When Telemedicine meet Acute Chest Pain Patients
How we use in-hospital tele-ECG to improved quality of care and improved D2BT of STEMI patients

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No disclosure to declare
Since 1967
1,030 Bed  (Famous in cardiovascular disease management)
19 cardiologist
Coronary angiography 3,000 pt/year
Coronary intervention > 1,500 pt/year

Telemedicine since 2007
- TeleECG: > 4,300 pts / HomeBP, glucose: > 1,700
Our Solution for **Telemedicine** different solution for different people

- Trans-telephonic ECG event analysis and on-line consultation
- Off-line **one month** post event ECG analysis
- Off-line **one week** post event ECG analysis
- Home **BP**, Home blood **sugar** monitoring
- In-hospital **tele-ECG** analysis and PPCI activation
- Pre-hospital **tele-ECG** transmission and analysis, PPCI activation
Home Tele-ECG transmission to call center

on-line consultation and give adequate suggestion

Clinical assessment and recommendation

ECG/ vital signs/ clinical data/ medical history

365/24 Tele-Care-Services Center in Cheng Hsin General Hospital

Internet / 3G web
Why We apply In-hospital TeleECG triage for Chest Pain Patients

- Ambulance to Hospital < 20min in Taiwan
- Most of chest pain management delay occurred in-hospital not pre-hospital
- Too many things need to do for chest pain patients at ED. It is hard to balance between working loading and Quality
Chest pain
Incidence and Importance
Chest pain: A common but important symptoms

- **6 million /year** chest pain visited to emergency departments (ED) in the United States (US)

- **2nd** most common ED complaint

- **12~ 15%** of all cases of chest pain in the ED is ACS

How many Chest Pain Presentation Become Myocardial Infarction at ED of Cheng Hsin General Hospital
2014 ED Chest pain pts

- N = 2,817 (Average 235 /month)
Most important diagnosis for chest pain patient

1. ST elevation MI (STEMI)
2. Non ST-elevation MI (NSTEMI)
3. Unstable angina (UA)
Cheng Hsin General Hospital

2014 ER diagnosis AMI

Only **7.8%** in chest pain population

- **STEMI** = 85
- **NSTEMI** = 136

Chest pain with ACS diagnosis finally

- **MI** 7.8%
- **Non-ACS** 92.2%

Only 7.8% in chest pain population
STEMI

- Time is muscle
- Goal  Door to balloon time < 90 min
Chest pain

ECG is the most important step for diagnosis

ECG → Dx (10 min) → CV consult (5 min) → Active emergent PCI team

Cath Staff ready (30 min) → Return perfusion (35 min)
Door to ECG is an Long way to go

Door to ECG

Chest pain  ED  ECG exam  Activation PPCI  Pt arrival Cath Rm  Reperfusion
ECG for everyone is good but Impossible

• Complete 12 lead ECG < 10min [3]

• age ≥30 chest pain
  age ≥50 chest pain or other symptoms (SOB, altered mental status, upper extremity pain, syncope, generalized weakness)
  elderly (≥80 years) with abdominal pain or N/V [6]

• repeated at 20~30 minute intervals for ongoing pain suspected ACS

• A brief history and physical examination
• Medication: Aspirin, morphine … etc

What’s wrong in current strategy

What’s Telemedicine Could do to Improve / Speed up Chest pain patient Assessment at ED
Dilemma 1

How to make diagnosis earlier?

Chest pain pt is **not the only** emergent condition.
There is **Always something more emergent**

Delay Diagnosis /
Mis-diagnosis /
Delay activation /
of ECG for STEMI patient
Chest Pain Observation units (CPUs) or Clinical Decision Units (CDUs)

- **Class I recommendation** in the ACC/AHA guidelines [3].
- **82 % discharge rate** In a 1000 mostly low risk patients, [33].

Chest pain Units (CPU) could / should Do

- **Identification** of chest pain patient
- **Divers** chest pain patients burden in ED
- **Full evaluation and disposition** of chest pain patient
Chest pain Unit: Ideal Goal

- Improved chest pain patient assessment quality
- Shorten D2EKG time in chest pain patients
- Achieve D2BT < 90min in STE patient
- Decrease misdiagnosis rate for ACS
- Improved hard outcomes (as Death, re-MI,... etc.)
- Shorter ED stay of chest pain patients
The Real world is !!

- ED patients overloaded
- ED physicians shortage
- Nursing / PA shortage
- Time limited for assessing of patients
- legal issue in clinical practice
Balance between patients and health-care provider

Care Quality

Health-care provider

- Decreased ED physician/ Nursing/ PA work burden without sacrifice quality
**Solution 2**

**In-hospital Tele-ECG process**

**Old**

- EP evaluation
  - A: Cardiologist arrival ED Complete patient evaluation
  - B: Cath Lab Staff arrival

**New**

- EP evaluation
  - A: Cardiologist arrival ED Complete patient evaluation
  - B: Cath Lab Staff arrival

**Timeline**

- Chest Pain Onset
- ED
- ECG Exam
- Patient arrival Cath Lab
- Balloon (reperfusion)
- Cardiologist arrival ED
- Complete patient evaluation
- Tele-ECG process
  - CV attending ECG reading & decide PPCI
- Early Activate PPCI
- Activate PPCI

*Key influenced point*

*Time interval in each process*
Signal Quality of ECG
Dilemma 2

How to get document data without increase work loading?

No record, No Quality control, But
Who should Responsible for record
Who had time to record
Data dependent on Staff to Remember recording in chart

1. **ED door time**: (triage nurse, PA, ED doctor)
2. **EKG time**: (triage nurse, PA, intern, fellow, VS)
3. **PPCI activation time**: (nurse, PA, intern, resident, fellow, VS)
4. **Cath Room ready time**: (CV Fellow, technician, CV VS)
5. **Patient sent to Cath Room time**: (ED nurse, resident, fellow)
6. **Patient arrival Cath Room time**: (ED nurse, resident, fellow, technician)
7. **Puncture time**: (by Fellow, VS)
8. **Balloon time**: Wire pass lesion / Balloon/ Thrombuster Time

- STEMI patient **ED medication remind** (Bokey, plavix, statin, BB) : (ED physician, nurse, PA)
Dilemma 3

Change is difficult

Learning
New system,
New protocol,
New staffs in ED is challenging
Make change to be **lovely** and **welcome**
Less effort, but **more efficient**

1. **Simplified** protocol with figuration *(easy to remember)*
2. **Internalized** protocol in daily activity *(keep protocol going)*
3. **Auto-recording** all parameter in practice *(initial assessment system / Prescription system / discharging system / billing system)* *(minimized paper work)*
4. **Summary** all data in management system *(monitor quality and performance, feedback to 1st line staff every month)*
12 versions of protocol changed
• As simplified as possible
• Less check point as possible
• One page for all condition
• Time interval reminder
• Record any reasons for delay
1. Standardized flow chart

2010 computerized
Dilemma 4

Too Busy or Forgot to keep record (ICD-9 old MI, new MI)

Use **Chest Pain Tag** to Tracing patient **diagnosis** and Dispatching
Internalized **Chest Pain Tag** in Triage nursing system

- Tracking Risk Factor like PCI, CABG, smoking habits
- Chest pain Tag==> Trigger associated function
Once Patent Tagged chest pain. Physician request to give diagnosis before Finish
Use RFID to record time points without need key-in

Time server synchronized time
Twice a day in all computer
RFID Wristband (minimized paper work)

- Auto-transmission of Time point while Leaving ED, Arrival Cath Room
Before system applied

1. ED door time: (triage nurse, PA, ED doctor)
2. EKG time: (triage nurse, PA, intern, fellow, VS)
3. PPCI activation time: (nurse, PA, intern, resident, fellow, VS)
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7. Puncture time: (by Fellow, VS)
8. Balloon time: Wire pass lesion / Balloon/ Thrombuster Time

- STEMI patient ED medication remind (Bokey, plavix, statin, BB): (ED physician, nurse, PA)
After apply new system
Only 1 Time point left for manual recording

1. ED door time: **ED Nursing statin system feedback**
2. EKG time: **(Wireless ECG transmission)**
3. PPCI activation time: **(CPU system feedback)**
4. Cath Room ready time: **(CV Fellow, technician, CV VS)**
5. Patient sent to Cath Room time: **(RFID)**
6. Patient arrival Cath Room time: **(RFID)**
7. Puncture time: **(1st cath imaging time)**
8. Balloon time: Wire pass lesion / Balloon/ Thrombuster Time **(Cath Sys.)**

- STEMI patient **ED medication remind** (Bokey, plavix, statin, BB): **(CPU system reminder / check up)**
Chest pain system collect
All data from different systems Real-time
Data could export for statistics

Collect All Quality control parameter is time consuming
Chest pain system collect data from different systems

**6**

**ED Nursing triage** (ED time, Past Hx, vital signs)

**ED Prescription** (chest pain Diagnosis, STEMI/NSTEMI, UA)

**EKG system** (quick ECG review, recording time)

**Lab data HIS** (cardiac enzyme, renal, lipid, glucose)

**ED prescription syst.** (ACS medication)

**RFID**

**Cath Syst**

**Reasons for not given**

**Reasons of delay**
Manpower Saving

Retrospective Charting
D2EKG > 10min
(manual check reasons)

ED door time?
ECG time?
STEMI/ NTEMI ??
Contact cardiologist
Medication (Aspirin / Plavix / concor / lipitor)
Why not given ??
Leave ED time?
Cath Rm time?

Chest pain
Initial assessment triage nurse

CPU Sys.
ED Nursing
EKG system
RFID
Lab data HIS
ER Prescription

Chest pain Tag

ED door time
Hx at initial triage sys.
Lab
ECG

Group activation time
Cath Rm time
Leave ED time

2
Balloon time

STEMI
NSTEMI
Unstable angina
Other

Before leave ED

ACS

Aspirin / Plavix
Lipitor / Concor

Record
Reason of Not given

Discharge/admission
Another critical chest pain population: NSE-MI

Non-ST elevation myocardial infarction
NSTEMI-more complex

•more work up and assessment are needed
  •Detail history taking
  •serial ECG follow up or monitoring
    •serial cardiac TnI follow up
    •close vital signs monitoring (BP, HR, oxygenation)

•Non-CAD work-up (aortic dissection, pulmonary embolism, GI, muscle skeletal....etc)
Chest pain etiology is heterogeneity

1. Cardiovascular
   Angina, MI, myocarditis, pericarditis, aortic dissection

2. Pulmonary disease
   pulmonary embolism, pneumonia, pleuritis, pneumothorax, pulmonary HTN

3. GI
   GERD, esophagial spasm, Malorii wise, peptic ulcer, biliary tract disease, pancreatitis

4. Muscle-skeletal
   costochondritis, spinal disease, panic disorder
Balancing between Sensitivity and Specificity and Cost

- Blood test (TnI, CPK, MB isoenzyme)
- other biochemistry work up (D-dimer, BNP or NT-proBNP, hs-CRP, PCT (prolactin), WBC with D/C)
- CxR
- Echocardiography
- Chest CT scan
Most outcome predictive by Cardiac Troponin I/T

Data from Hamm CW, Braunwald E. Circulation 2000; 102:118.
TnI (+)
Go invasive
- Chronic or acute renal dysfunction
- Severe congestive heart failure – acute and chronic
- Hypertensive crisis
- Tachy- or bradyarrhythmias
- Pulmonary embolism, severe pulmonary hypertension
- Inflammatory diseases, e.g. myocarditis
- Acute neurological disease, including stroke, or subarachnoid haemorrhage
- Aortic dissection, aortic valve disease or hypertrophic cardiomyopathy
- Cardiac contusion, ablation, pacing, cardioversion, or endomyocardial biopsy
- Hypothyroidism
- Apical ballooning syndrome (Tako-Tsubo cardiomyopathy)
- Infiltrative diseases, e.g. amyloidosis, haemochromatosis, sarcoidosis, scleroderma
- Drug toxicity, e.g. adriamycin, 5-fluorouracil, herceptin, snake venoms
- Burns, if affecting >30% of body surface area
- Rhabdomyolysis
- Critically ill patients, especially with respiratory failure, or sepsis

TnI (+) Not always ACS
Tnl: Negative

Risk assessment

Time consuming

Acute Chest Pain

hsTn < ULN

Pain >6h

hsTn no change

Painfree, GRACE <140, differential diagnoses excluded

Discharge/Stress testing

Invasive management

Pain <6h

Re-test hsTn: 3h

Δ changea (1 value > ULN)

Highly abnormal Tn + clinical presentation

hsTn no change

Work-up differential diagnoses
Risk identification

• TIMI score
  – Thrombolysis in Myocardial infarction

• GRACE score
  – Global Registry of Acute Cardiac Events

TIMI Risk Score (3A 2C 2E) for UA/ Non STEMI (TIMI 11B and Essence)

- **Age**: ≥ 65 old
- **Angina**: ≥ 2 angina symptoms in 24 hours
- **Aspirin**: use Aspirin ≤ 7
- **CAD risk**: ≥ 3 CVD risk factor
- **CAD hx**: prior CAD ≥ 50%
- **EKG**: STT change while symptoms
- **Enzyme**: elevated cardiac enzyme

TIMI score vs 14 day mortality, re-MI, emergent PCI rate

0-2 = Low Risk
3-4 = Intermediate
> = 4 High Risk

Antman et al. JAMA 2000, 284:835-842
Auto collection needed information for scoring and Risk stratification
GRACE Score
(Global Registry of Acute Coronary Events)

- **DOA:** Cardiac arrest at admission
- **Age**
- **CxR:** Killip score
- **Vital signs:** SBP, heart rate
- **Lab:** Creatinin, Cardiac enzyme (CPK, MB, TnI)
- **EKG:** ST elevation, depression

<table>
<thead>
<tr>
<th>Killip Score</th>
<th>Points</th>
<th>SBP mm Hg</th>
<th>Points</th>
<th>Heart Rate Beats/min</th>
<th>Points</th>
<th>Age years</th>
<th>Points</th>
<th>Serum Creatinine μmol/L</th>
<th>Points</th>
</tr>
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<tbody>
<tr>
<td>I</td>
<td>0</td>
<td>≤ 80</td>
<td>58</td>
<td>≤ 50</td>
<td>0</td>
<td>≤ 30</td>
<td>0</td>
<td>0 - 34</td>
<td>1</td>
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<tr>
<td>II</td>
<td>20</td>
<td>80 - 99</td>
<td>53</td>
<td>50 - 89</td>
<td>3</td>
<td>30 - 39</td>
<td>9</td>
<td>35 - 70</td>
<td>4</td>
</tr>
<tr>
<td>III</td>
<td>38</td>
<td>100 - 119</td>
<td>43</td>
<td>70 - 89</td>
<td>9</td>
<td>40 - 49</td>
<td>25</td>
<td>71 - 105</td>
<td>7</td>
</tr>
<tr>
<td>IV</td>
<td>56</td>
<td>120 - 139</td>
<td>24</td>
<td>60 - 100</td>
<td>15</td>
<td>50 - 59</td>
<td>41</td>
<td>106 - 140</td>
<td>10</td>
</tr>
<tr>
<td>V</td>
<td>74</td>
<td>140 - 159</td>
<td>24</td>
<td>60 - 100</td>
<td>15</td>
<td>30 - 39</td>
<td>41</td>
<td>141 - 170</td>
<td>13</td>
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<tr>
<td>VI</td>
<td>92</td>
<td>160 - 199</td>
<td>10</td>
<td>90 - 100</td>
<td>15</td>
<td>40 - 49</td>
<td>25</td>
<td>177 - 253</td>
<td>21</td>
</tr>
<tr>
<td>VII</td>
<td>110</td>
<td>≥ 200</td>
<td>0</td>
<td>≥ 200</td>
<td>46</td>
<td>≥ 50</td>
<td>100</td>
<td>2353</td>
<td>28</td>
</tr>
</tbody>
</table>

**Other Risk Factors**

| Cardiac Arrest at Admission | 39 |
| ST-Segment Deviation        | 28 |
| Elevated Cardiac Enzyme Levels | 14 |

| Total Points | ≤ 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 210 | 220 | 230 | 240 | 250 |
|--------------|------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Probability of In-Hospital Death, % | ≤ 0.2 | 0.3 | 0.4 | 0.8 | 0.8 | 1.1 | 1.6 | 2.1 | 2.9 | 3.9 | 5.4 | 7.3 | 9.8 | 13  | 18  | 23  | 29  | 36  | 44  | ≥ 52 |
# Auto-scoring of GRACE, TIMI score

<table>
<thead>
<tr>
<th>Score</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GRACE: 209</td>
<td>TIMI: 4</td>
<td></td>
</tr>
</tbody>
</table>

**Final diagnosis**
- Chest Pain: [ ] Chest Pain [ ] STEMI [ ] NSTEMI [ ] Unstable Angina [ ] Other
- SBP / DBP: 123 / 7
- HR: 101

**Lab:**
- Creatinin: 3.99
- Cardiac enzyme (CPK, MB, TnI)

**EKG:**
- ST elevation, depression

**DOA:** Cardiac arrest at admission
**Age:**
**Killip:**
**Vital signs:** SBP, heart rate
**Lab:** Creatinin, Cardiac enzyme (CPK, MB, TnI)
**EKG:** ST elevation, depression
<table>
<thead>
<tr>
<th>Risk category (tertile)</th>
<th>GRACE risk score</th>
<th>In-hospital death (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>≤108</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Intermediate</td>
<td>109–140</td>
<td>1–3</td>
</tr>
<tr>
<td>High</td>
<td>&gt;140</td>
<td>&gt;3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk category (tertile)</th>
<th>GRACE risk score</th>
<th>Post-discharge to 6-month death (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>≤88</td>
<td>&lt;3</td>
</tr>
<tr>
<td>Intermediate</td>
<td>89–118</td>
<td>3-8</td>
</tr>
<tr>
<td>High</td>
<td>&gt;118</td>
<td>&gt;8</td>
</tr>
</tbody>
</table>
Some **NSTEMI** need **Early Intervention**
2 hour (Urgent CAG)

Group 1

- TnI (+) (POC), dynamic STT change plus
  - Refractory ischemia
  - associated heart failure
  - Hemodynamic instability
  - Ventricular arrhythmia (VT, Vf)
< 24 hour (Early invasive)

Based on TIMI score risk
(modified TIMI score 3A, 2C, 2E)

- Persistent or recurrent of angina (A1)
- cardiac Troponin I positive (E1)
- Dynamic ST or T wave (symptomatic or Asymptomatic) (E2)
72 hour CAG (Indication)

Group 3  AHA/ACC + TIMI score

- **Significant CAD** (C1)
  - Documented by CAG, MDCT scan: (> 2VD > 50%)
  - TL201 scan: moderate to severe ischemia
  - Prior PCI (Recent PCI)
  - Prior CABG

- **Risk factor (≥ 3)** (C2)
  - DM
  - HTN
  - Smoking
  - Hyperlipidemia
  - Family history of CAD (Male age < 55, Female < 60 years)

- **Previous Aspirin/ clopidogrel use** (A2)
- **Age > 65 years old** (A3)
- **CKD (eGFR < 60 ml/ min/ 1.73m2 BSA)**
- **Early post infarction angina**
- **Intermittent to high GRACE score > 110**
- **LVEF < 40%**
Conservative strategy
(no or elective angiography)

Group 4

- No recurrence of chest pain.
- No signs of heart failure.
- No abnormalities in the initial ECG or a second ECG (at 6–9 h)
- No rise in troponin level (at arrival and at 6–9 h)
- No inducible ischemia.
Dilemma 8

There are always New staff in ED,
Too many systems need to familiar
for young staff

Merge Chest pain system in Background,
No need to learn,
Just Do what your familiar to Do at ED

Bridging all information to admission/
discharging / health care
Total care of chest pain, MI patient from ED to Home care

Emergency Room

Chest pain → ED → ECG → Leave ED → Cath Lab → Reperfusion

Chest pain system

RFID

Nursing system

Hx of DM, smoking

ASA/BB/ARB allergy hx

ACS Tag

Admission

Discharge / OPD

Time Line

Diet, exercise, quit smoking program

Home BP, sugar monitor by telecare services center

Cardiac Rehab

Dietician consult

Clinical Pharmacist

Discharge medication

- DAPT
- ACEI/ARB
- BB
- Statin

2012/3/15

Hx of DM, smoking
Is Working ?
## Short D2BT by In-hospital Tele-ECG triage

<table>
<thead>
<tr>
<th></th>
<th>Tele-ECG group (n = 51)</th>
<th>Control group (n = 54)</th>
<th>Median difference</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-hospital on-scene time (hours)</td>
<td>2.6 (1-9)</td>
<td>4.8 (1-8)</td>
<td>-2.2</td>
<td>0.191</td>
</tr>
<tr>
<td>Door-to-balloon time (minutes)</td>
<td>86 (75-95)</td>
<td>125 (90-127)</td>
<td>-39</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Door-to-balloon time &lt; 90 minutes</td>
<td>76%</td>
<td>44%</td>
<td>33</td>
<td>0.0001</td>
</tr>
<tr>
<td>Door-to-ECG time (minutes)</td>
<td>6 (2-8)</td>
<td>9 (5-11)</td>
<td>-3</td>
<td>0.005</td>
</tr>
<tr>
<td>ECG-to-infarct team activation time (minutes)</td>
<td>7 (4-12)</td>
<td>25 (11-45)</td>
<td>-18</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Infarct team activation time- to-cath lab time (minutes)</td>
<td>42 (31-50)</td>
<td>44 (35-60)</td>
<td>-2</td>
<td>0.018</td>
</tr>
<tr>
<td>Cath lab-to-balloon time (minutes)</td>
<td>31 (23-38)</td>
<td>35 (25-50)</td>
<td>-4</td>
<td>0.011</td>
</tr>
</tbody>
</table>

Values are expressed as median (inter-quartile range).

Short D2BT by In-hospital Tele-ECG triage

<table>
<thead>
<tr>
<th></th>
<th>After</th>
<th>Before</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>D2BT (median time)</td>
<td>68 min</td>
<td>125 min</td>
<td>-39</td>
</tr>
<tr>
<td>D2BT &lt; 90min %</td>
<td>81%</td>
<td>44%</td>
<td>37%</td>
</tr>
<tr>
<td>ECG-Dx-activation time</td>
<td>7 min</td>
<td>25 min</td>
<td>-18</td>
</tr>
</tbody>
</table>

**Before**
- Pain → ED → ECG → 25 min → activation → Reperfusion → 125 min

**After**
- Pain → ED → ECG → 7 min → activation → Reperfusion → 68 min
Cumulative Event Free Survival curves for major adverse cardiac and cerebral adverse events (MACCE)

**P = 0.012**
Mortality between 2 triage

P = 0.102
2014~ 2015/1-2 D2EKG time

- Total D2EKG < 10min = 78% (> 70%)
- Median 1.5 min
D2EKG < 10min  (good performance till now)

• 2015 Jan ~ June
• Total D2EKG < 10min = 80% (> 70%)  Median 2 min

D2EKG < 10min 87% 78.5% 88.6% 79% 70% 85.6%
1月 2月 3月 4月 5月 6月 7月 8月 9月 10月 11月 12月

D2EKG<10min 87% 78.5% 88.6% 79% 70% 85.6%
2015 Jan ~ June  Door to balloon time (D2BT)

- Total Median D2BT = 81 min ( <90min)
- D2BT < 90min % = 90% ( > 75%)
For chest pain patients, ECG should be performed ASAP.

For NSTEMI, cTnI, history taking, GRACE / TIMI score can help to identify risk.

In-hospital TeleECG triage combined with information system automatic feedback may ensure data-collection, quality control and manpower-saving.

Our in-hospital TeleECG triage combined with chest pain system could solve clinical problems by interrogating to daily practice without increasing work loading.

TeleECG triage not only shortens D2BT but also associates better clinical outcomes.

Conclusion
Thanks for your attention and welcome your comment

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