Case discussion

指導老師：尹文耀主任
魏昌國主任
報告者：林禹君
General Data

- 劉陳 X 花
- 82 y/o female
- ID: P201921594
- Admitted on 94/10/22

- Chief complaint: sudden onset abdominal pain for one day
Brief history

- Underlying condition:
  - DM, HTN
  - Congestive Heart Failure
  - Atrial fibrillation
  - Mitral valve regurgitation
  - Myocardial infarction

- Since 1 day before admission
  - Sudden onset abdominal pain
  - Vomiting
  - Diarrhea
  - No bloody stool, fever, or cough

→ ER
Physical examination

- Consciousness: clear, E4V5M6
- Vital signs
  - T/P/R: 37.6/118/27
  - BP: 125/89
- Eyes: anicteric sclera, no pale conjunctiva
- Heart: irregular heart beat, no murmur
- Lung: symmetric expansion, no wheezing
- Abdomen: soft, hypoactive bowel sounds, diffuse tenderness, rebound tenderness+-
- Extremities: freely movable, no edema
- Digital exam: soft and yellowish stool, no mass palpable
<table>
<thead>
<tr>
<th>Blood</th>
<th>0941021</th>
<th>WBC</th>
<th>9.79</th>
<th>*10^3/uL</th>
<th>3.6</th>
<th>0.6</th>
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<tr>
<td></td>
<td></td>
<td>Hb</td>
<td>15.4</td>
<td>g/dL</td>
<td>12</td>
<td>10</td>
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<tr>
<td></td>
<td></td>
<td>WBC DC</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>0941021</td>
<td></td>
<td>N.band</td>
<td>%</td>
<td>0</td>
<td>3</td>
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<tr>
<td></td>
<td></td>
<td>N.seg.</td>
<td>%</td>
<td>45</td>
<td>70</td>
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<td></td>
<td></td>
<td>Lyn.</td>
<td>%</td>
<td>25</td>
<td>40</td>
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<thead>
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<th>Blood</th>
<th>0941021</th>
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<th>135</th>
<th>mmol/L</th>
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<th>146</th>
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<tr>
<td></td>
<td></td>
<td>K</td>
<td>4.2</td>
<td>mmol/L</td>
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<tr>
<td></td>
<td></td>
<td>GLU</td>
<td>200</td>
<td>mg/dL</td>
<td>70</td>
<td>110</td>
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<tr>
<td></td>
<td></td>
<td>BUN</td>
<td>50</td>
<td>mg/dL</td>
<td>6</td>
<td>20</td>
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<tr>
<td></td>
<td></td>
<td>CRE</td>
<td>2.0</td>
<td>mg/dL</td>
<td>0.5</td>
<td>1.2</td>
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<tr>
<td></td>
<td></td>
<td>GOT/AST</td>
<td>19</td>
<td>IU/L</td>
<td>32</td>
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<tr>
<td></td>
<td></td>
<td>C K</td>
<td>64</td>
<td>IU/L</td>
<td>28</td>
<td>140</td>
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<tr>
<td></td>
<td></td>
<td>Tn†</td>
<td>Negative</td>
<td>ng/ml</td>
<td>0.1</td>
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<tr>
<td></td>
<td></td>
<td>CKMB(mass)</td>
<td>4.85</td>
<td>ng/ml</td>
<td>0.1</td>
<td>4.94</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CRP</td>
<td>0.71</td>
<td>mg/dL</td>
<td>0.5</td>
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</table>

| Blood  | 0941022 | Lipase  | 57   | IU/L    | 13  | 60  |

<table>
<thead>
<tr>
<th>Blood</th>
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<th>PT</th>
<th>sec.</th>
<th></th>
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<td>sec</td>
<td>23.9</td>
<td>34.9</td>
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EKG: Atrial fibrillation with RVR
Impression
- SMA occlusions with ischemia bowels

Management
- NPO, NG decompression
- Thrombolytic therapy:
  - Urokinase, intraarterial-catheter infusion
10/25

- Clinical condition
  - Diffuse abdominal pain exacerbated
  - Bowel sounds: absence
  - Muscle guarding(-)

- Angiogram

→ arrange operation on 10/25
Operation

**OP finding:**
- Gangrene, ischemia
- Mild ischemia
- Healthy jejunum, 80cm
- Solid tumor, 3*2*3cm

**Procedure:**
- Subtotal colectomy
- Massive small bowel resection
- Treiz ligament
**Diagnosis:**
- Ischemic bowel (SMA occlusion)
- Small intestine tumor, suspect GIST

**Pathology:**
- Ischemia small intestine and colon
- GIST
**Post-op condition**

- SICU care
- AMI attack
- post-operation day 1 → DDT

<table>
<thead>
<tr>
<th>Blood</th>
<th>0941025</th>
<th>CKMB (mass)</th>
<th>8.71</th>
<th>ng/ml</th>
<th>0.1</th>
<th>4.94</th>
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</thead>
<tbody>
<tr>
<td>Blood</td>
<td>0941025</td>
<td>K</td>
<td>4.4</td>
<td>mmol/L</td>
<td>3.4</td>
<td>5.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GOT/AST</td>
<td>14</td>
<td>IU/L</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LDH</td>
<td>281</td>
<td>IU/L</td>
<td>135</td>
<td>225</td>
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<tr>
<td></td>
<td></td>
<td>C K</td>
<td>85</td>
<td>IU/L</td>
<td>26</td>
<td>140</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TnT</td>
<td>0.281</td>
<td>ng/ml</td>
<td>0.1</td>
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</tbody>
</table>
Discussion

- mortality and risk of thrombolytic therapy in acute SMA occlusion patient?
- Other alternative therapy?
- The prognosis of surgery
Thrombolytic therapy for acute superior mesenteric artery occlusion


- Review article
- 1966 to 2003 regarding thrombolytic therapy for superior mesenteric artery thromboembolism (Oclusion: via angiography)
- 20 case reports, 7 small series, 48 p’t
Treatment

Agent:
- **Urokinase**: 38/48 (79%)
  - Intra-arterial urokinase: half-life 16 mins
- **Reverse**: intravenous lysine analogues
  - ε-aminocaproic acid, tranexamic acid

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Table 2. Specific thrombolytics

<table>
<thead>
<tr>
<th>Agent</th>
<th>Source</th>
<th>Mechanism of action</th>
<th>Dose</th>
<th>Half-life</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Streptokinase</td>
<td>protein produced by Group C β-haemolytic streptococci and purified for clinical use</td>
<td>forms complex with plasminogen, which then cleaves the Arg560–Val561 ‘activator bond’ to convert both complexed and free plasminogen to plasin</td>
<td>250 000 U (2.5 mg) intra-arterial bolus or low-dose continuous infusion with 5000–10 000 U/hr</td>
<td>12–18 min</td>
<td>least expensive, risk of allergic reaction (3%), sufficient dose must be given to overcome possible neutralization with antibodies to streptococcus, acts on both bound and free plasminogen</td>
</tr>
<tr>
<td>Urokinase</td>
<td>cultured from human kidney cells</td>
<td>directly activates plasminogen by cleaving Arg560–Val561</td>
<td>200 000–250 000 U intra-arterial bolus, followed by infusion of 60 000–120 000 U/hr</td>
<td>15–20 min</td>
<td>expensive, acts on both bound and free plasminogen</td>
</tr>
<tr>
<td>Tissue plasminogen activator (t-PA)</td>
<td>recombinant human serine protease</td>
<td>binds to fibrin and is activated by cleavage of an arginine–isoleucine bond after which it activates plasminogen by cleaving Arg560–Val561</td>
<td>20 mg ‘slow’ intra-arterial bolus, followed by a subsequent 20 mg bolus 12 h later</td>
<td>2–6 min</td>
<td>most expensive, ‘fibrin-selective’ as acts primarily on fibrin-bound plasminogen</td>
</tr>
</tbody>
</table>

*Doses that have been reported in case studies and series.*
Dose

- Great variety

- **Urokinase:** high dose (100000 - 600000U/h)
  - Revascularization < 3hrs

- **Streptokinase:** low dose (5000 - 10000 U/h)
  - Revascularization < 30-60hrs

- **High dose infusion**
  - Complete clot lysis↑
  - Infusion time ↓
  - Significant bleeding ↓
Efficacy

- Angiographic success: 90% (43/48)
  - X: duration of Sx., localization, agent, dose, infusion protocol
  - O: age of embolus/thrombus, best result <72hrs of occlusion

- Clinical success: 62.5% (30/48)

- Overall survival: 90% (43/48)
  - Mortality: 24% - 94% (previous review)
Safety

- **Bleeding complications**
  - minor: 10-15%
    - Usually at puncture site
  - Similar with lower limb arterial occlusion
  - major: none
    - Hypotension, blood transfusion
    - lower limb arterial occlusion: 9%

- **Thromboembolic complications**
  - Distal embolism: 8% (4/48)
  - Lower extremity occlusion: 12%
Vasodilator therapy

Sammartano et al: papaverine HCl in acute superior mesenteric arterial occlusion (Gastroenterology 1981)

- dog modol
- intra-arterial saline(n=5) : intra-arterial papaverine(n=10)
- 24 hour survival: saline:papaverine=20%:100%
- Bowel ischemia: 4/5 : 0/10
- Angiogram: constriction↓, collateral flow↑
Boley et al.: Initial results from an aggressive roentgenological and surgical approach to acute mesenteric ischaemia (Surgery 1977; 82: 848–55)

- Early angiography and papaverine → acute mesenteric infarction
- Mortality rate: 54% v.s 70–80% (traditionally managed patients)

intramesenteric artery vasodilator infusion (48hrs) in a rat model of acute segmental mesenteric vascular occlusion

<table>
<thead>
<tr>
<th></th>
<th>Total mesenteric blood flow</th>
<th>Length of viable segment</th>
</tr>
</thead>
<tbody>
<tr>
<td>papaverine</td>
<td>↑</td>
<td>↓</td>
</tr>
<tr>
<td>isoproterenol</td>
<td>↑</td>
<td>↓</td>
</tr>
<tr>
<td>norepinephrine</td>
<td>↓</td>
<td>↓</td>
</tr>
<tr>
<td>saline</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Contemporary management of acute mesenteric ischemia: Factors associated with survival

- Woosup M. Park, Peter Gloviczki, Kenneth J. Cherry, and et al.
- Retrospective review
- all the patients (58) underwent operation for acute mesenteric infarction
- 1990/1/1 - 1999/12/31
Overall Survival

90 days
59%

1 yr
43%

3 yrs
32%

white Midwestern control population
(P < .001).
<90 days mortality: 41% (24/58)

Related factors:

- Older
- Post-op <43 days with acute mesenteric infarction as complications

Highest mortality rates: Older patients, bowel resection(-), and NMI

Table IV. Causes of early and late mortality

<table>
<thead>
<tr>
<th>Mortality</th>
<th>No. of deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>At ≤90 days</td>
<td></td>
</tr>
<tr>
<td>Multiorgan failure/sepsis</td>
<td>18 (75%)</td>
</tr>
<tr>
<td>Mesenteric thrombosis</td>
<td>2 (8%)</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>2 (8%)</td>
</tr>
<tr>
<td>Coronary obstructive pulmonary disease</td>
<td>1 (4%)</td>
</tr>
<tr>
<td>Unknown</td>
<td>1 (4%)</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
</tr>
<tr>
<td>At &gt;90 days</td>
<td></td>
</tr>
<tr>
<td>Cardiac</td>
<td>4 (25%)</td>
</tr>
<tr>
<td>Short bowel syndrome</td>
<td>3 (19%)</td>
</tr>
<tr>
<td>Mesenteric ischemia</td>
<td>2 (13%)</td>
</tr>
<tr>
<td>Cancer</td>
<td>2 (13%)</td>
</tr>
<tr>
<td>Unknown</td>
<td>2 (13%)</td>
</tr>
<tr>
<td>Pulmonary embolus</td>
<td>1 (6%)</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>1 (6%)</td>
</tr>
<tr>
<td>TPN line sepsis</td>
<td>1 (6%)</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
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Clinical implications for the management of acute thromboembolic occlusion of the superior mesenteric artery: autopsy findings in 213 patients.


autopsy in patients with fatal acute thromboembolic occlusion of SMA
1970-1982, autopsy rate 78% → 213 p’t
embolus/thrombus = 1.4 /1

Thrombotic occlusion
- more proximally (P < 0.001)
- infarction more extensive (P = 0.025)
- associated with old brain infarction (P = 0.048), aortic wall thrombosis (P = 0.080), and disseminated cancer (P = 0.079)

Embolic occlusions (n = 122)
- higher frequency of AMI (P = 0.049)
- synchronous embolism and/or source of embolus in 115 (94%)

remaining cardiac thrombi in 58 (48%) and synchronous emboli affected 273 other arterial segments in 83 (68%).
Summary

- **Surgery:**
  - Thromboembolectomy
  - Bypass
  - Resection
  - Second look operation
- **Thrombolytic therapy**
- **Vasodilator:** papaverine
- **Anticoagulant**

modified from the *Guidelines on Intestinal Ischemia* by the American Gastroenterological Association
Comments

- 研究中病人的特性與報告病人是否相近，影響到我們能不能把研究結果用到病人身上，所以應該在報告中要提到。
- 如果研究結果還不確定，例如papaverine多是動物實驗，可以不用列比較好。
- 背景可以單純。
Thanks for your attention!!