ACS in ESRD Patients - Risk factor, Diagnosis and Outcome

Case: 55 year old male with PMH of CHF, ESRD (dialysis T, Th, Sat x10 years), COPD, HTN who presents with SOB since yesterday evening, associated with left sided chest pain, lasted 30 minutes, sharp, 8/10, non-radiating, no n/v/d, diaphoresis, self-resolved. On exam, patient appears to be overloaded with crackles and bilateral leg edema. EKG with ST depression in lateral leads, no prior to compare. Trop elevated at .33.

Question #1: PICO: In patients with ESRD, is hypertension a risk factor for ACS?

Of 373,539 patients with ESRD, approximately 44% of patients have at least one heart condition, including MI. Patients with HTN is 2.8 times more likely to develop heart condition than those without HTN.

Question #2: PICO: In patients with ESRD, is the use of cTn-I better than the use of CK-MB in evaluating patients with chest pain?

In the 56 patients with renal failure, MI was diagnosed in 32% via cTn-I and only 13% with CK-MB. 38% with indeterminate CK-MB level and 53% of these had MI, whereas all patients with positive cTn-I positive had positive cardiac studies. Sensitivity and specificity for CK-MB is 44 and 56%, and 94% and 100% for cTn-I.

Question #3: PICO: In patients with ESRD, is elevated troponin associated with increased mortality compare to normal troponin level?

In the 3774 patients recruited, 40% mortality rate was found in severe RF patient with high cTn-I, compare to 12% with no cTn-I elevation.

Outcome:

Patient admitted to CCU, serial cTn-I are drawn which stayed in the same range. He was optimized and later had a negative stress test.

Reference:


Emergency Medicine PICO Presentation

History of Present illness:
81 y/o male with PMH of HTN, cholangiocarcinoma on chemotherapy, and VTE of lungs and left lower extremity on Lovenox who presents with bleeding of recent paracentesis site. Pt received chemotherapy 2 days ago, was doing well afterwards, did some exercises the next day at his nursing facility which included bending/flexing, and later that night stood up from a sitting position and noticed his clothing was soaked in blood and blood was gushing from the paracentesis site. Pressure for 30 minutes did not stop bleeding. Came to ER. Denies fevers, chills, pain, lightheadedness.

Learning Objectives:
1) What is better for anticoagulation in patients with cancer and VTEs: LMWH (Lovenox) or Warfarin?
2) Are there any characteristics of certain cancer patients that make them more prone to developing VTEs?
3) Is there any other markers in the blood that can help identify cancer patients with a higher risk of VTE?

PICO #1: In cancer patients with a VTE, is the use of LMWH vs. Warfarin associated with less risk of major bleeding or recurrent VTE?


Outcome: Warfarin associated with increased risk of fatal bleeding compared to LMWH (P = .03).

PICO #2: In cancer patients, is the presence of a VTE a significant risk factor for development of another VTE?


Outcome: Significant association between development of VTE and a prior episode of thrombosis (P<0.006) during adjuvant chemotherapy in patients with malignant disease.

PICO #3: In cancer patients with already high risk of VTE, can levels of P-Selectin in blood predict those with higher risk of VTE?


Outcome: The cumulative probability of VTE after 6 months was 11.9% in patients with P-selectin above the 75th percentile and 3.7% in patients with P-selectin below 75th percentile (P = .002).
¿Nephrolithiasis?

**Case Scenario:** A 45 year old male with no significant past medical history presents with one day of throbbing, colicky pain well localized to left flank, non-radiating, 8/10 in severity. Initially the pain was intermittent with episodes lasting 20-30 min, now it is constant. He had a few episodes of frank hematuria yesterday but this has resolved. He has had some associated nausea and chills but no documented fever. He denies dysuria, vomiting, constipation, diarrhea, abdominal pain, last bowel movement was this AM. He has taken ibuprofen without relief. His brother has a history of kidney stones, but the patient has never had one himself.

**PICO #1:** In middle aged men with flank pain, is CT more sensitive and specific than US in diagnosing nephrolithiasis?

YES. More sensitive, anyway. Prospective study showed CT sensitivity 96%, sensitivity of US was 61% (p=0.02). Specificity of both was 100%. US remains the best option for pregnant women and children.

*Study:* Prospective clinical trial, blinded radiologists, but small sample size


**PICO #2:** In patients with diagnosed nephrolithiasis, are opioids and NSAIDs more effective than either agent alone in controlling pain?

YES. Prospective, double-blinded, randomized, controlled clinical trial showed combination of morphine and Toradol is superior to either agent alone in reducing pain and avoiding need for "rescue" pain control.

*Study:* "Gold-standard" clinical trial. Large sample size, intent to treat analysis


**PICO #3:** In patients with diagnosed nephrolithiasis, what treatments are available to facilitate stone passage?

Calcium channel and alpha blockers increase chances of spontaneous stone passage by 65% (p=0.0001), alpha blockers may be more effective than CCB.

*Study:* Meta-analysis pooling data from 693 patients, large sample size, randomized prospective study needed


Our Patient: He was managed well according to the available evidence; providing NSAID and narcotic simultaneously as soon as stone was suspected may have provided superior pain control.
Emergency Medicine PICO Presentation.

HPI: The patient is a 46 y/o lady with PMH of HTN and renal transplant (living non-related donor in 8/2011) who presents with burning epigastric pain since waking at 5:30am in the morning. She took her morning meds (including pepcid) and ten minutes later began to feel a 10/10 burning pain down her chest. The pain lasted 30-45 min, was associated with nausea, and radiated laterally around her sides. The patient noted that she had a similar episode a few weeks ago when walking with her daughter.

In the ED, EKG was normal sinus rhythm and 1st trop neg; patient was given protonix and zofran. A few hours later, the patient went to use the bathroom, felt the pain again and was diaphoretic and nauseated. EKG now with ST elevation, cath lab activated...

Do renal transplant patients, compared to those of the general population, have the same risk factors that lead to the incidence of acute coronary syndrome?

Among 35,847 patients, the incidence of post-transplant MI was 4.3% at 6 months, 5.6% at 12 months. Traditional risk factors of older age, male gender and co-morbidities such as diabetes, dyslipidemia, obesity, smoking and HTN were unadjusted from the general population. However, other non-traditional risk factors such as graft failure (HR 2.78), new onset post-transplant diabetes (HR 1.60), older donor age, deceased donor, donor hypertension and donor that is CMV seropositive all contributed to incidence of MI.


In females with Printzmetal angina and mild or no coronary occlusion, compared to men with similar occlusion, what is the long-term prognosis?

In 1248 patients with less than 50% stenosis who were followed for 11 +/- 6 years, 7.3% developed unstable angina, MI, or exertional angina. The presence of any degree of coronary narrowing under 50% was associated with worse prognosis (P=0.018). Female patients had a better prognosis than male patients only when they had no significant narrowing (P=0.0091).


In patients with variant angina, is Diltiazem vs Nifedipine a better drug for long-term symptom management?

Both drugs provide effective anti-anginal therapy for coronary spasm vs placebo (p<0.05) and it was unpredictable which patients would respond better to either drug. Nifedipine was associated with more side effects including edema, nausea, and impotence. The combination of the drugs was associated with frequent side effects but may be helpful in patients who remain symptomatic despite maximal doses of a single drug.

Prida, X. et. al. Comparison of Diltiazem and Nifedipine Alone and in Combination in Patients With Coronary Artery Spasm *JACC* 1987 Feb; 9(2):412-9
Emergency Medicine

HPI: The patient is a 14 year old male with no significant past medical history who presents with abdominal pain. The patient reports abdominal pain since 1am this morning. It started on the left side but is now in the RLQ, still with some pain on left. Has not taken any pain medication, walking makes it worse, lying still makes it better. Describes it as achy, 9/10 with no radiation. Has not gotten better since starting. Reports 5 episodes of NBNB emesis, poor appetite and fatigue. Has not eaten all day. Currently denies nausea. Normal BM this morning. Of note patients brother is at home with similar symptoms, they both ate hot chips last night. Denies chest pain, SOB, diarrhea, fever.

1. In the diagnosis of appendicitis in children, does CT when compared to US provide improved diagnosis rate?
The sensitivity and specificity of the staged protocol were 98.6% and 90.6%, respectively. The negative appendectomy rate was 8.1% (19 of 235 patients), and the missed appendicitis rate was less than 0.5% (one of 631 patients). CT was avoided in 333 of the 631 patients (53%) in whom the protocol was followed and in whom the US findings were definitive.

2. In the examination of children with possible appendicitis, does the administration of morphine when compared to no analgesia, significantly alter the physical exam?
One hundred eight children were enrolled; 52 received morphine and 56 received a placebo saline solution. There were no differences between groups in demographic variables or the degree of pain. There were no differences between groups in the diagnoses of appendicitis or perforated appendicitis or the number of children who were observed and then underwent laparotomy. The reduction in the mean pain score was significantly greater in the morphine group (2.2 vs 1.2 em). The emergency physicians' and surgeons' confidence in their diagnoses was not affected by the administration of morphine.

3. In the surgical treatment of pediatric appendicitis, does a laparoscopic appendectomy compared to an open appendectomy improve post-surgical outcome?
Twenty-three studies including 6477 children (43% laparoscopic, 57% open) were included. Wound infection was significantly reduced with laparoscopic versus open appendectomy (1.5% versus 5%; odds ratio [OR] = 0.45, 95% confidence interval [CI], 0.27-0.75), as was ileus (1.3% versus 2.8%; OR = 0.5, 95% CI, 0.29-0.86). Intra-abdominal abscess formation was more common following laparoscopic surgery, although this was not statistically significant. Subgroup analysis of randomized trials did not reveal significant difference between the 2 techniques in any of the 4 complications. Operative time was not significantly longer in the laparoscopic group, and postoperative stay was significantly shorter (weighted mean difference, -0.48; 95% CI, -0.65 to -0.31).

Patient presentation: 16 yo obese F with no sig PMH who p/w acute onset of chest pain and SOB this AM. States chest pain is intermittent, feels "sore", worse when laughs. Associated w/SOB. Denies F/C, URI symptoms, diaphoresis, dizziness, N/V, or diarrhea. Also, has 2 day h/o heavy vaginal bleeding and LLQ pain. Is currently bleeding, feels weak. Took Provera from March 18-28 after missing 1-2 periods. Has intermittent, cramping LLQ pain and pressure in pelvis when urinating. Denies vaginal discharge, itchiness, dysuria, hematuria, or LBP. Currently sexually active w/1 male partner, no hx of STDs or pregnancies. Tachycardic and TTP in LLQ on PE. Urine pregnancy test was positive. Concern for PE, so received LE dopplers, D-dimer, and ECHO while awaiting trans-vaginal u/s to confirm intra- vs extra-uterine pregnancy.

PICO #1: In pregnant patients with concern for venous thromboembolism, can D-dimer be used to exclude VTE as compared to D-dimer in low pre-test probability, non-pregnant patients?


Summary: Prospective study using 89 healthy pregnant women and 12 women w/concern for VTE to establish D-dimer cut-off levels in pregnancy as D-dimer known to increase w/gestational age. 1st trimester had 81% of women w/normal D-dimers as compared to 1% in 3rd trimester. Study found 100% sensitivity of D-dimer in pregnant pts with the following cut-off values- 1st trimester=286, 2nd=457, 3rd=644 ng/mL.

PICO #2: In pregnant patients, can serum value ADAM-12 be used to determine if pregnancy is intra- vs extra-uterine as compared to serial beta-hCG measurements?


Summary: Case-control study of 199 women seen in ED in 1st trimester w/vaginal bleeding and diagnosed EP vs IUP. ADAM-12 fluoroimmunoassays performed and compared between two groups with average of 18.6 ng/mL in IUP and 2.5 ng/mL in EP. Cut-off point of 2.53 had sensitivity of 70% and specificity of 84% while cut-off of 48.49 had 97% sensitivity and 37% specificity.

PICO #3: In patients with tubal ectopic pregnancy, does surgical intervention (salpingectomy vs salpingostomy) have better prognosis for future fertility as compared to medical management?


Summary: Retrospective study of 133 patients w/tubal EPs who received medical treatment w/methotrexate, salpingectomy, or salpingostomy and were surveyed regarding time until pregnancy. No significant difference was noted among pregnancy rates between 3 groups (p>0.9). Mean time to pregnancy in MTX group was 7.8 +/-2.2 months, salpingectomy 8.7 +/-2.2 mos, & salpingostomy 9.3 +/- 3.1. Decision based on pt’s preference & likelihood to f/u.
Acute Pancreatitis

Case: 19 y/o male with history of acute lymphoblastic leukemia (dx in 2011 with relapse 1/2012), currently receiving weekly chemotherapy (vincristine, daunorubicin, peg-asparaginase; last treatment was 1 day prior to presentation) who presented with abdominal pain. Pain described as 10/10, "sharp", constant, located in the epigastric region and extending to the back. Pt also complains of fevers, chills, and nausea with 1 episode of vomiting. He denies chest pain, SOB, LE swelling, and diarrhea.

Vitals: BP 107/67, HR 100, RR 20, T 97.7, O2 98%

Physical exam reveals soft, non-distended abdomen with normal bowel sounds that is diffusely tender to light palpation.

Labs significant for lipase of 1600; CT abdomen/pelvis consistent with pancreatitis

Q 1: In patients with acute pancreatitis, does rapid fluid resuscitation vs slow fluid resuscitation decrease mortality?

Study: Prospective Randomized Controlled Trial, 115 patients (56 in rapid, 59 in slow)
Outcome: Slow hemodilution resulted in lower incidence of sepsis (57.6% vs 78.6%) and higher survival rates (84.7% vs 66.1%)
Take home point: Early fluid resuscitation is important, but don’t overdo it. Keep Hct 35-40 in first 48 hrs

Q 2: In patients with ALL who are receiving asparaginase, does treatment with allopurinol vs. no intervention reduce the risk of developing pancreatitis?

Study: Retrospective chart review, 130 pts with ALL, 8 developed pancreatitis, 3 were taking allopurinol
Outcome: Patients on allopurinol had lower avg CT severity index score (0 vs 6.4 – statistically significant) and lower avg amylase levels (228 vs 486 – not statistically significant)
Take home point: Allopurinol may decrease the severity of pancreatitis in patients with ALL taking asparaginase. Due to the devastating effects of pancreatitis in pt with ALL, this intervention warrants further investigation.

Q 3: In patients with ALL who develop asparaginase induced pancreatitis, does the subsequent use of asparaginase increase the risk of developing recurrent pancreatitis?

Study: Retrospective, 403 patients with ALL, 28 developed pancreatitis, 16 re-challenged w/ asparaginase
Outcome: Only pts with mild cases were re-challenged, 63% of the 16 patients experienced second episode of pancreatitis after an average of 13 additional doses of asparaginase
Take home point: A second episode of pancreatitis is likely if patients are re-challenged with asparaginase. However, the benefit of additional asparaginase treatment may outweigh the risk of pancreatitis. It is reasonable to re-challenge patients with very mild cases of pancreatitis.

Outcome: patient admitted to ICU.

References:
25 yo M w/ recent diagnosis of B-ALL in 3/2012 s/p IV chemo [3/26/12] and IT chemo [4/2/12] who presented on 4/7/12 with fevers x 4 hours and abdominal pain + loose stools x 16 hours. His vital signs upon presentation in the ED: 89/42, 102.1F, 106bpm, 20rr, 100% on RA. ANC = 88.

1. What distinguishes a low risk patient vs. a high risk patient with neutropenic fever?

The Multinational Association for Supportive Care in Cancer (MASCC) risk index was developed as a scoring system to identify low-risk febrile neutropenic cancer patients. The MASCC scoring system includes factors such as burden of illness, hypotension, COPD, solid tumor or previous fungal infection, dehydration, outpatient status, and age > 60 years. A MASCC risk-index score ≥ 21 identified low-risk patients with a positive predictive value of 91%, specificity of 68%, and sensitivity of 71%. In this study, only 6% of low risk patients later developed a serious medical complication.


2. What are the most common organisms that cause bacteremia in neutropenic patients and their associated mortality rates?

2,142 patients with febrile neutropenia were followed prospectively to determine if they had bacteremia and the causative organism(s). 499 (23%) patients were found to have bacteremia. The relative frequencies of Gram-positive, gram-negative, and polymicrobial bacteremias were 57%, 34%, and 10% with respective mortality rates of 5%, 18%, and 13%.


3. Does empirically treating with double gram negative coverage improve survival compared to empiric monotherapy?

A meta-analysis of 46 trials including 7,642 patients compared beta-lactam monotherapy versus beta-lactam-aminoglycoside combination therapy with the primary outcome of all cause mortality. Monotherapy was regarded as the superior therapy compared to combination therapy based on a similar, if not better, survival, significantly lower treatment failure, and lower rates of adverse events associated with significant morbidity (e.g. renal failure).


In the ED, he was given 4L NS and started on cefepime. His BP improved but his tachycardia worsened so tobramycin and vancomycin were quickly added. A CT A/P w/ IV contrast revealed evidence of cholecystitis, pancreatitis, and colitis/typhilitis. His hypotension eventually required the max doses of 3 pressors. He was found to be C. Diff positive and his BCx grew out pan-susceptible Klebsiella pneumoniae. An emergent perc cholecystectomy tube was placed on 4/8/12 and the patient was intubated for the procedure. He required AVVH on 4/9 for his acidosis. On 4/10, all pressors were weaned and the patient was extubated on 4/11. He was transferred to the Heme/Onc floor on 4/13. At that time, he was on Dori, PO Vanc, and empiric diflucan.