Minimizing Unnecessary Coagulation Testing in the ED

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Conflict of Interest

• I have no conflicts of interest
• Academic support through AHS funded non-clinical role
Scope of the problem

- 177,586 PTT or INR studies done in Calgary Zone ED’s in 2014
  - Nearly 30,000 of these coags were ordered for Cardiac Chest Pain by RN Order Set

- Very compelling evidence that the yield of ordering routine INR/PTT in CP patients is VERY LOW
- 99.8% of ED PTT and INR are bundled
- In our setting, total cost = 7.5$* per INR or PTT,
  - direct cost 2.51$ (reagent, labour, tubes)
Intervention

• PHASE 1: Remove Preselected PTT/INR from EDRN Cardiac Chest Pain Protocol* only (May-Aug 2015)
  • Provide clinical guidance to RN’s
    • Send coagulation studies if patient is on coumadin/warfarin, has liver disease or a bleeding disorder
  • RN/Physician Engagement
  • Educational Rollout targeting nurses and physician

• PHASE 2: Unbundle PTT/INR in appropriate order sets (Feb 2016 – ongoing)
  – 10 of 197 order sets have been completed
### Reductions in PTT or INR’s

| Phase 1 – ED RN Chest Pain  
<table>
<thead>
<tr>
<th>(May-Aug 2015)</th>
<th>8,412</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED RN Chest Pain</td>
<td>8,936</td>
</tr>
<tr>
<td>(Feb to May 2016)</td>
<td></td>
</tr>
<tr>
<td>Phase 2 – Unbundling</td>
<td>12,875</td>
</tr>
<tr>
<td>PTT/INR (May-Aug 2016)</td>
<td></td>
</tr>
<tr>
<td>Total Reduction in PTT or INR’s</td>
<td>30,223</td>
</tr>
</tbody>
</table>

Summary

• This multi-faceted intervention (order set change, decision support and RN/MD education)
  – Dramatic reduction in coagulation testing in the ED
  – Cost-savings* of 124,078$ over a 15mth period
    • Actual savings vs labour savings

• There is more to come!
  – Currently reviewing all ED order sets
  – Current inpatient review to unbundle PTT and INR
Acknowledgments

• ED: Dr. Eddy Lang, Dr. Tom Rich, Heather Hair, Alexis Mageau
• SCM: Kathy Yiu, Jim Ray Lamsen
• CLS: Dr. Chris Naugler, Heather Sereda (economic analysis)
Additional Slides
Order Set Change

EDRN Cardiac Chest Pain Protocol [9 orders of 15 are selected]

*** This order set is intended for patients with suspected ischemic chest pain. Refer to ED Suspected Ischemic Chest Pain Protocol. ***

All Lab orders have been preset to Unit to Collect and STAT priority.

Hematology
- Complete Blood Count (CBC)

Chemistry
- Chem Panel 7 (Na, K, Cl, CO2, Cr, Glu, Urea)
- Troponin

Coagulation
Send if patient is on warfarin/coumadin, has liver disease or a bleeding disorder.
- PT INR/PTT Group

CV Labs
Please page ECG tech for STAT orders.

<table>
<thead>
<tr>
<th>Order</th>
<th>Indication</th>
<th>Portable</th>
<th>Priority</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 Lead ECG - 2 item(s)</td>
<td>Electrocardiogram (- 12 Lead)</td>
<td>Chest Pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Lead ECG - 2 item(s)</td>
<td>Clinical Communication</td>
<td>Chest Pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 Lead ECG - 1 item(s)</td>
<td>Electrocardiogram (- 15 Lead)</td>
<td>ST Elevation in leads II, III, AVF.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Secondary Outcomes

- No change in MD ordering rates
  - 219 PTT and INR 90 d pre
  - 218 PTT and INR 90 d post
- **Total Number of coags (PTT and INR)**
  - Pre – 18,327
  - Post - 12,769 (1352 fewer PTT/INR* beyond ED RN OS)
- % INR abnormal
  - Pre- 24.6%
  - Post – 29.7%
Assumptions

• “xx” service will always want it. I might as well order it…

• “Dr. xyz” will just order it anyways, why even try?

• “You’re taking away our autonomy to order these tests”

• “What if their INR is xxx?”

• BARRIER TO CULTURE CHANGE: ASSUMING THAT CHANGE CAN’T HAPPEN
Summary of evidence– PTT/INR in CP

• Campbell S. et al CAEP abstract 2014) – 78.7% of CP (?)cardiac) had INR’s done (patients on Coumadin were excluded). Only 13 (1.8%) had abnormal INR – 12 of which were on a/c but not recorded in chart.

• Martin et al. Emerg Med J 2012, vol 29 pg 184. 640 pts with CP had coag studies – 79 were abnormal. All of these could be predicted on Hx (anticoagulant use or liver disease) OR were trivial (4 patients, INR <1.5).

• Schwartz et al. 23 patients (13%) of patients admitted with ACS had INR >1.25. 20 Of these patients had hx of anticoag usage or liver disease or daily. In the remaining 8 patients (mean INR was 1.44) no change in therapy was initiated based on these abnormalities.
References

1 http://www.acepnow.com/article/emergency-physicians-can-reduce-unnecessary-coagulation-testing-patients-chest-pain/
4 Kitchens, CS. (2005). To bleed or not to bleed? Is that the question for the PTT?. Journal of Thrombosis and Haemostatis, 3:2607-2611
6 Campbell SG, Magee, K., Cajee, I., Field, S., Butler, M., Campbell CL. (2014). The utility of measuring international normalized ratio (INR) as part of the investigation of patients with cardiac-type chest pain. CAEP/ACMU 2014 Scientific Abstracts. May 31 to June 4, 2014
8 McKinley, L., and Wrenn, K. (1993). Are baseline prothrombin time/partial thromboplastin time values necessary before instituting anticoagulation?. Annals of Emergency Medicine 22(4); 697-702