Human Factors and Major Haemorrhage

A Case Report

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Introduction

- Human factors involved in a major haemorrhage case
  - Behaviour of individuals, their interactions with each other / environment

- Decisions under difficult circumstances
  - Compromise our decision making
  - Impact on quality of patient care

Case: Patient AB

- 44 year old female
- Admitted, via A&E, to Sunderland Royal Hospital on 10th December, 2018
- Past Medical History
  - Auto-immune hepatitis
  - Non-alcoholic fatty liver disease
  - Liver fibrosis and cirrhosis
  - Hypertension
  - ? Mixed connective tissue disease - under Rheum
  - Oesophageal and rectal varices
  - Heart failure
  - Pulmonary hypertension
  - Chronic Anaemia

Admission

- Background
  - 2-3 years intermittent rectal bleeding, worse in past 6 months
  - Multiple clinic appointments and investigations
  - Multiple hospital admissions

- Admission
  - Admitted via A&E on 10th December, 2018
  - 2 day history of rectal bleeding (fresh red blood), constant ooze
  - Dizziness and fainting
  - Looking lethargic and washed-out

Investigations

- Blood Results
  - Hb 48g/L
  - PT 21.3 secs
  - VBG: pH 7.36, HCO_3 20.1mmol/L, BE -5.4mmol/L, Lactate 3.1mmol/L

- Prior to admission - recent investigations
  - Endoscopy (4/10/18) - Oesophageal varices
  - Flexible-sigmoidoscopy (4/10/18) - rectal varices with no evidence of recent bleeding
  - CT Abdomen (7/12/18) - patchy colitis and proctitis, engorged rectal vessels

- On admission
  - Flexible-sigmoidoscopy (13/12/18) - severe colitis, deep ulceration with fissuring
  - CT Abdomen (13/12/18) - no active bleeding, engorged rectal vessels

Further Actions

- Multiple further episodes of rectal bleeding
- Deteriorating blood results
  - ABG: pH 7.22, HCO_3 14.3mmol/L, BE -13.5mmol/L, Lactate 5.2mmol/L
- Referred to and reviewed by intensive care on 13th December

Cardiac Arrest

- Rectal bleed - > 1L blood loss
- Major haemorrhage protocol activation
- Resuscitation - CPR, adrenaline, blood transfusion
- Transferred to intensive care, intubated and ventilated

Major Haemorrhage

- Massive haemorrhage - 2-3L blood loss
- Peri-arrest, blood pressure 40/30mmHg

Patient Safety Incidents - Contributing Factors

1. Physical Demands - Fatigue and Tiredness
2. Physical Environment - Busy
3. Cognition and Mental Workload - Stress*

* Patient Safety First (2009), The ‘How to Guide’ for Implementing Human Factors in Healthcare, Version 1, 2009

Human Factors in Healthcare

"The principles and practices of Human Factors focus on **optimising human performance** through better understanding the **behaviour of individuals, their interactions with each other and with their environment**"*

* National Quality Board (2013), Human Factors in Healthcare A Concordat from the National Quality Board, November 2013

Human Factors Involved

- Teamwork
  - Communication, Situational Awareness
- Tasks
- Equipment
- Workspace*

* National Quality Board (2013), Human Factors in Healthcare A Concordat from the National Quality Board, November 2013

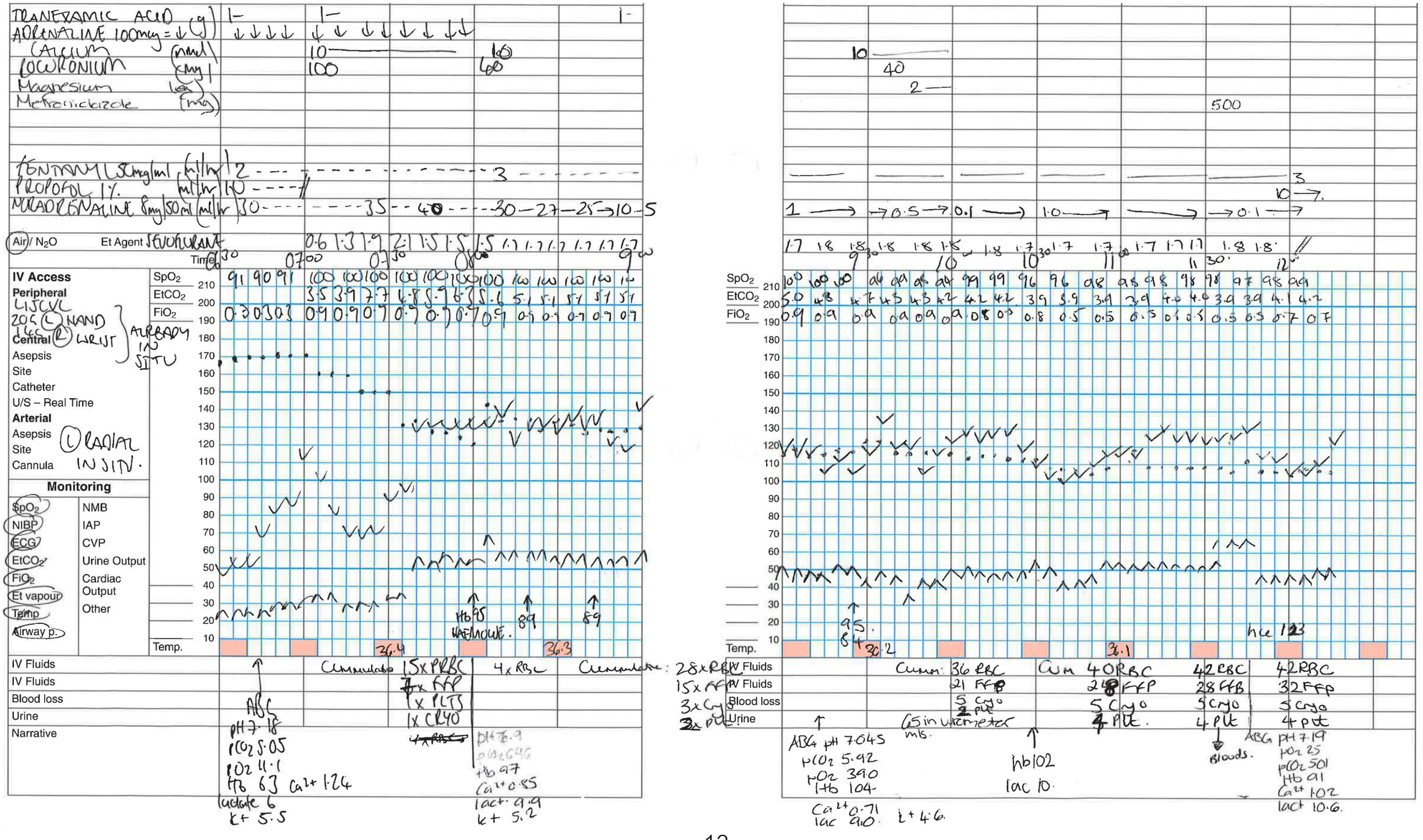
Theatre

- Task Fixation / Loss of situational awareness*[1]
- Involuntary Automaticity*[2]

*1 Patient Safety First (2009), The ‘How to Guide’ for Implementing Human Factors in Healthcare, Version 1, 2009

*2 Toft B, Gooderham P, Involuntary automaticity: a potential legal defence against an allegation of clinical negligence? BMJ Quality & Safety 2009;18:69-73.

Anaesthetic Chart



Transfusion

- 56 units of blood (£162/unit) (£9072)
- 46 units of fresh frozen plasma (£27/unit) (£1242)
- 8 units of cryoprecipitate (£180/unit) (£1440)
- 4 units of platelets were consumed (£208/unit) (£832)
- Total ~ £12,500*

* National Clinical Guideline Centre (UK). Blood Transfusion. London: National Institute for Health and Care Excellence (UK); 2015 Nov. (NICE Guideline, No. 24.)

NPSA / WHO Checklist

- NPSA - Five Steps to Safer Surgery*[1]
  - Briefing
  - Sign-in
  - Timeout
  - Sign out
  - Debriefing
- Reduced complications - 11% to 7%
- Reduced in-hospital mortality - 1.5% to 0.8%*[2]

*1 Vickers R, Five steps to safer surgery, The Annals of The Royal College of Surgeons of England 2011 93:7, 501-503

*2 Haynes AB, et al. Safe Surgery Saves Lives Study Group: a surgical safety checklist to reduce morbidity and mortality in a global population. N Engl J Med. 2009;360:491–9

Team Debrief

- Benefits
  - Identify areas of optimal and sub-optimal performance
  - Improve future team performance
  - Encourage reflection*[1]

- Barriers
  - Logistical difficulties
  - Insufficient time
  - Lack of trained facilitators
  - Lack of a debriefing setting*[2]

*1 Kessler, David & Cheng, Adam & Mullan, Paul. (2014). Debriefing in the Emergency Department After Clinical Events: A Practical Guide. AEM. 10.1016
*2 Sandhu N, Eppich W, Mikrogianakis A, et al. Postresuscitation debriefing in the pediatric emergency department: a national needs assessment. CJEM. 2013;15:1-10

Human Factors

- Promote learning environment
- Increase awareness about certain human characteristics
- Foster culture of safety
- Improve care for our patients*

* Russ AL, Fairbanks RJ, Karsh B, et alThe science of human factors: separating fact from fictionBMJ Quality & Safety 2013;22:802-808

Thank you