Original research

Five year experience in management of perforated peptic ulcer and validation of common mortality risk prediction models – Are existing models sufficient? A retrospective cohort study

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HIGHLIGHTS

- Early presentation, prompt diagnosis and emergent surgery are the pillars to successful management and good outcomes of PPU.
- To provide optimal care, it is important to stratify patients into high and low risk of mortality, ideally prior to surgery.
- All the four MRPMs tested had a similar moderate accuracy for mortality prediction in our experience.
- There is a potential for improvement of existing MRPMs; especially due to geographic and demographic diversity.
- MPI is the only scoring system which predicts all – intra-abdominal collection, leak, re-operation and mortality.

ARTICLE INFO

ABSTRACT

Background: Emergency surgery for perforated peptic ulcer (PPU) is associated with significant morbidity and mortality. Accurate and early risk stratification is important. The primary aim of this study is to validate the various existing MRPMs and secondary aim is to audit our experience of managing PPU.
Methods: 332 patients who underwent emergency surgery for PPU at a single intuition from January 2008 to December 2012 were studied. Clinical and operative details were collected. Four MRPMs: American Society of Anesthesiology (ASA) score, Boey's score, Mannheim peritonitis index (MPI) and Peptic ulcer perforation (PULP) score were validated.
Results: Median age was 54.7 years (range 17–109 years) with male predominance (82.5%). 61.7% presented within 24 h of onset of abdominal pain. Median length of stay was 7 days (range 2–137 days). Intra-abdominal collection, leakage, re-operation and 30-day mortality rates were 8.1%, 2.1%, 1.2% and 7.2% respectively. All the four MRPMs predicted intra-abdominal collection and mortality; however, only MPI predicted leak (p = 0.01) and re-operation (p = 0.02) rates. The area under curve for predicting mortality was 75%, 72%, 77.2% and 75% for ASA score, Boey's score, MPI and PULP score respectively.
Discussion and conclusion: Emergency surgery for PPU has low morbidity and mortality in our experience. MPI is the only scoring system which predicts all – intra-abdominal collection, leak, reoperation and mortality. All four MRPMs had a similar and fair accuracy to predict mortality, however due to geographic and demographic diversity and inherent weaknesses of exiting MRPMs, quest for development of an ideal model should continue.

1. Introduction

Perforated peptic ulcer (PPU) is a common surgical emergency [1]. Mortality following PPU can be up to 25% [2–4]. To provide optimal care and allocate resources, it is important to stratify

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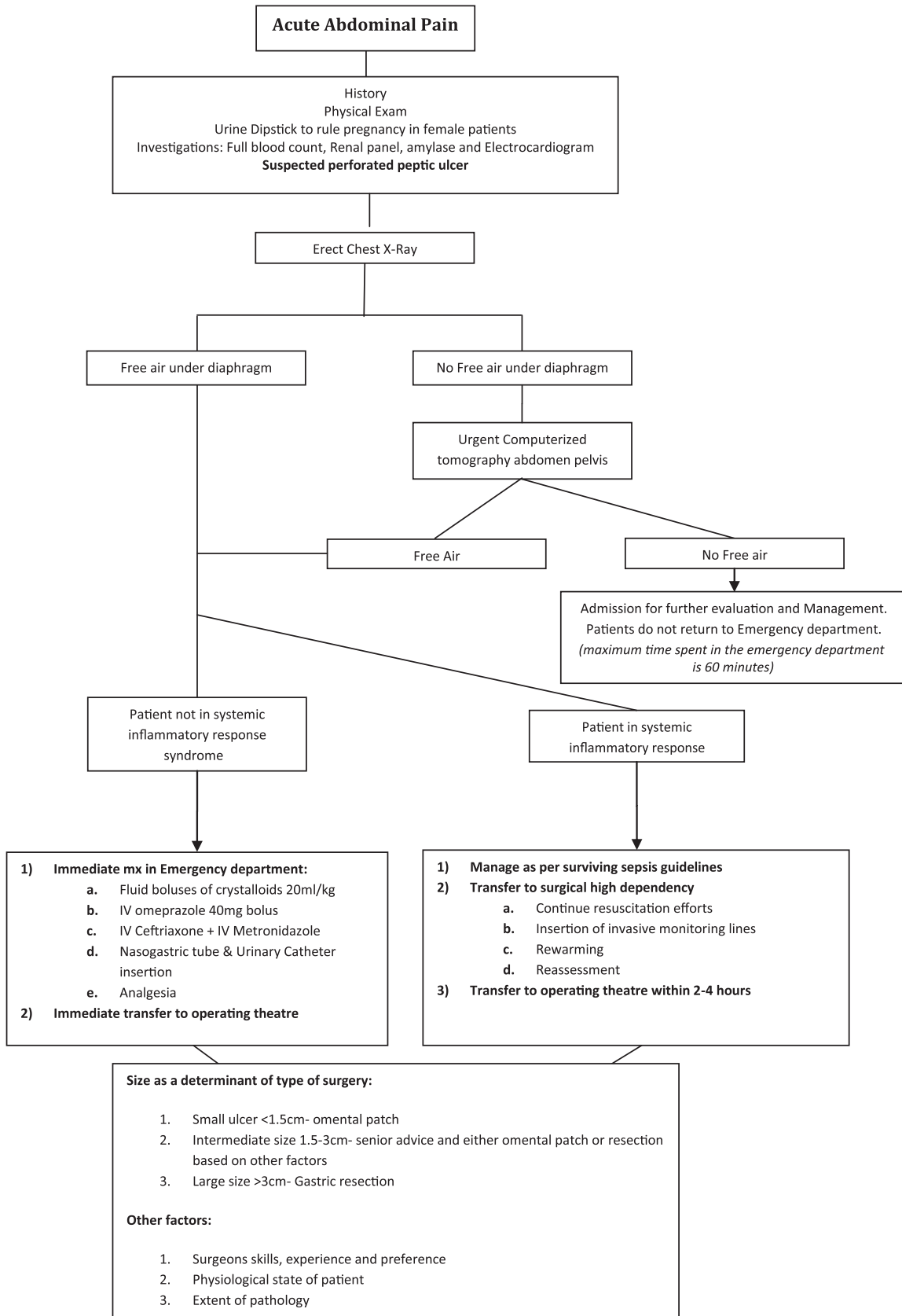 E-mail address: vgshelat@rediffmail.com (V.G. Shelat).

Acute Abdominal Pain

History
Physical Exam
Urine Dipstick to rule pregnancy in female patients
Investigations: Full blood count, Renal panel, amylase and Electrocardiogram
Suspected perforated peptic ulcer

Erect Chest X-Ray

Free air under diaphragm

No Free air under diaphragm

Urgent Computerized
tomography abdomen pelvis

Free Air

No Free air

Admission for further evaluation and Management.
Patients do not return to Emergency department.
*(maximum time spent in the emergency department
is 60 minutes)*

Patient not in systemic
inflammatory response
syndrome

Patient in systemic
inflammatory response

1) **Immediate mx in Emergency department:**
    a. Fluid boluses of crystalloids 20ml/kg
    b. IV omeprazole 40mg bolus
    c. IV Ceftriaxone + IV Metronidazole
    d. Nasogastric tube & Urinary Catheter
        insertion
    e. Analgesia
2) **Immediate transfer to operating theatre**

1) **Manage as per surviving sepsis guidelines**
2) **Transfer to surgical high dependency**
    a. Continue resuscitation efforts
    b. Insertion of invasive monitoring lines
    c. Rewarming
    d. Reassessment
3) **Transfer to operating theatre within 2-4 hours**

Size as a determinant of type of surgery:

1. Small ulcer <1.5cm- omental patch
2. Intermediate size 1.5-3cm- senior advice and either omental patch or resection
based on other factors
3. Large size >3cm- Gastric resection

Other factors:

1. Surgeons skills, experience and preference
2. Physiological state of patient
3. Extent of pathology

Fig. 1. Tan Tock Seng Hospital algorithm of management of patients with perforated peptic ulcer.