

Review

Selective non-operative management of civilian gunshot wounds to the abdomen: A systematic review of the evidence

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ABSTRACT

Background: Selective non-operative management (SNOM) of penetrating abdominal wounds has become increasingly common in the past two or three decades and is now accepted as routine management for stab wounds. Gunshot wounds are more frequently managed with mandatory laparotomy but recently SNOM has been successfully applied. This review systematically appraises the evidence behind SNOM for civilian abdominal gunshot wounds.

Methods: A Medline search from 1990 to present identified civilian studies examining success rates for SNOM of abdominal gunshot wounds. Case reports, editorials and abstracts were excluded. All other studies meeting the inclusion criteria of reporting the success rate of non-operative management of abdominal gunshot wounds were analysed.

Results: Sixteen prospective and six retrospective studies met the inclusion criteria, including 18,602 patients with abdominal gunshot wounds. 32.2% ($n = 6072$) of patients were initially managed non-operatively and 15.5% ($n = 943$) required a delayed laparotomy. The presence of haemodynamic instability, peritonitis, GI bleeding or any co-existing pathology that prevented frequent serial examination of the abdomen from being performed were indications for immediate laparotomy in all studies. Delayed laparotomy results in similar outcomes to those in patients subjected to immediate laparotomy. Implementation of SNOM reduces the rates of negative and non-therapeutic laparotomies and reduces overall length of stay.

Conclusions: SNOM can be safely applied to some civilian patients with abdominal gunshot wounds and reduces the rates of negative or non-therapeutic laparotomy. Patients who require delayed laparotomy have similar rates of morbidity and mortality and similar length of stay to those patients who undergo immediate laparotomy.

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Introduction

The surgical management of gunshot wounds (GSW) to the abdomen has for many years been mandatory laparotomy [1,2], whereas more recently blunt trauma and stab wounds have been successfully managed non-operatively in selected patients [3–6]. Such a policy of selective non-operative management (SNOM) significantly reduces the rates of negative or non-therapeutic laparotomy and reduces patient morbidity, length of stay and cost [7–9].

Potential candidates for SNOM after penetrating abdominal injury must be haemodynamically stable and without peritonitis on examination [9,10]. They should be routinely investigated with contrast enhanced computed tomography (CT) scans to identify intra-abdominal injury. CT evidence of hollow viscus injury mandates laparotomy but solid organ injury in the stable patient may not necessitate surgery [11–13]. SNOM is not ‘doing nothing’ and is an active process in which a patient is serially and regularly assessed by an experienced surgeon, preferably the same one, to detect changes in the abdominal examination. Any other injury that precludes serial examination such as a decreased conscious level from drugs, drink or head injury, or another indication for surgery such as extremity trauma should also mandate laparotomy in the presence of penetrating abdominal injury [14,15].

GSWs and other ballistic injuries to the abdomen are perceived to be less amenable to non-operative management as the energy transfer involved is usually far greater than in stabbings and the likelihood of significant intra-abdominal injury much higher [16]. Studies of surgery for civilian abdominal GSW describe rates of non-therapeutic laparotomy of up to 25%, suggesting that NOM could be successfully and usefully pursued in this group [14,17].

Over the last two decades a number of studies looking at SNOM of abdominal GSW have been published and demonstrate that it is a viable technique in selected patients. This article reviews the evidence regarding SNOM of civilian GSW to the abdomen.

Materials and methods

An electronic search was performed of the Medline database covering the period 1990–Oct 2012 using the terms “abdominal gunshot wounds” and “conservative management” and the MeSH headings: “gunshot wounds”, “non-operative management”, “conservative management” and “ballistic wounds”. The search was limited to English language publications and human subjects. All titles and abstracts were reviewed, and appropriate papers further assessed. The reference sections of all relevant papers deemed relevant were hand searched to identify papers that may have been missed during the primary search.

Studies were included if they described clinical outcomes for patients with abdominal gunshot wounds whose initial treatment intention was non-operative. Data collated included the methods used to determine if a patient was suitable for non-operative management, delayed operation rates, morbidity and mortality rates and length of hospital stay. The minimum data set required

for inclusion was: patients with conservatively treated abdominal gunshot wounds and success rates of non-operative management. All reports fitting these criteria, irrespective of the size of the study population, were included. Case reports, editorials, abstracts and reviews were excluded (Fig. 1). ‘Negative laparotomy’ was defined as a laparotomy at which no injuries or abnormalities were found; ‘non-therapeutic laparotomy’ (NLT) was a laparotomy at which injuries were found but no intervention was necessary; ‘therapeutic’ or ‘positive laparotomy’ is one at which injuries were found and treated with anything from placement of a drain to major resections.

Results

Twenty-two studies were identified that fitted the inclusion criteria, comprising 18,602 patients with abdominal gunshot wounds (Table 1).

The largest group of patients by far was that provided by Nabeel Zafar et al. [34]. Their study analysed data from more than 12,000 patients from the North American National Trauma Database between 2002 and 2008 and is likely to include duplicate patients from other American studies published during or after this period [13,27,31,32]. It is also noticeable that most of the 22 studies are published by only two or three groups based on either the West coast of the USA or in South Africa. Several of the published series clearly use the same databases but look at different patient populations or outcomes within them. It was not possible from the

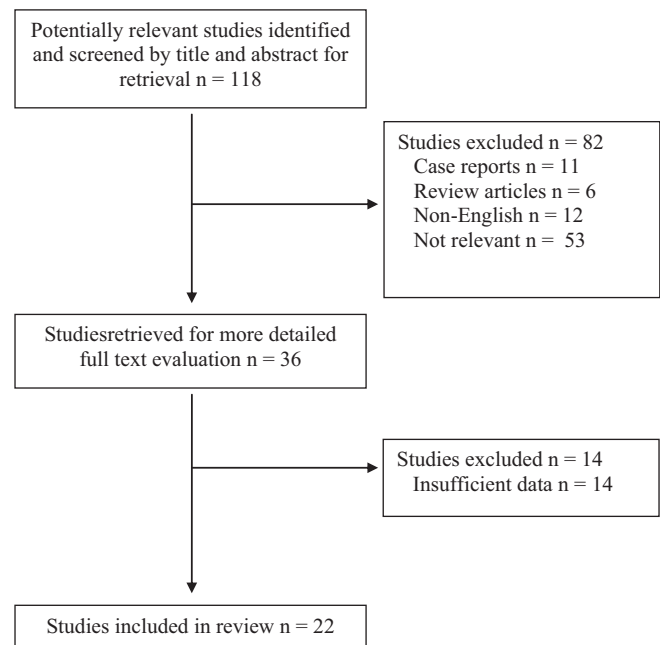


Fig. 1. Flow diagram demonstrating studies included in this review following the search criteria.

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