden deterioration of existing dyspnea, or sudden onset of pleuritic chest pain without another apparent cause

Exclusion: therapeutic doses of unfractionated or low-molecular-weight heparin for > 24 hrs, life expectancy < 3 mo, pregnancy, < 18 years, allergy to IV contrast, renal insufficiency (Crea clearance < 30 ml/min), too ill to undergo CT scanning, hemodynamic instability

RISK FACTORS	POINTS
• Clinical signs and symptoms of deep venous thrombosis*	3
• Alternative diagnosis less likely than pulmonary embolism	3
• Heart rate > 100/min	1.5
• Immobilization (> 3 days) or surgery in previous 4 weeks	1.5
• Previous pulmonary embolism or deep ven thrombosis	1.5
• Hemoptysis	1
• Malignancy (receiving treatment, treated in the last 6 mo or palliative)	1

* minimum of leg swelling and pain with palpation of the deep veins

PE unlikely (score ≤ 4) + negative d-dimer: 0.5% nonfatal PE/DVT at 3 month follow-up

HEART FAILURE

Background	• Heart failure	LR+ 5.8	LR- 0.45
	• Myocardial infarction	LR+ 3.1	LR- 0.69
Symptoms	• PND*	LR+ 2.6	LR- 0.70
	• Orthopnea	LR+ 2.2	LR- 0.65
	• Dyspnea on exertion	LR+ 1.3	LR- 0.48
Physical	• S3	LR+ 11	LR- 0.88
	• JVD**	LR+ 5.1	LR- 0.66
	• Rales	LR+ 2.8	LR- 0.51
	• Wheezing	LR+ 0.5	LR- 1.3
EKG	• Atrial fibrillation	LR+ 3.8	LR- 0.79
	• Any abnormal finding	LR+ 2.2	LR- 0.64
Ultrasound	• Reduced EF	LR+ 4.1	LR- 0.24
	• IVC ≥ 20.5 mm	SN 90%	SP 73%
	• Pleural effusion(s)	LR+ 2.0	LR- 0.49
	• Positive B-line scan	LR+ 7.4	LR- 0.16
Chest X-ray	• Venous congestion	LR+ 12.0	LR- 0.48
	• Cardiomegaly	LR+ 3.3	LR- 0.33
BNP	• > 100 pg/ml	LR+ 2.2	LR- 0.11
NT-proBNP	• > 300 pg/ml	LR+ 1.8	LR- 0.09

* PND = paroxysmal nocturnal dyspnea.

** JVD = Jugular venous distension

7 Dyspnea: Clinical Diagnostic Rules & Clues

OTTAWA HEART FAILURE RISK SCALE

Purpose: predict death from any cause within 30 days or ED visit or serious adverse event within 14 days of ED visit (regardless of whether admitted): admission to critical care or acute monitoring unit where the patient is too ill to ambulate, endotracheal intubation or NIV, myocardial infarction, unplanned CABG/PCI/cardiac surgery, return to ED for any related medical problem (e.g. for respiratory distress, fever, sepsis) and admission

Inclusion: ≥ 50 yr, presenting to ED with shortness of breath < 7 days duration due to exacerbation of chronic HF or new-onset HF (pulmonary or peripheral fluid retention + abnormal cardiac structure or function)

Exclusion: too ill to be discharged after 2-15 hrs of ED management: SpO2 < 85% or after being on home oxygen levels > 20 min, heart rate ≥ 120/min on arrival, SBP < 85 mm Hg on arrival, confusion / disorientation / dementia, ischemic chest pain or acute ST-T changes, STEMI, terminal status, nursing home or chronic care facility, chronic hemodialysis

CATEGORY	POINTS
Initial assessment	
• History of stroke or TIA	1
• History of intubation for respiratory distress	2
• Heart rate on ED arrival ≥ 110	2
• Room air SaO2 < 90% on EMS or ED arrival	1
Investigations	
• EKG has acute ischemic changes	2
• Urea ≥ 12 mmol/L	1
• Serum CO2 ≥ 35 mmol/L	2
• Troponin I or T elevated to MI level	2
• NT-ProBNP ≥ 5,000 ng/L	1
Walk Test* after ED treatment	
• One of the following: ○ SaO2 < 90% on room air or usual O2 ○ HR ≥ 110 during 3-minute walk test ○ Too ill to walk	1

SCORE	RISK
0	3%
1	5%
2	9%
3	16%
4	26%
5	40%
6	55%
7	70%
8	81%
9	89%

*Patient is asked to walk at their own pace for 3 minutes in the ED, regardless of the distance covered

7 Dyspnea: Clinical Diagnostic Rules & Clues

OTTAWA COPD RISK SCALE

Purpose: predict death from any cause within 30 days or ED visit or serious adverse event within 14 days of ED visit (regardless of whether admitted): admission to critical care or acute monitoring unit where the patient is too ill to ambulate, endotracheal intubation or NIV, myocardial infarction, unplanned CABG/PCI/cardiac surgery/new hemodialysis, return to ED for any related medical problem (e.g. for respiratory distress, fever, sepsis) and admission

Inclusion: ≥ 50 years, COPD previously diagnosed or diagnosed in ED on the basis of 1 year of chronic dyspnea or cough with sputum production, ≥ 15 pack year smoking history, prior or current evidence of moderate airflow obstruction, COPD exacerbation (increase in ≥2/3 of breathlessness, sputum volume, sputum purulence)

Exclusion: too ill to be discharged: resting SpO2 < 85%; heart rate ≥ 130/min; SBP < 85 mm Hg; confusion, disorientation or severe dementia, ischemic chest pain requiring treatment on arrival; STEMI on arrival; death from chronic illness expected within weeks; arrival from a nursing home or chronic care facility

CATEGORY	POINTS
History	
• Coronary bypass graft	1
• Peripheral vascular disease intervention	1
• Intubation for respiratory distress	2
Examination	
• Heart rate on arrival in ED ≥ 110 /min	2
• Too ill to do the Walk Test* after treatment in ED (SaO2 < 90% or heart rate ≥ 120/min)	2
Investigations	
• Acute ischemic changes on ECG	2
• Pulmonary congestion evident on chest X-ray	1
• Hemoglobin < 100 g/L	3
• Urea ≥ 12 mmol/L	1
• Serum CO2 ≥ 35 mmol/L	1

SCORE	RISK
0	2%
1	4%
2	7%
3	13%
4	21%
5	33%
6	48%
7	63%
8	76%
9	NA
10	91%

*Patient is asked to walk at their own pace for 3 minutes in the ED, regardless of the distance covered

PNEUMONIA: CRB-65

RISK FACTOR	POINTS
• Confusion of new onset	1
• Respiratory rate ≥ 30 breaths / min	1
• SBP < 90 mm Hg or DBP < 60 mm Hg	1
• Age ≥ 65 years	1

- Score = 0: outpatient therapy; LR 0.15 (0.10-0.22) for 30-day mortality
- Score = 1-2: consider hospitalization
- Score ≥ 3: hospitalization; LR 4.4 (3.6-5.5) for 30-day mortality

8 Fever

Elevated body temperature not caused by exogenous factors. If other symptoms present (e.g. headache) see other checklists.

BACKGROUND

M
- Current medications? New medications?
- Acetaminophen usage?

A
- Allergies?

P
- Past medical history?

L
- Life circumstances? (e.g. travel history?)

E
- Alcohol: how often? How much?

S
- Smoking: amount? Prior smoking?

HISTORY

O
- When did the fever begin?

S
- Degree of fever?

T
- Constant or intermittent? Increasing?
- Prior similar episodes?

+
- Headache? Neck stiffness?
- Shortness of breath? Cough? Chest pain?
- Abdominal pain? Diarrhea?
- Back pain? Dysuria?
- Leg pain or swelling?
- Rash?

PHYSICAL

Vitals
- RR, SpO2%, HR, BP, Temp?

Head
- Meningismus?

Heart
- S3/S4, murmurs?

Lung
- Rales?

Abdo
- Inspection
- Auscultation
- Palpation

Back
- Inspection
- Percussion tenderness over the kidneys?

Leg
- Unilateral swelling?

Skin
- Rash on the trunk / extremities?

TESTS

- WBC (ev Diff), CRP

CONSIDER FOR ALL:

1. Sepsis
2. Risk for contagion (e.g. influensa)

CONSIDER IF UNCLEAR:

The list of causes of fever is long. If the history and physical examination do not suggest a specific cause, consider the following diagnoses:

1. Pulmonary embolism
2. Cholecystitis
3. Pyelonephritis
4. Appendicitis
5. Diverticulitis
6. Infectious endocarditis
7. Drug fever
8. Malignancy

8 Fever: Clinical Syndromes & Prediction Rule

SEPSIS

Sepsis is defined as life-threatening organ dysfunction caused by a dysregulated host response to infection (Sepsis-3 definition). The clinical criteria for sepsis are the presence of both:

- Suspected or documented infection
- Acute increase in the Sequential Organ Failure Assessment (SOFA) score ≥ 2 points consequent to infection. The SOFA score assigns 0-4 points depending on the degree of dysfunction in each of six organ systems (respiration, cardiovascular, central nervous system, renal, coagulation, liver). Bilirubin, platelet count, PaO2 and creatinine are necessary to calculate the SOFA score.

SEPTIC CHOCK

Septic shock is a subset of sepsis associated with substantially increased mortality due to profound circulatory and cellular/metabolic abnormalities. The clinical criteria for severe sepsis (associated with a hospital mortality > 40%) are the presence of both:

- Persisting hypotension requiring vasopressors to maintain MAP ≥ 65 mm Hg
- Serum lactate level > 2 mmol/L despite adequate volume resuscitation (30 ml/kg cystalloid during the first 3 hours; Dellinger 2013; 1000 ml over the first 30 min Gårdlund 2011).

QUICK SEQUENTIAL ORGAN FAILURE ASSESSMENT (qSOFA)

The qSOFA score uses bedside clinical criteria to identify patients with suspected infection who have an increased risk of mortality or prolonged ICU admission, i.e. those with ≥ 2 of the following criteria:

- Respiratory rate ≥ 22/min
- Systolic blood pressure ≤ 100 mm Hg
- Altered mentation

The qSOFA score had similar predictive validity to the full SOFA score outside the ICU (Seymour 2016). Its purposes are to (Singer 2016):

- help identify adults with infections who are likely to have a poor outcome
- prompt consideration of possible infection if infection is not yet suspected
- prompt testing for biochemical organ dysfunction
- prompt the physician to initiate or escalate therapy
- increase the frequency of monitoring or refer to critical care

TOXIC CHOCK SYNDROME

Toxic shock syndrome (TSS) is cause by exotoxins synthesize by Staphylococcus aureus or Group A Streptococcus (GAS). These exotoxins act as 'superantingens' and activate large numbers of T cells resulting in massive cytokine production. Staphylococcal toxic shock syndrome is associated with a variety of clinical settings, e.g. menstruation, postpartum and postsurgical states, barrier contraceptive use, staphylococcal pneumonia. The cytokines cause capillary leak and tissue damage, leading to

- Shock
- Diffuse, sunburn-like erythematous rash
- Multiorgan failure

9 Headache - Facial Pain

Headache within one day of trauma: see 17. Throat or neck pain: see 16 Throat or Neck Pain.

BACKGROUND

M
- Current medications? Birth control pill? Pain medications: how much / often?

A
- Allergies?

P
- Past medical history? Prior cancer?

L
- Life circumstances?

E
- Alcohol: how often? How much?

S
- Smoking: amount? Prior smoking??

HISTORY

O
- When did the pain start? What were you doing?
- Time till max intensity: sec? min? hr?

P
- Pain location? Size of the painful area?
- Radiation?

Q
- New type of headache? Pulsating?

R
- Worse lying vs standing?
- Worse with valsalva / effort?

S
- VAS (1-10)? Effect on daily function?

T
- Constant or intermittent? Increasing?
- Worse in the morning or in the evening?
- Prior similar headaches?

+
- Neck pain / stiffness?
- Head trauma?
- Fever?
- Vision disturbance (e.g. aura, double vision)?

PHYSICAL

Vitals
- RR, SpO2%, HR, BP, Temp?

Head
- Palpation

Eye
- Redness?
- Fundoscopy: papilledema? bleeding?

TESTS

- CRP if > 50 years
- EKG if > 50 years

CONSIDER:

1. Subarachnoid hemorrhage
2. Bacterial meningitis
3. Serious intracranial pathology
4. Temporal arteritis

NEUROLOGICAL EXAM

Higher cerebral functions
- Level of consciousness
- Orientation
- Dysphasia / dysarthria

Cranial nerves
- Visual fields & neglect
- Pupil size, reactivity
- Eye movements
- Facial sensation
- Facial movement
- Soft palate and uvula
- Tongue movement

Motor
- Proximal and distal arm strength
- Proximal and distal leg strength

Sensory
- Sensation touch and pinch in the distal arm
- Sensation touch and pinch in the distal leg

Reflex
- Arm
- Patella

Coordination
- Finger-nose
- Knee-shin
- Romberg

9 Headache - Facial Pain: Clinical Diagnostic Rules

OTTAWA SUBARACHNOID HEMORRHAGE RULE

Purpose: ruling-out SAH clinically

Inclusion: adults (≥ 16 years); nontraumatic headache reaching max intensity within 1 hour; alert and oriented (GCS 15); no fall or direct head trauma within previous 7 days; presenting to the ED within 14 days of headache onset

Exclusion: new neurologic deficits (e.g. isolated cranial nerve palsies, limb weakness); papilledema on fundoscopic examination; previous diagnosis of cerebral aneurysm, SAH, brain neoplasm, or hydrocephalus; history of recurrent headaches (≥ 3 episodes of the same character and intensity over the course of ≥ 6 months); returned for reassessment of the same headache if already investigated with both CT and lumbar puncture

Rule: investigate for SAH if **≥** 1 high-risk variable present:

• Age ≥ 40 y	• Witnessed loss of consciousness
• Onset during exertion	• Neck pain or stiffness (subjective)
• Thunderclap headache*	• Limited neck flexion on examination**

* Instantly peaking

** Inability to touch chin to chest or raise head 8 cm off bed if supine

SUBARACHNOID HEMORRHAGE & CT HEAD

- CT head (modern, correctly interpreted) within 6 hours of onset of isolated headache (no primary neck pain, no loss of consciousness, normal neuro exam): SN 100%, LR- 0.01
- CT head beyond 6 hours from headache onset: SN 89%, LR- 0.07

BACTERIAL MENINGITIS

95% of adults with community-acquired bacterial meningitis had ≥ 2 of the following:

• Headache	• Neck stiffness
• Fever	• Change in mental status

SERIOUS INTRACRANIAL PATHOLOGY

Among alert (GCS 15) patients > 15 years presenting to the ED with nontraumatic headache, the presence of ≥ 1 of the following had a Sn 98.6%, Sp 34.4%, LR+ 1.50 , LR- 0.04 for serious IC pathology:

• Abnormal findings on neurological examination	
• Sudden onset of the headache	• Age > 50 years

TEMPORAL ARTERITIS

The presence of the following combination motivates empiric treatment with corticosteroids and temporal artery biopsy:

• New onset headache w/o alternative explanation (e.g. normal CT)	
• Elevated CRP w/o alternative explanation	• Age > 50 years

MIGRAINE: "POUNDing"

≥ 4/5 had a LR of 24 while ≤ 2/5 had a LR of 0.41 for migraine:

• Pulsatile quality	• Nausea and vomiting
• Duration 4-72 hOurs	• Disabling intensity
• Unilateral location	

10 Joint Pain

Joint Pain. If pain in the lower extremity, see also 11 Leg Pain - Swelling.

BACKGROUND

- **M** • Current medications?
- **A** • Allergies?
- **P** • Past medical history?
- **L** • Life circumstances?
- **E** • Alcohol: how often? How much?
- **S** • Smoking: amount? Prior smoking?

HISTORY

- **O** • When did the pain start? What were you doing?
  - • Time till max intensity: sec? min? hr?
- **P** • Location of the pain? One or several joints?
  - • Radiation?
- **Q** • Pain? Stiffness?
- **R** • Worse with movement? In such case, which?
- **S** • VAS (1-10)? Effect on daily function?
- **T** • Constant or intermittent? Increasing?
  - • Prior similar painful episodes?
- **+** • Fever / chills?
  - • Pain somewhere else?

PHYSICAL

- **Vitals** • RR, SpO2%, HR, BP, Temp?
- **Joint** • Inspection: red, swollen?
  - • Palpation: warm, tender, joint effusion?
  - • Range of motion?

ARTHROCENTESIS

- WBC + Neutrophils
- Culture
- Crystals
- Glucose

CONSIDER:

1. Septic arthritis
2. If shoulder pain: acute coronary syndrome

10 Joint Pain: Clinical Diagnostic Rules

SEPTIC ARTHRITIS

WBC COUNT: The higher the WBC count in the synovial fluid, the more likely septic arthritis:

- WBC < 25 x 10^9/L: LR 0.32 (0.23-0.43)
- WBC ≥ 25 x 10^9/L: LR 2.9 (2.5-3.4)
- WBC > 50 x 10^9/L: LR 7.7 (5.7-11.0)
- WBC > 100 x 10^9/L: LR 28.0 (12-66)

However, a low WBC count can occur in early infection, and WBC > 50 x 10^9/L can occur with rheumatoid arthritis, gout and pseudogout (Adams 2009)

PMN PERCENTAGE: Polymorphonuclear cells count > 90% in the synovial fluid suggests septic arthritis LR+ 3.4 (2.8-4.2); LR- 0.34 (0.25-0.47)

GLUCOSE: Low synovial fluid glucose (defined as serum/synovial fluid glucose ratio < 0.75 and/or synovial fluid glucose < 1.5 mmmol/ml) is weakly associated with septic arthritis Sn 51% Sp 85% LR+ 3.4 (2.2-5.1); LR- 0.58 (0.44-0.76)

LDH: LDH > 250 U/L in the synovial fluid is sensitive but not specific for septic arthritis Sn 100%; Sp 51%; LR+ 1.9 (1.5-2.5); LR- 0.10 (0.00-1.60)

ACUTE PRIMARY GOUT

(American Rheumatism Association)

The presence of ≥ 7 of the following is required for a diagnosis of acute gout (Sn 74%, Sp 99%, +LR 74, -LR 0.26):

- More than 1 attack of acute arthritis
- Maximum inflammation developed within 1 day
- Attack of monoarthritis
- Redness observed over joints
- First metatarsophalangeal joint painful and swollen
- Unilateral attack of first metatarsophalangeal joint
- Unilateral attack of tarsal joint
- Tophus (proven or suspected)
- Hyperuricemia
- Asymmetric swelling within a joint on radiograph
- Subcortical cysts without erosions on radiograph
- Monosodium urate monohydrate microcrystals in joint fluid during attack
- Culture of joint fluid negative for organisms during attack

KNEE OSTEOARTHRITIS

(American College of Rheumatology)

Knee pain + ≥ 3 of the following suggests osteoarthritis (Sn 95%, Sp 69%; LR+ 3.1; LR- 0.07):

- Age > 50 years
- Morning stiffness lasting < 30 min
- Crepitus on active range of motion
- Bony tenderness
- Bony enlargement
- No palpable warmth

Knee pain + osteophytes on radiograph + ≥ 1 of the following suggests osteoarthritis (Sn 91%, Sp 86%; LR+ 6.5; LR- 0.10):

- Age > 50 years
- Morning stiffness lasting < 30 min
- Crepitus on active range of motion

11 Leg Pain - Swelling

Leg pain and/or swelling.

BACKGROUND

M
- Current medications?
- Birth control pill? Hormones?

A
- Allergies?

P
- Past medical history?
- Prior clots in the leg or lung?

L
- Life circumstances?

E
- Alcohol: how often? How much?

S
- Smoking: amount? Prior smoking?

HISTORY

O
- When did the pain/swelling start? What were you doing?
- Time till max intensity: sec? min? hr?

P
- Location of the pain/swelling? Size of the area?
- Radiation (if pain is present)?

Q
- Pain? Swelling? Other symptoms (t ex redness, itch)?

R
- Is the pain exacerbated by leg/foot movements?
- Is the pain/swelling affected by position (supine, sitting)?

S
- VAS (1-10)? Effect on daily function?

T
- Constant or intermittent? Increasing?
- Prior similar painful episodes?

+
- Chest pain?
- Shortness of breath?
- Fever?

PHYSICAL

Vitals
- RR, SpO2%, HR, BP, Temp?

Leg
- Inspection
- Palpation

TESTS

- CRP

CONSIDER:

1. Deep vein thrombosis
2. Arterial insufficiency
3. Infection
4. Compartment syndrome
5. Ruptured Achilles tendon

11 Leg Pain - Swelling: Clinical Diagnostic Rules

SIMPLIFIED CLINICAL MODEL FOR ASSESSMENT OF DEEP VEIN THROMBOSIS

RISK FACTORS	POINTS
• Active cancer (treated within the previous 6 months or currently receiving palliative treatment)	1
• Paralysis, paresis, or recent plaster immobilization of the lower extremities	1
• Recently bedridden for ≥ 3 days or major surgery within the previous 12 weeks requiring general or regional anesthesia	1
• Localized tenderness along the distribution of the deep venous system	1
• Entire leg swollen	1
• Calf swelling at least 3 cm larger than on the asymptomatic side (measured 10 cm below the tibial tuberosity)	1
• Pitting edema confined to the symptomatic leg	1
• Collateral superficial veins (nonvaricose)	1
• Previously documented deep-vein thrombosis	1
• Alternative diagnosis at least as likely as deep-vein thrombosis	-2

In patients with symptoms in both legs, the more symptomatic leg is used.

D-DIMER USE

Wells et al evaluated the use of routine D-dimer testing in the diagnosis of deep vein thrombosis. D-dimer testing was performed with either the SimpliRED assay (Agen Biomedical) or the IL-Test (Instrumentation Laboratory). For the SimpliRED test, the result was considered negative if no agglutination was seen. For the IL-Test, the result was considered negative if the value was less than 200 µg per liter. According to their study, deep-vein thrombosis can be ruled out in the following situations:

- Score < 2 + negative d-dimer
- Score < 2 + positive d-dimer + negative ultrasound
- Score ≥ 2 + negative d-dimer + negative ultrasound
- Score ≥ 2 + positive d-dimer + negative ultrasound + negative repeat (+ 1 week) ultrasound

STATENS BEREDNING FÖR MEDICINSK UTVÄRDERING

Enligt Statens Beredning för Medicinsk Utvärdering (2004) kan djup ventrombos uteslutas i följande situationer:

- Låg klinisk sannolikhet (< 2 poäng) + negativ d-dimer
- Låg klinisk sannolikhet (< 2 poäng) + negativt proximalt ultraljud
- Hög klinisk sannolikhet + negativ d-dimer + negativt proximalt ultraljud
- Hög klinisk sannolikhet +
  - negativt ultraljud, både proximalt + av underbenets vener
  - negativ flebografi
  - negativt proximalt ultraljud + negativt upprepat ultraljud +1v

12 Neurological Deficit

Weakness and/or paresthesia. If head trauma, see also 17 Trauma to the Head or Neck

BACKGROUND

- **M** • Current medications?
- **A** • Allergies?
- **P** • Past medical history?
- **L** • Life circumstances?
- **E** • Alcohol: how often? How much?
- **S** • Smoking: amount? Prior smoking?

HISTORY

- **O** • When did the deficit start?
  - What were you doing?
  - Time till max intensity: sec? min? hr?
- **P** • Location of the deficit?
- **Q** • Weakness? Paresthesia? Both?
- **S** • Degree of deficit? Effect on daily function?
- **T** • Constant or intermittent? Increasing?
  - Prior similar episodes?
- **+** • Difficulty finding/understanding words?
  - Vision problems?
  - Urinary incontinence/retention?
  - Pain (head, neck, chest, back)?
  - Fever?

PHYSICAL

- **Vitals** • RR, SpO2%, HR, BP, Temp?
- **Heart** • S3/S4, murmurs?
  - Irregular rhythm?

TESTS

- EKG if > 50 years
- CRP if > 50 years

CONSIDER:

1. Stroke / TIA within 5 hours?
2. Dissection (aorta, carotid, vertebrobasilar arteries)?
3. Myelopathy
4. Temporal Arteritis

NEUROLOGICAL EXAM

- **Cortical functions** • Orientation
  - Dysphasia / dysarthria
  - Visual fields & neglect
- **Cranial nerves** • Pupil size, reactivity
  - Eye movements
  - Facial sensation
  - Facial movement
  - Soft palate and uvula
  - Tongue movement
- **Motor** • Proximal arm strength
  - Distal arm strength
  - Proximal leg strength
  - Distal leg strength
- **Sensory** • Sensation touch hand
  - Sensation pinch hand
  - Sensation touch foot
  - Sensation pinch foot
- **Reflex** • Arm
  - Patella
- **Coordination** • Finger-nose
  - Knee-shin
  - Romberg

12 Neurological Deficit: Clinical Syndromes

FOCAL FOREBRAIN LESION

- Unilateral weakness in the face (forehead sparing), arm and/or leg
- Dysphasia, neglect, conjugated eye deviation and/or homonymous hemianopsia are present with cortical involvement

FOCAL BRAINSTEM and/or CEREBELLAR LESION

- Unilateral cranial nerve dysfunction (no forehead sparing)
- Contralateral weakness and/or decreased sensation with long tract involvement.

MYELOPATHY

Absence of cortical and cranial nerve involvement; a sensory or motor level is present:

- **Total cord syndrome**: bilateral weakness, loss of sensation for all modalities and sphincter dysfunction
- **Anterior cord syndrome**: bilateral weakness and loss of sensation for pain; preserved touch
- **Posterior cord syndrome**: bilateral loss of touch; preserved strength and pain sensation
- **Central cord syndrome**: bilateralt loss of strength and pain sensation in the arms
- **Brown-Séquard**: ipsilateral weakness and loss of sensation for touch; preserved pain sensation
- **Conus medullaris/cauda equina syndromes**: leg weakness in specific myotomes; saddle anesthesia; incontinence

RADICULOPATHY

	Paresthesia	Weakness	Hyporeflexia
C5	Lower lateral shoulder	Arm abduction	
C6	Lateral lower arm	Elbow flexion	Biceps
C7	Dig 3	Elbow extension	Triceps
C8	Mediala lower arm	Finger flexion	
T1	Medial side of elbow	Finger abduction	
L3	Medial thigh	Hip adduction	
L4	Medial calf	Knee extension	Patella
L5	First web space (dig 1-2)	Extension of dig 1	
S1	Sole of the foot	Foot plantar flexion	Achilles

PERIPHERAL MONONEUROPATHY

Nerve	Paresthesia*	Weakness*
Axillary	Lower lateral shoulder	Arm abduction
Musculo-cutaneus	Lateral forearm	Elbow flexion
Radial	Radial aspect of the back of the hand	Elbow extension & flexion Wrist & finger extension
Median	Radial aspect of the palm	Thumb opposition
Ulnar	Ulnar aspect of the hand	Finger abduction & adduction
Lateral cutaneous	Lateral thigh	None
Obturator	Medial thigh	Hip adduction
Femoral	Anterior thigh & medial calf	Knee extension
Peroneal, deep	First web space of the foot	Foot & toe dorsiflexion
Peroneal, superficial	Lateral calf and foot	Foot eversion
Tibial	Sole	Foot & toe dorsiflexion
Ischial	Lateral thigh and calf Dorsom and sole of the foot	Knee flexion

* The distribution of the deficit depends on the level of injury

13 Poisoning

Suspected poisoning. If altered consciousness, see also 3. If trauma to the head, see also 17.

BACKGROUND

- **M** • Current medications?
- **A** • Allergies?
- **P** • Past medical history? Substance abuse?
  • Prior poisoning / self-harm?
- **L** • Life circumstances? Children < 18 year?
- **E** • Alcohol: how often? How much?
- **S** • Smoking: amount? Prior smoking?

HISTORY

- **What?** • Which substances? Amounts?
- **When?** • Time of intoxication?
- **Why?** • Reason? Suicide attempt?
- **Now?** • How do you currently feel (somatically)?
  • How do you currently feel (mentally / psychologically)?

PHYSICAL

- **A** • Trauma to the head?
  • Tongue bite?
- **B** • SpO2%
  • Respiratory rate?
  • Lung auscultation?
  • Chest wall examination
- **C** • Pulse / blood pressure
  • Heart rate
  • QRS width, regularity?
- **D** • Level of consciousness?
  • Eye / pupil examination
  • Focal neurological deficits in the arms/legs?
  • Glucose?
- **E** • Front side of the body
  • Back side of the body
  • Temperature?

EKG

- Rhythm abnormality (e.g. AV block)?
- Prolonged QRS?
- Prolonged QTc?

TESTS

- Acid-base: pH, pCO_2, HCO_3/BE
- Electrolytes: Na, K, Cl, anion gap
- Paracetamol (4 hr after consumption)
- Ethanol
- Pregnancy test in fertile women

CONSIDER:

1. Toxidrome?
2. Contact Poison Control Center
3. Specific tests, e.g.:
   - Medication levels, toxic alcohols
   - Urine toxicologic screen
   - CK, myoglobin (rhabdomyolysis?)
   - Lever function tests
   - INR
4. Chronic alcohol abuse (thiamine?)
5. Admission for somatic reasons?
6. Residual risk for suicide / self-harm?
7. Contact with social services (e.g. caretaker of child)?

13 Poisoning: Toxidromes

ABCDE TOXIDROMES

		NEITHER	DRY	WET
			• Red, warm, dry skin • Dry mouth • Dry eyes • Ileus • Urinary retention	• Sweaty skin • Salivation • Increased tearing • Diarrhea • Urinary incontinence
H **I** **G** **H**	B: Tachypnea, normal O_2% C: Hypertension, tachycardia D: Agitation, mydriasis, seizure E: Hyperthermia	**Sympathomimetic / Hallucinatory**	**Anticholinergic**	**Serotonergic**
L **O** **W**	B: Bradypnea, low O_2%, bronchospasm C: Hypotension, bradycardia D: Somnolence, miosis, hyporeflexia E: Hypothermia	**Sedative-Hypnotic**	**Opioid**	**Cholinergic**

Sympathomimetic/Hallucinatory	**Anticholinergic**	**Serotonergic**
Cocaine, amphetamines, ephedrine, theophyllamine, caffeine, phencyclidine (PCP), ketamine, lysergsyredietylamid (LSD), mescaline, psilocybin	Tricyclic antidepressants, antihistamines, antiparkinson medications, phenthiazines, scopolamine, muscle relaxants, white angel's trumpet, Jimson weed, deadly nightshade	Serotonin reuptake inhibitors, monoamine oxidase inhibitors, tricyclic antidepressives, L-tryptophan, ecstasy (MDMA[2]), cocaine
Sedative-Hypnotic	**Opioid**	**Cholinergic**
Bensodiazepines, zopiklon, zolpidem, alpha 2 agonists, barbiturates, ethanol, gamma-hydroxibutansyra (GHB), gamma-butyrolactone (GBL), butanediol (BD)	Morphine, methadone, oxycodone, hydromorphone, buprenorphine, loperamide, diphenoxylate, heroin, fentanyl	Acetylcholinesterase inhibitors (e.g. neostigmine, donepezil), insecticides (organophosphates, carbamates), certain pesticides, certain mushrooms, organophosphorous ("nerve") gases (e.g. sarin)

ACID-BASE TOXIDROMES

Respiratory Alkalosis
Salicylates, theophylline, caffeine, nicotine

Increased Anion Gap
Methanol, metformin, paraldehyde, phenformin, iron, isoniazid, ibuprofen, ethylene glycol, salicylates, cyanide, toluene (glue sniffing), solvents

Decreased Anion Gap
Lithium, iodide, bromide (falsely low), salicylates (falsely low)

EKG TOXIDROMES

AV nodal blocking
Beta-blockers, verapamil, diltiazem, digoxin

Na channel blocking (wide QRS), K channel blocking (long QTc)
- Antiarhythmics (Ia & Ic)
- Tricyclic antidepressants
- Antipsychotics
- Antihistamines
- Chloroquine

14 Scrotal - Testicular Pain

Pain localized to the scrotum or testicle. If concurrent abdominal pain, see also 1-Abdominal - Flank Pain.

BACKGROUND

- **M** • Current medications?
- **A** • Allergies?
- **P** • Past medical history?
- **L** • Life circumstances? Sexual activity?
- **E** • Alcohol: how often? How much?
- **S** • Smoking: amount? Prior smoking?

HISTORY

- **O** • When did the pain start? What were you doing?
- • Time till max intensity: sec? min? hr?
- **P** • Pain location? Size of the painful area?
- • Radiation?
- **Q** • Description of pain quality
- **R** • Worse with movement?
- **S** • VAS (1-10)?
- **T** • Constant or intermittent? Increasing?
- • Prior similar painful episodes?
- **+** • Dysuria, urgency, discharge?
- • Fever / chills?
- • Nausea, vomiting?

PHYSICAL

- **Vitals** • RR, SpO2%, HR, BP, Temp?
- **Buk** • Inspection
- • Palpation
- **Genitalia** • Inspection
- • Palpation
- • Cremaster reflex

TESTS

- CRP
- Urine dipstick

CONSIDER:

1. Testicular torsion
2. Epididymitis

14 Scrotal - Testicular Pain: Clinical Diagnostic Rule

TESTICULAR TORSION

A prospective cohort study of 228 male patients aged 0-21 years evaluated for acute (≤ 72 hours) scrotal pain in the Emergency Department of an urban children's hospital reported the following features associated with testicular torsion (defined by diminished blood flow on testicular doppler US, ischaemic/infarcted testicle at operative assessment, or presence of testicular atrophy at 1- to 3-month follow-up):

- Horizontal or inguinal lie OR 18.17 (6.2-53.2)
- Nausea or vomiting OR 5.63 (2.08-15.22)
- Age 11-21 years OR 3.9 (1.27-11.97)

The authors propose the following clinical decision tool to rule out testicular torsion clinically:

- Normal testicular lie
- Lack of nausea and vomiting
- Age 0-10 years

The presence of all three criteria ruled-out testicular torsion with a sensitivity of 100% and negative predictive value of 100%. The tool has not been externally validated.

15 Syncope - Seizure

Transient loss of consciousness with rapid onset & complete recovery. If residual altered consciousness see 3.

BACKGROUND

M
- Current medications?
- Recent additions, dosage changes?

A
- Allergies?

P
- Past medical history?
- Prior episodes with transient loss of consciousness?

L
- Life circumstances?

E
- Alcohol: how often? How much?

S
- Smoking: amount? Prior smoking?

HISTORY

Prior
- Circumstances (activity? Standing/sitting/supine?)
- Prodrome? Pain? Palpitations?
- Trauma upon loss of consciousness?

During (if witnessed)
- Shaking?
- Skin colour?
- Duration of loss of consciousness?

After
- Confusion? If so, duration?
- Pain (muscular, head, chest, back, abdomen, leg)?

PHYSICAL

Vitals
- RR, SpO2%, HR, BP, Temp?

Mouth
- Tongue bite?

Head
- Head trauma?

Heart
- S3/S4, murmurs?
- Elevated JVP?

Leg
- Swelling?

CONSIDER:

1. Syncope or seizure?
2. Unclear syncope: cardiogenic?

EKG

Rate
- Tachy- bradycardia?

Rhythm
- AV block?
- Atrial fibrillation?

P
- Left atrial hypertrophy?

PR
- Short PR segment?

Q
- Deep, narrow in lateral leads?
- Signs of prior infarction?

R/S
- Tall precordial R waves?

QRS
- Bundle branch block?
- Delta wave?
- Epsilon wave?

ST
- Ischemia?
- Brugada pattern?

T
- Ischemia?

QTc
- Prolonged? Short?

15 Syncope - Seizure: Clinical Diagnostic Rules

CANADIAN SYNCOPE ARRHYTHMIA RISK SCORE

Purpose: predict death, arthyhmia or procedural interventions to treat arrhythmias within 30 days of ED evaluation among patients for whom arrythmia and non-arrhythmic serious conditions were not identified during the ED evaluation

Inclusion: adults (≥ 16 yr) with syncope presentin within 24 hours after the event

Exclusion: prolonged loss of consciousness (> 5 min), change in mental status from baseline after the syncope, obvious witnessed seizure or head trauma causing loss of consciousness, major trauma requiring hospital admission, intoxication with alcohol or illicit drugs, language barrier

CATEGORY	POINTS	SCORE	RISK
Clinical Evaluation		-2	0.2%
• Vasovagal predisposition*	-1	-1	0.5%
• History of heart disease÷	+1	0	0.9%
• Any ED SBP < 90 or > 180 mm Hg‡	+1	1	1.9%
Investigations		2	3.8%
• Troponin > 99%ile	+1	3	7.5%
• QRS duration > 130 ms	+2	4	14.3%
• QTc interval > 480 ms	+1	5	25.4%
Diagnosis in Emergency Department		6	41.1%
• ED diagnosis of vasovagal syncope	-1	7	58.8%
• ED diagnosis of cardiac syncope	+2	8	74.5%

Score of ≥ 0 had SN 97% and SP 53% for death/arrhythmia/intervention within 30 days.

*Warm-crowded place, prolonged standing, fear, emotion or pain

÷ Includes history of coronary or valvular heart disease, cardiomyopathy, congestive heart failure or non-sinus rhythm (ECG evidence during the index visit or documented history of ventricular or atrial arrhythmias, or device implantation)

‡ Includes blood pressure values from triage until ED disposition

SYNCOPE VERSUS SEIZURE

QUESTIONS	POINTS
• At times do you sweat before your spells?	-2
• At times is emotional stress associated with losing consciousness?	1
• At times do you have a sense of deja vu or jamais vu before your spells?	1
• Have you ever had lightheaded spells?	-2
• Is prolonged sitting or standing associated with your spells?	-2
• Unresponsive, unusual posturing, jerking limbs during spells or no memory of spells afterwards?	1
• Has anyone ever noted your head turning during a spell?	1
• At times do you wake with a cut tongue after your spells?	2
• Has anyone ever noted that you are confused after a spell?	1

Score ≥ 1 suggests seizure, score < 1 suggests syncope.

16 Throat - Neck Pain

Pain in the throat or neck. If concurrent headache see 9 Headache - Facial Pain. If post-traumatic see 17.

BACKGROUND

- **M** • Current medications?
- **A** • Allergies?
- **P** • Past medical history?
- **L** • Life circumstances?
- **E** • Alcohol: how often? How much?
- **S** • Smoking: amount? Prior smoking??

HISTORY

- **O** • When did the pain start?
  - • Time till max intensity: sec? min? hr?
- **P** • Pain location?
  - • Radiation?
- **Q** • Pain quality?
- **R** • Worse with swallowing?
- **S** • VAS (1-10)?
- **T** • Constant or intermittent? Increasing?
  - • Prior similar painful episodes?
- **+** • Fever / chills?
  - • Cough?
  - • Trauma to the head / throat / neck?

PHYSICAL

- **Vitals** • RR, SpO2%, HR, BP, Temp?
- **Throat** • Redness? Swelling? Exudate?
- **Neck** • Swelling (e.g. lymph nodes)?
  - • Tenderness?

TESTS

- CRP
- EKG if > 50 years

CONSIDER:

1. Epiglottitis
2. Serious infection, e.g. retropharyngeal abscess, Ludwig's angina, Lemierre's syndrome
3. Dissection (carotid, vertebro-basilar)
4. Acute coronary syndrome

16 Throat - Neck Pain: Clinical Syndromes & Decision Rule

EPIGLOTTITIS

Fever + the 4 D's:

- Dypnea
- Dysphagia (odynophagia)
- Dysphonia
- Drooling

DEEP NECK SPACE INFECTIONS

Description, pathophysiology.

- Peritonsillar abscess (quinsy), Parotitis
- Infection in the submandibular space (Ludwig's angina)
- Infection in the parapharyngeal space
- Infection in the retropharyngeal space

Symptoms that may occur:

- Sore throat
- Trismus (the inability to open the jaw)
- Purulent oral discharge, pooling of saliva in the mouth, asymmetry of the oropharynx
- Lymphadenopathy is usually present.
- Dysphagia and odynophagia are secondary to inflammation of the cricoarytenoid joints.
- Dysphonia and hoarseness are late findings in neck infections and may indicate involvement of the tenth cranial nerve
- Unilateral tongue paresis indicates involvement of the twelfth cranial nerve.
- Stridor and dyspnea signify airway obstruction and may be manifestations of local pressure or spread of infection to the mediastinum.

MODIFIED CENTOR CRITERIA

Criteria	Points
Temperature > 38.0	1
Tonsillar swelling or exudate	1
Swollen tender anterior cervical nodes	1
Absence of cough	1
3-14 years	1
≥ 45 years	-1

Points	Likelihood of positive throat culture for Group A Streptococcal Pharyngitis
≤ 0	1-2.5%
1	5-10%
2	11-17%
3	28-35%
≥ 4	51-53%

There are different thresholds for performing a throat culture or rapid antingen-detection test (RADT):

- ≥ 2 points

17 Trauma to the Head or Neck

Trauma to the head of neck. If altered consciousness, see also 3. If loss of consciousness prior to trauma, see also 15.

BACKGROUND

M
- Current medications?
- Platelet inhibitors? Anticoagulant?

A
- Allergies?

P
- Past medical history?

L
- Life circumstances?

E
- Alcohol: how often? How much?

S
- Smoking: amount? Prior smoking?

HISTORY

Prior
- Circumstances?
- Prior symptoms (e.g. palpitations?)

Trauma
- Mechanism of injury?
- Loss of consciousness?

After
- Amnesia (retrograde, anterograde)?
- Vomiting?
- Headache? Neck pain?
- Seizure?
- Paresthesia?
- Vision disturbance?
- Altered bite?

PHYSICAL

Vitals
- RR, SpO2%, HR, BP, Temp?

Head
- Inspection
- Palpation

C-spine
- Palpation

Face
- Visual acuity
- Swinging flashlight test
- Eye movements
- Palpation of the orbital rims
- Palpation of the nasal bridge
- Examination of the nasal septum
- Inspection of the oral cavity
- Examintion of jaw movement
- Otoscopy

Neuro
- Level of consciousness
- Gross sensation and strength in the extremities

TESTS

- EKG if > 50 years
- INR and thrombocytes if the patient is taking an anticoagulant

CONSIDER:

1. Poisoning, arrhythmia, seizure, assault etc.
2. Intracranial bleed
3. C-spine fracture
4. Facial fracture
5. Admission for observation

17 Trauma to the Head or Neck: Clinical Decision Rules

SCANDINAVIAN NEUROTRAUMA COMMITTEE GUIDELINES

Applies to all adults with minimal, mild and moderate head injury (GCS 9-15 / RLS 1-3) within 24 hrs of injury

GCS 9-13 / RLS 3	• CT head **and** admission for observation > 24 hrs
GCS 14-15 / RLS 1-2 + **any of**: • posttraumatic seizures • focal neurological deficits • clinical signs of depressed or basal skull fracture • shunt-treated hydrocephalus • therapeutic anticoagulation or coagulation disorders	• CT head **and** admission for observation > 24 hrs
GCS 14-15 / RLS 1-2 + **both of**: • age ≥ 65 years • anti-platelet medication	• CT head **or** admission for observation ≥ 12 hours; discharge* if CT normal
GCS 14 / RLS 2 **or** GCS 15 / RLS 1 **and any of:** • suspected/confirmed loss of consciousness • repeated vomiting (≥ 2 episodes)	• S100B if < 6 hrs since injury; discharge* if < 0.1 ug/L • CT head **or** admission for observation ≥ 12 hrs if > 6 hrs or S100B not available or S100B > 0.1 ug/L; discharge* if CT normal
GCS 15 / RLS 1 and none of the risk factors listed above	• Discharge*

* with oral and written instructions

NEXUS LOW-RISK CRITERIA

No cervical spine x-ray is required if **all 5** are present:

- Normal level of alertness
- No evidence of intoxication
- No painful distracting injuries
- No focal neurologic deficit
- No posterior cervical-spine tenderness

CANADIAN C-SPINE RULE

No cervical spine x-ray is required if **all 4** are present:

- Fulfills the inclusion criteria
- 0 high risk factors
- ≥ 1 low risk factor
- Able to rotate the neck actively > 45° left and right

Inclusion criteria: > 15 years, no history of back or vertebral disease, normal level of consciousness, trauma < 48 hrs old
High risk factors: age ≥ 65 years, paresthesias in the extremities, dangerous mechanism of injury (fall from ≥ 1 m or 5 stairs, axial load on the head, motor vehicle collision at high speed (> 100 km/h) or with rollover or ejection, a collision involving a motorized recreational vehicle, a bicycle collision)
Low risk factors: simple rear-end motor vehicle collision, sitting position in the ED, ambulatory at any time, delayed (not immediate) onset of neck pain, absence of midline cervical-spine tenderness

18 Vertigo

Transient or permanent illusion of motion or unsteadiness. If feeling of impending faint, see 15 Syncope - Seizure.

BACKGROUND

- **M** • Current medications?
- **A** • Allergies?
- **P** • Past medical history?
- **L** • Life circumstances?
- **E** • Alcohol: how often? How much?
- **S** • Smoking: amount? Prior smoking?

HISTORY

- **O** • When did vertigo start? Activity at the time?
- • Time till max intensity: sec? min? hr?
- **Q** • Illusion of motion? Faintness?
- **R** • Worse with movement of the head?
- **S** • Effect on daily function?
- **T** • Duration: sec, min, hr, days?
- • Prior similar episodes?
- **+** • Diplopia?
- • Dysarthria?
- • Dysphagia?
- • Decreased hearing / tinnitus?
- • Decreased strength or sensation?
- • Dysmetria?
- • Headache / neck pain?
- • Trauma to the head / neck recently?

PHYSICAL

- RR, SpO2%, HR, BP, Temp?

CONSIDER:

1. Stroke, including dissection
2. Vestibular neuritis
3. Bacterial labyrinthitis

NEUROLOGICAL EXAM

Higher cerebral functions	• Level of consciousness • Orientation • Dysphasia / dysarthria
Cranial nerves	• Visual fields & neglect • Pupil size, reactivity • Eye movements • Facial sensation • Facial movement • Soft palate and uvula • Tongue movement
Motor	• Proximal and distal arm strength • Proximal and distal leg strength
Sensory	• Sensation touch and pinch in the distal arm • Sensation touch and pinch in the distal leg
Reflex	• Arm • Patella
Coordination	• Finger-nose • Knee-shin • Romberg

18 Vertigo: Clinical Diagnostic Rules & Tests

ACUTE VESTIBULAR SYNDROME (AVS)

AVS consists of dizziness with the following:

- rapid onset (over seconds to hours)
- duration ≥ 1 day
- nystagmus
- gait unsteadiness
- nausea/vomiting
- intolerance to head motion

HINTS

HINTS (**H**orizontal head **I**mpulse test, **N**ystagmus and **T**est of **S**kew) is a clinical decision rule to identify stroke among patients with AVS.

A stroke can be rule out in a patient with AVS if **all of the following** are present:

- Positive impulse test
- No change in direction of the nystagmus
- No skew deviation

A patient with AVS is likely to have a stroke if **any of the following** are present (acronym INFARCT):

- Impulse Normal
- Fast-phase Alternating
- Refixation on Cover Test

The HINTS examination has the following test characteristics for stroke: SN 98%, SP 85%, LR- 0.02.

BENIGN PAROXYSMAL POSITIONAL VERTIGO (BPPV)

Affirmative answers to both of the following questions yielded a LR of 6.81 (5.11-9.10) for diagnosis of DHT (Dix-Hallpike test positive) + BPPV, while negative answers to both had a LR of 0.19 (0.08-0.47):

- Duration of dizziness ≤ 15 seconds
- Onset when turning over in bed

The **Dix-Hallpike Test** can help diagnose BPPV affecting the posterior semicircular canal. A structured critical appraisal of the litterature suggests that the Dix-Hallpike has the following test characteristics: Sn 79% (65-94); Sp 75% (33-100); LR+ 3.17 (0.58-17.50); LR- 0.28 (0.11-0.69) (Halker 2008).

The **Pagnini-McClure (Head-Roll) Test** can help identify BPPV affecting the horizontal (lateral) semicircular canal.

19 Vision Disturbance

Decreased visual acuity and/or disturbances, e.g. flashes. If headache see 9. If neurological deficits see 12.

BACKGROUND

- **M** • Current medications?
- **A** • Allergies?
- **P** • Past medical history?
- **L** • Life circumstances?
- **E** • Alcohol: how often? How much?
- **S** • Smoking: amount? Prior smoking?

HISTORY

- **O** • When did the vision disturbance start? What were you doing?
  - Time till max intensity: sec? min? hr?
- **P** • Does the disturbance affect vision from one or both eyes?
  - Which part of the visual field is affected?
- **Q** • Description of the distrubance: decreased visual acuity, shadows, flashes, floaters, halo?
- **S** • Degree of deficit (e.g. ability to read, count fingers)?
- **T** • Constant or intermittent? Increasing?
  - Prior similar episodes?
- **+** • Eye pain? Headache?
  - Fever?

PHYSICAL

- **Vitals** • RR, SpO2%, HR, BP, Temp?
- **Eye** • Inspection of the eyelids, conjunctiva, cornea
  - Visual acuity
  - Visual fields
  - Pupil size, reaction to light
  - Swinging flashlight test
  - Fundoscopy

TEST

- CRP if > 50 years

CONSIDER:

1. Central retinal artery occlusion?
2. Stroke?
3. Temporal arteritis?

NEUROLOGICAL EXAM

- **Higher cerebral functions** • Level of consciousness
  - Orientation
  - Dysphasia / dysarthria
- **Cranial nerves** • Visual fields & neglect
  - Pupil size, reactivity
  - Eye movements
  - Facial sensation
  - Facial movement
  - Soft palate and uvula
  - Tongue movement
- **Motor** • Proximal and distal arm strength
  - Proximal and distal leg strength
- **Sensory** • Sensation touch and pinch in the distal arm
  - Sensation touch and pinch in the distal leg
- **Reflex** • Arm
  - Patella
- **Coordination** • Finger-nose
  - Knee-shin
  - Romberg

19 Vision Disturbance: Clinical Diagnostic Clues

MONOCULAR VISION DISTURBANCE

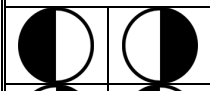
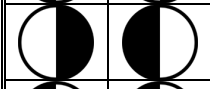
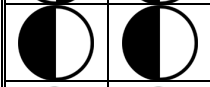
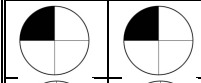
Acute monocular vision disturbance suggests a problem in the eye or the optic nerve, e.g.

- Vitreous hemorrhage
- Retinal detachment
- Temporal arteriits
- Central retinal artery occlusion
- Central retinal vein occlusion
- Optic neuritis

BINOCULAR VISION DISTURBANCE

Acute binocular vision disturbance may be caused by either

- a chiasmal or post-chiasmal process
- a systemic process, e.g. temporal arteritis

Field Loss*	Terminology	Pathology
	Bitemporal (bipolar) hemianospia	Midline chiasmal lesion
	Binsasal hemianospia	
	Left homonymous hemianopsia	Lesion affecting the right optic tract Lesion affecting the right occipital lobe
	Left homonymous superior quadrantanopsia	Lesion affecting the lower right optic radiations
	Left homonymous inferior quadrantanopsia	Lesion affecting the upper right optic radiations

* from the patient's perspective

20 Wound

Wound. If trauma to the head or neck, see also 17 Trauma to the Head or Neck.

BACKGROUND

- **M** • Current medications?
- **A** • Allergies (e.g. to dental procedures)?
- **P** • Past medical history?
- **L** • Life circumstances?
- **E** • Alcohol: how often? How much?
- **S** • Smoking: amount? Prior smoking?

HISTORY

- **When** • When did the wound occur?
- **What** • What were you doing at the time?
  - Mechanism of injury?
  - Might foreign material still be present in the wound?
- **Why** • Accident? Poisoning? Syncope? Assault? Self-harm?

PHYSICAL

- **Protective gear** • Gloves, consider eye guard, mouth guard
- **Distal function** • Touch (two point discrimination)?
  - Motor function (specific tendon function)?
  - Perfusion?
- **Anesthesia** • Cleanse the skin
  - Anesthesia with lidocain +/- adrenalin
- **Inspection** • Irrigate with NaCl / tap water
  - Hemostatic measures if needed
  - Inspect for injured structures (e.g. tendons)
  - Inspect for foreign material

CONSIDER:

1. Investigations to rule-out foreign material (t ex ultrasound, X-ray)
2. Tetanus booster
3. Antibiotics

20 Wound: Management Tips

PRIMARY CLOSURE

Primary closure is contraindicated in the following settings:

- Wounds that are already infected
- Contamination with soil, organic matter, faeces
- Extensive tissue damage, e.g. explosion injuries, high-velocity missile injuries, complex crush injuries
- Deep or contaminated lacerations on the bottom of the foot
- Human bite wounds

Alternatives to primary closure include:

- Secondary closure (excision of the wound followed by primary closure)
- Delayed primary closure on day 4-5
- Primary healing i.e. healing by secondary intention

TETANUS PROPHYLAXIS

Minimally contamined minor wound:

- Fully immunized ≤ 10 years since last dose: no prophylaxis
- Not fully immunized or > 10 years since last dose: tetanus toxoid

Tetanus-prone wound (contaminated or complex wound, e.g. deep puncture wound):

- Fully immunized ≤ 5 years since last dose: no prophylaxis
- Fully immunized 5-10 years since last dose: tetanus toxoid
- Fully immunized > 10 years since last dose OR non-fully immunized: tetanus toxoid + human tetanus immune globulin

ANTIBIOTICS

Consider 72 hours of antibiotic treatment in the following settings:

- extremity bite wounds
- puncture-type bite wounds in any location
- intraoral lacerations that are sutured
- orocutaneous lip wounds
- wounds that cannot be cleaned or débrided satisfactorily
- highly contaminated wounds (e.g. with soil, organic matter, purulence, faeces, saliva)
- wounds involving tendons, bones, or joints
- wounds requiring extensive débridement in the operating room
- wounds in lymphedematous tissue
- distal extremity wounds when treatment is delayed for 12 to 24 hours
- patients with orthopedic prostheses
- patients at risk for the development of infective endocarditis

The choice of antibiotics depends on the cause of the wound (e.g. the species responsible for the bite) and evolving bacterial resistance.