**Supplementary material 1.** Text message and email content

**Signs, symptoms and presentations (9%)**

1. DDx of CP sx: abrupt onset, severe pain radiating to back- AD or esophageal rupture. Pleuritic pain w dyspnea- PE or PTX. Gradual onset, pressurelike- MI

**(156)**

1. Cardiac tamponade: tachycardia, hypotension, Kussmaul breathing (neck vein distension during inspiration), pulsus paradoxus (dec SBP >10 mmHg during inspiration)

**(166)**

1. PE: pleuritic pain, dyspnea, tachycardia, clear lungs, RV strain, Lead I prominent S wave. Risk factors: cancer, recent surgery long trip, h/o DVT. Tx LMWH or UFH

**(165)**

1. Mesenteric Ischemia: severe abdominal pain out of proportion to exam in elderly pt w Afib. SMA thrombus causes intestinal angina w postprandial pain, weight loss

**(165)**

1. Hyponatremia: obtundation, seizures. Consider SIADH in pt w malignancy. Tx Hypertonic (3%) saline. If rapidly corrected, can lead to central pontine myelinolysis

 **(164)**

1. Ruptured Esophagus: retrosternal pain after retching or recent endoscopy. Mackler’s triad: CP, vomiting, subcutaneous emphysema. Causes chemical mediastinitis

**(162)**

1. Grey Turner sign: flank discoloration-retroperitoneal hematoma, pancreatitis. Cullen sign: periumbilical ecchymosis-pancreatitis, ectopic pregnancy, ruptured AAA

**(166)**

1. Hypothyroid: AMS, hypothermia, bradycardia, neuropathy, slow DTRs, periorbital edema, hypotension. Hyperthyroid: agitated, tremulous, tachycardia, fever

**(156)**

1. To assess brainstem function in unconscious pt w oculovestibular response, intact response by eyes deviating toward stimulus then nystagmus & return to midline

**(162)**

**Abdominal and gastrointestinal disorders (9%)**

1. FB obstruction: cricopharyngeal muscle C6 (kids), aortic arch T4, GE junction T11 (adults). Remove STAT: upper esophagus coins, sharp objects, >2×5 cm, button battery

**(165)**

1. Spontaneous bacterial peritonitis: fever, ascites, abd pain, AMS. Dx requires paracentesis w PMN >250. E. coli and strep most common organisms. Tx 3rd gen ceph

**(160)**

1. Hepatitis B Markers. HBsAg=active/infective. HBsAB=immunity. HBcAB IgM=recent infection, +2 wks after HBsAg +. HBcAB IgG=remote infection. HBeAg=high infectivity

**(165)**

1. Acalculous cholecystitis: occurs in postop, burns, trauma, DM, septic, postpartum, elderly, kids. ⇑ risk for gangrene & perforation, Tx emergent cholecystectomy

**(164)**

1. Ranson’s criterion is a tool for prognosis in pancreatitis pts. Hospital admission: Age>55, Glucose>200, WBC>16k, LDH>350, AST>250. Mortality incr w no of positives

**(166)**

1. Scombroid fish poisoning: improper refrigeration, facial flushing. Tx Antihistamines. Ciguatera: ingestion of neurotoxin, reverse hot/cold sensation. Tx symptoms

**(165)**

1. In acute diarrheal illness, avoid antimotility meds. Campylobacter- most common. C. difficile- recent Abx. Salmonella- contaminated eggs/poultry. Shigella-Tx Bactrim

**(165)**

1. Crohn’s Disease: terminal ileum & colon, skip lesions, transmural, cobblestone, fistulas. Ulcerative Colitis: continuous colonic lesions, rectal involvement, abscess

**(165)**

1. Sigmoid volvulus: debilitated elderly pt, chronic constipation; Tx rectal tube decompression. Cecal volv: healthy pt, embryologic defect; XR coffee bean sign; Tx surg

**(166)**

**Cardiovascular disorders (10%)**

1. Aortic Disssection: Type A involves ascending aorta, Tx Surg. Type B is distal to L subclavian artery, Tx β-blockers. Goal SBP 100–120 mmHg; goal HR 50–60 bpm

**(159)**

1. 6 causes of widen QRS: hyperkalemia, meds (Na channel antagonists), paced rhythm, ventricular rhythm, bundle branch block, WPW syndrome

**(142)**

1. 6 causes of ST seg elevation: benign early repolarization (J-point elevation), acute MI, pericarditis, LV aneurysm, prinzmetal’s angina, bundle branch block

**(161)**

1. STEMI reperfusion: PCI within 90 min, Thrombolytics within 30 min of presentation. PCI indications-cardiogenic shock, <75 yo, severe CHF, unstable ventric arrhythmias

**(166)**

1. Complications of AMI: Inferior-1° or 2° AV block, Anterior-2° or 3° AV block; Dressler’s syndrome, papillary muscle dysfunction, ventricular septal rupture, CHF

**(162)**

1. Endocarditis: Staph aureus- IVDA tricuspid valve. Viridans strep- L side subacute. Coagulase neg Staph- prosthetic valve. Strep bovis- GI malignancy. Candida-AIDS

**(166)**

1. HTN Emergencies & Tx: Preeclampsia, ICH-Labetalol; Eclampsia- Mg; Pheochromocytoma- Phentolamine then β-blocker; Encephalopathy, ARF, Pulm edema- Nitroprusside

**(163)**

1. STEMI ECG Mimics: peri/myocarditis-fever, benign early repolarization-young, healthy male, LVH-HTN, pacer, hyperkalemia-renal failure, coronary vasospasm-cocaine

**(161)**

1. WPW short PR interval, prolonged QRS, delta wave. Tx w wide complex procainamide, avoid meds that block AV node Dig, CCB, BBB. Tx w narrow complex adenosine

**(157)**

1. AV block: 1°-PR interval >200 ms, no Tx. 2°-Type 1 progressive PR increase until QRS dropped, Tx Atropine. Type 2 sudden dropped beats, pacer. 3°-dissoc P & QRS, pacer

 **(166)**

**Cutaneous disorders (2%)**

1. Basal: pearly, rolled border w telangiectasia, only where hair follicles exist, no mets. Squamous: raised, indurated border, mets. Melanoma: ABCDE, depth=prog, mets

**(163)**

1. EM: target lesions, benign, <10% BSA. Large bullae, Mucus memb involved, severe- SJS: 10–30% BSA, ICU admit. TEN >30% BSA, Nikolsky sign, death from sepsis

**(153)**

1. Autoimmune- Pemphigus vulgaris: 40–60 yo, Nikolsky sign, flaccid bullae start in mouth, fatal if untx. Bullous pemphigoid: elderly, neg Nikolsky, thick bullae, benign

**(166)**

**Endocrine, metabolic, and nutritional disorders (3%)**

1. Hyperthyroid Storm Tx: Selective beta-1 Blocker, PTU, Methimazole, Steroids. Iodide given 1hr after meds. Draw free T4 & TSH before meds. Avoid ASA, atropine

**(159)**

1. Electrolyte abnormalities that prolong QT interval (↑ risk Torsades, Vfib): hypokalemia, hypocalcemia, hypomagnesemia, hyperphosphatemia. Fastest tx ↓K: NaHCO3

 **(163)**

1. Pseudohyponatremia: MM, ↑lipid, ↑gluc. ↑K most rapidly fatal electrolyte abnormality- flat P, peaked T, wide QRS, prolong QT, bradycardia/AV block, sine wave/Vfib

**(164)**

**Environmental disorders (3%)**

1. High altitude illness: AMS tx acetazolamide. HACE cerebral edema/ataxia tx descent/O2/dexa. HAPE dyspnea/cough, tx descent/lasix

**(133)**

1. Hypothermia: <30°C, AMS, cold diuresis, ↑Hb, ↓RR, DIC. Classic ECG findings: prolonged intervals, bradycardia, slow Afib, Osborne J waves, Vfib, asystole

**(154)**

1. Acute Radiation Syndrome. Prodromal-N/V. Latent-sx free. Hematopoietic-pancytopenia. ALC best prognostic indicator at 48hrs post exposure. Recovery/Death based on ALC

**(166)**

**HEENT disorders (5%)**

1. Malignant Otitis Externa: pain on ear movement, canal cellulitis/drainage. Elderly diabetic, debilitated or immunocompromised, Pseudomonas, IV Abx

**(146)**

1. Peripheral Vertigo: acute onset, intermittent, intense spinning sensation worse w position changes, N/V, hearing loss, tinnitus, horizontal nystagmus.

**(149)**

1. Ellis Class I: Enamel fx. Class II: Dentin exposure, sensitivity to hot, cold, air. Class III: pulp exposure (pink tinge or drop of blood)- true dental emergency

**(161)**

1. Orbital Floor Fx: diplopia on upward gaze, enophthalmos. Water’s view: maxillary sinus air/fluid level, hanging teardrop. Abx if subcutaneous emphysema; refer optho

**(165)**

1. Painless visual loss: CRAO-pale retina, cherry red spot, Diamox, Timolol. CRVO-blood & thunder fundus. Retinal Detachment-floaters, inferotemporal area, prog dt macula

**(167)**

**Hematologic disorders (2%)**

1. Transfusion Complications: Febrile- Leukocyte-reduced RBCs, premedicate. Hemolytic Rxn- Stop blood, type & cross RBCs transfused. Urticaria- Stop blood, Benadryl

**(163)**

1. Massive Transfusion >10 units over few hrs. Complications: DIC from dilutional effects, metabolic alkalosis & hypocalcemia from citrate toxicity, hypervolemia/CHF

**(166)**

**Immune system disorders (2%)**

1. Anaphylaxis Tx Epi. Doses- SC/IM 0.01 mL/kg of 1:1000 soln. IV 10 mL of 1:100,000 aqueous Epi over 10 min=0.1 mg. HI & H2 blocker, steroid. Glucagon in pt on BB

**(160)**

1. Transplant Drug Toxicity. Cyclosporine-nephrotoxic. Azithioprine-neutropenia. Steroids- adrenal suppression. Tacrolimus- neuro/nephrotoxic, no rx macrolide Abx

**(163)**

**Systemic infectious disorders (5%)**

1. Drug rxns in AIDS pts: Didanosine-pancreatitis, Indinavir-nephrolithiasis, INH-hepatitis, Bactrim-rash, Ritonavir-parasthesias, Dapsone-hepatits, Pentamidine-↑/↓gluc

**(165)**

1. 3 forms of botulism. Most common Infant- 2-4mo, honey, constipation, hypotonia. Wound- black tar heroin. Food- symmetric descending weakness. Death 2/2 resp failure

**(165)**

1. Lyme Disease: Borrelia burgforferi, transmitted by Ixodes tick bites. 3 stages: localized (rash), disseminated (neuro, cardiac), persistent (arthritis). Tx Doxy/Amox

**(165)**

1. Anthrax: Bacillus anthracis. Inhaled- death w/in 72 hrs. Cutaneous- wool sorter’s disease, black eschar. GI- mesenteric lymphadenitis. Tx Cipro. PPx Cipro/Doxy-60 days

**(166)**

1. Rabies. Most commonly infected animal worldwide- dog. US- raccoon, skunk, fox, coyote, bat. Tx HRIG, HDCV days 0, 3, 7, 14, 28. If bat in room of sleeping pt, assume bite

**(166)**

**Musculoskeletal disorders (3%)**

1. Low back pain Red Flags: trauma, prolonged steroids, osteoporosis, cancer, age>70, syncope, fever, IVDA, unexplained weight loss, pain worse at rest, immunocompromised

**(170)**

1. Flexor Tenosynovitis: Staph, Kanavel signs- symmetric swelling, pain w passive extension (early), tender tendon sheath, finger flexed. Tx Naficillin, Surg for I&D

**(162)**

1. SCFE: medial slip femoral epiphysis, ext rotated. Obese boys 12-16. Klein’s lines on AP. LCP: AVN femoral head, ages 4–9. Osgood: partial tibial tuberosity separation

**(170)**

**Nervous system disorders (5%)**

1. Meningits: <1 mo-GBS, E. coli, Listeria. Amp/Gent+Cefotax. >1 mo-GBS, S. pneumo, Listeria. Amp+Cefotax+Vanc. 3-50 yo: S. pneumo, N. mening. Cef3+Vanc+steroid, >50 yo +amp

**(163)**

1. Guillain-Barre Syndrome: demyelinating polyneuropathy. Follows GI/URI (Campylobacter, flu vaccine). Ascending, symmetric weakness, hyporeflexia. CSF ↑protein. Tx IVIG

**(166)**

1. Spinal Cord Injury: Central cord- hyperextension, UE>LE. Anterior cord- forced flexion, pinprick & temp loss. Brown-Sequard- penetrating injury, cord hemisection

**(161)**

1. SAH: thunderclap, worst ha of life. LP- xanthochromia. Assoc polycystic kidney, aortic coarctation. Tx: Nimodipine, NSG

**(119)**

1. Unstable Fx: “Jefferson bit off a hangman’s thumb.” Jefferson’s, Burst fx, Bilateral facet dislocation, Odontoid type 2 & 3, Any fx/dislocation, Hangman’s, Teardrop

**(162)**

**Obstetrics and gynecology (4%)**

1. PID: N. gonorrhea, C. trachomatis (most common). Admit if TOA, pregnant, peritonitis, IUD, sepsis. Ceftriaxone 250mg IM+Doxy 100 mg po BID×14 d

**(142)**

1. HELLP: RUQ pain, plt<100,000, burr cells/schistocytes, LDH>600, Bili>1.2. Tx Mg load 4-6 g IV over 20 min, maint 2 g/hr. Toxicity ↓DTRs, antidote CaGluconate 10%

**(164)**

62. PE in pregnancy. CT more sens & less fetal radiation expos vs V/Q. Tx: Enoxaparin. Heparin- fetal osteoporosis, ↓plt, miscarriage. NO Coumadin (miscar, fetal defect)

**(165)**

63. Trauma in pregnancy. Place in LL decubitus. ↑bl vol, delays signs of shock

(↑lactate). 4 h fetal tocometry. RhoGAM for Rh- mom. KB test hemorrhage

**(146)**

**Psychobehavorial disorders (3%)**

64. Child Abuse Injuries: shaken baby, liver/splenic lac, duodenal hematoma, long bone spiral fx, metaphyseal, rib/scapula fx, skull fx other than parietal, burns, bites

**(165)**

65. EtOH w/drawal: Minor- 6–24 h, N/V, insomnia, anxiety. Major- 24 h–5 d, seizure, auditory hallucinations. DTs- 48 h–7 d, visual/tactile hallucinations, AMS. ↓Mg/K. Tx Benzo

**(166)**

66. Neuroleptic Effects: dystonic rxn- torticollis, oculogyric crisis (Benztropine, Benadryl), tardive dyskinesia-invol movement, akathisia-motor restlessness, NMS (Benzo)

**(167)**

**Renal and urogenital disorders (3%)**

67. Dialysis Indications: Metabolic acidosis, ↑K>6.5, pericarditis, uremic encephalopathy, ↑vol, acute toxicity w dialyzable agents (ethylene glycol, ASA, methanol, Li)

**(167)**

68. Renal Stone Admission: intractable N/V/pain, obstruction w infection, extravasation of CT contrast, stone>5 mm, solitary kidney, worse renal fxn, high-grade obstruction

**(167)**

69. Renal Transplant. Acute Rejection occurs w/in 3 mo: ↓urine output, ↑BP, ↑Cr, ↑WBC, fever, graft swelling, pain. Chronic occurs 1 yr after: progressive ↓renal function

**(166)**

**Thoracic-respiratory disorders (8%)**

70. Pertussis: Gram-cocci. Catarrhal- after 7-10d, URI. Paroxysmal- for 2–4 w, short coughs, inspiratory whoop. Convalescent- wks, residual cough. PPx Erythromycin. 3 wk iso

**(167)**

71. Light’s criteria: Exudate- pleural: serum protein>0.5, pleural: serum LDH>0.6, pleural LDH >2/3 upper limit of nmL serum LDH. Transudate: serum-effusion albumin grad>1.2

**(166)**

72. ARDS Causes-Sepsis, aspiration, trauma, inhalation injuries. Dx PCWP<18 mmHg, PaO2/FiO2<200, CXR bl alveolar infiltrates. Tx 6 mL/kg TV, PEEP to recruit, prone position

**(166)**

73. Lobar-S. pneumonia. Klebsiella- RUL, bulging fissure, current jelly sputum, EtOH. Interstitial- Mycoplasma. Staph aureus-pleural effusion, abscess, IVDA. Apical- TB

**(163)**

74. Legionella- water supply, older men, AMS, ↓HR, GI sx. Risks-smoker, COPD. Dx Urine Ag, Tx Doxy. Histoplasma capsulatum (Mississippi), Coccidioides imminitis (Southwest)

**(167)**

75. Coxiella burnetii (sheep: Q fever), Chlamydia psittaci (birds: psittacosis), Bordetella bronchiseptica (dogs: kennel cough), Yersinia pestis (rodents/fleas: plague)

**(164)**

76. HIV. CD4 200-500: MAC, TB, Cryptococcus neoformans, H. capsulatum. <200: PCP, TB. <50: PCP, CMV, MAC, fungal. PCP-bl infiltrates, ↑LDH, Tx Bactrim, PaO2<60+steroid

**(162)**

77. Paraneoplastic Syndromes- ACTH: ↓K, PTH: ↑Ca, SIADH: ↓Na. Pancoast: apical lung tumor. Horner’s: unilateral ptosis, miosis, anhidrosis.

 **(132)**

**Toxicologic disorders (4%)**

78. Acetaminophen: NAC, Anticholinergics: Physostigmine, BB: Glucagon, CO: O2/HBO, TCAs/Chlorine gas: NaHCO3, CN: Nitrite/thiosulfate, Fe: Deferoxamine, INH: pyridoxine

**(164)**

1. Methemoglobinemia: Methylene blue, Opiates/Clonidine: Naloxone, Rattlesnake: antivenom, plt count, Arsenic: BAL, Organophosphates: Atropine/Pralidoxime, HF: Cagluc

**(167)**

80. Salicylate OD: tinnitus, resp alkalosis (central resp stimulation), met acidosis (uncouple oxidative phosphoryl), met alkalosis (vol contraction). Tx NaHCO3 ↑urine pH

**(166)**

81. Dig Tox: inhibt Na-K ATPase. Most common arrhythmia PVC. Indications Dig-specific Fab: malignant dysrhythmias, K>5, Dig level >15 acutely or >10 6 hrs later. NO Ca

**(164)**

**Traumatic disorders (4%)**

82. Salter-Harris Fx: M+E=ME. Type 1: physeal plate, normal xray. 2: metaphysis, most common. 3: epiphysis. 4: met&epip. 5: crush injury.

**(136)**

83. Neck Injury. Zone 1: sternal notch to cricoid, Angio/Bronch/Endo. 2: cricoid to mandible angle, surg. 3: mandible to skull base, angio/laryngo. platysma violation-OR

**(165)**

84. Bites-↑risk contamination, avoid closure. Mainly Staph & Strep. Human bite- Eikenella corrodens. Cat bite- Pasteurella multocida. Dog bite- Capnocytophaga canimorsus

**(165)**

85. Burn Unit Admission. Adult>20% BSA, Young (<10)/old (>55)>10% BSA, >5% full-thickness burn, high-voltage burn, inhalation injury, face/ears/eyes/genitalia/hands/feet burn

**(167)**

86. Spinal shock: flaccid paralysis w/o sensation, DTRs, urinary incontinence, ↓HR/temp/BP, ileus. Neurogenic shock: loss sympathetic tone, vasodilation,↓BP w nl HR

**(160)**

87. Hemorrhagic Shock. Class 1: <15% blood loss, <750 mL, HR<100, nl SBP. 2: 15–30%, 1.5 L, HR>100, nl SBP. 3: 30–40%, 1.5–2 L, HR>120, SBP<90. 4: >40%, >2 L, HR>140, SBP<70

**(165)**

88. Inhalation injuries intubate early: face/mouth burns, singed facial hair, sooty sputum, hoarse voice/stridor, cough/dyspnea. Parkland: 4mL×kg×%BSA burn per day of LR

**(165)**

89. AD CXR Findings: widened mediastinum >8 cm on PA, R tracheal deviation, Indistinct aortic knob, abnl cardiac contour, L pleural effusion, L apical cap, Ca sign>5 mm sep

**(166)**

90. Pelvic Fx. AP compression (open book): head-on MVC. Ext fix. Vertical Shear: fall from height. Lateral compression: auto vs ped. Malgaigne (double ring): vertical shear

**(168)**

91. Perilunate: capitate pushed behind lunate on lateral. Lunate: “spilled teacup” on lateral & AP ”piece of pie”. Volar splint. Scapholunate: 3 mm gap btw scaphoid & lunate

**(168)**

92. 5th metatarsal base. Avulsion fx: inversion, peroneus brevis pulled off prox bone. Tx cast boot 2–3 wks. Jones: transverse fx 15–31 mm distal to joint. Tx NWB cast 6–8 wk

**(168)**

**Procedures and skills (6%)**

1. Transvenous pacer placed through R IJV. ST elevation noted on the monitor indicates successful pacemaker placement in the apex of the right ventricle

**(154)**

1. Infant pads in <10 kg or 1 yo, others use adult pad. Ped dosing: Defib 2 J/kg then 4 J/kg. Cardiovert start with 0.5, 1, 2, 4 J/kg

**(135)**

1. Difficult Cricothyrotomy: SHORT Surgery, Hematoma, Obesity, Radiation, Tumor. No cric in age <12, bleeding diathesis, tracheal transection, distorted neck anatomy

**(168)**

1. Ind for CT before LP: age >60, immunocompromise, Sz in 1 wk, known CNS lesion, AMS, focal neurodeficit, papilledema or susp ↑ ICP. No bed rest. OP in supine position

**(165)**

1. Shoulder reduction: Stimson- pt prone, hang 10 lbs at wrist, scapular- move scap tip medial, ext rotate-hold adduct, elbow flexed, grasp wrist and ext rotate

**(157)**

1. Awake Intubation. Dry mouth- glycopyrrolate 0.2 mg & suction, Local anesthesia- mucosal atomizing device 5 mL 4% Lidocaine 5 lpm, Sedate- ketamine 1 mg/kg, glidescope

**(163)**

**Other components (3%)**

99. Field triage Levels. 1 red critical. 2 yellow priority. 3 green delayed. 4 black dead. Disaster Levels: 1-local med reply, 2-regional support, 3-state/federal support

**(167)**

100. Direct (On-line) Medical Control: direction given by dr in person at scene or remotely by radio. Indirect (Off-line): direction given thru protocols/ standing orders

**(165)**