Abdominal gunshot wounds — current status of selective non-operative management

The standard of care for abdominal gunshot wounds has traditionally been mandatory laparotomy. This was also the case for abdominal stab wounds until the beginning of the 1980s, by which time selective non-operative management (SNOM) had become an acceptable alternative for a selected group of patients. Adopting the same policy for gunshot wounds of the abdomen has created resistance due to certain dissimilarities between the two mechanisms of penetrating trauma. Approximately one-third of stab wounds to the abdomen are associated with significant injury, while the same is true for approximately 80% of gunshot wounds. This is because gunshot results in a greater degree of energy transmission than stab wounds and because bullets travel further within the body, increasing the probability of injury. In addition, the degree of injury as measured by the abdominal trauma index is characteristically higher than with stab wounds. The increased severity of injury also tends to render the physical examination less equivocal in the face of peritoneal penetration.1

Until recently the only exception to the practice of mandatory laparotomy was the certainty that the abdominal cavity had not been penetrated by the bullet. A serious challenge to the above dogma has been developing slowly. In 1960 Shaftan first demonstrated that patients with intraperitoneal injury following penetrating abdominal trauma could be clinically identified with a high degree of accuracy, while the remainder of patients could be managed safely by means of close observation. Although the majority of patients in that study had stab wounds, several patients with gunshot wounds were managed non-operatively. The challenge to the dogma became more intense in the 1990s, and a significant number of publications — some of them prospective — were published favouring the practice of the SNOM approach, similar to the one practised with stab wounds. Those supporting this policy accept that gunshot wounds have a longer track and a higher incidence of peritoneal penetration and therefore a higher incidence of visceral damage. They argue that a considerable proportion of patients will have injury to the abdominal wall only or negligible intra-abdominal injury. Analysis of published experience shows an average incidence of 20% for unnecessary laparotomies for gunshot wounds due to civilian violence. Even more surprising, in the Vietnam war where the principle of mandatory laparotomy was followed, there was a 19.2% incidence of negative laparotomy. This high negative laparotomy rate was considered acceptable surgical practice because it was thought to be associated with a negligible increase in morbidity. Those advocating the concept of SNOM state that negative laparotomies result in significant complications, with an associated increase in length of hospital stay. In an era of economic constraint, avoiding non-therapeutic laparotomies would translate into significant savings.

The above shows that there is a place for SNOM in managing gunshot wounds of the abdomen. The question that arises pertains to the selection of appropriate patients in order to avoid any increase in morbidity and mortality. In the initial reports on SNOM all abdominal gunshot injury patients were presented as one group. In the last few years they have been divided into separate anatomical groups: gunshot wounds to the anterior abdomen, to the back, to the buttocks, transpelvic gunshot wounds and thoracoabdominal gunshot wounds. It is worth mentioning that the majority of these studies come from one centre (the University of Southern California). It is interesting to note the patients considered eligible for SNOM. They include patients who are haemodynamically stable and who do not have signs of diffuse abdominal tenderness. After the decision not to do an emergency laparotomy is taken, the patient is kept in hospital under close clinical observation. Clinical signs suggestive of intra-abdominal injury include diffuse tenderness, localised tenderness, haemodynamic instability, haematuria, blood on rectal examination, blood in the nasogastric tube and diminished or absent lower extremity pulses. Although such signs may be absent on presentation, they may appear later. If indicated, haemodynamically stable patients can be investigated using diagnostic peritoneal lavage (DPL), radiological studies, endoscopy or even diagnostic laparoscopy depending on the individual case. While these tests are helpful they should not replace good clinical examination. It is interesting to see that all patients admitted for observation by the main proponents of SNOM (University of Southern California) usually underwent several diagnostic studies, including a spiral CT scan, irrespective of the anatomical area of the abdomen injured. Serial clinical examination in a dedicated monitored area constituted the most significant component of SNOM. If the patient’s clinical examination remained stable, and the diagnostic studies did not show anything significant, they were discharged 24 hours after admission. Patients who were intoxicated, intubated, sedated or unconscious or who had associated head or spinal cord injuries were considered to be unevaleuable and to have an intra-abdominal injury until proven otherwise. It is said that SNOM has no role to play in managing these patients. It has also been stated that it is advisable to explore the abdomen in patients who undergo general anaesthesia for other reasons (i.e. orthopaedic procedures). The authors claim that they did not have any significant missed injuries and definitely no significant morbidity and no mortality following this policy.

In their latest publications on SNOM involving 1 856 patients with abdominal gunshot wounds the authors reflect as follows: “When surgeons believe that they do not violate the standard care by observing patients with abdominal gunshot wounds, it is likely that operations for equivocal symptoms will be done less liberally and the rate of unnecessary laparotomy will decrease. The surgeon’s anxiety about managing an abdominal gunshot wound without surgery under the current medicolegal implications of SNOM for abdominal gunshot wounds was evident in our series. There was a significantly higher unnecessary laparotomy rate among patients who were explored initially versus those who were observed and explored later (13% v. 29%). This indicates that even the members of a trauma team with extensive experience in SNOM kept a low threshold for operating on patients who were initially managed without surgery but later developed suspicious symptoms.”

The advocates of SNOM present a valid argument for the subset of patients in whom lack of peritoneal violation is clinically obvious or can be easily excluded by diagnostic tests. The
same applies for anterior abdominal wall gunshot patients who remain asymptomatic while under observation. However, we have repeatedly encountered patients with stab wound and extraperitoneal injuries (particularly to the back) who were discharged after a period of observation only to be re-admitted in grave physiological condition due to a missed injury. Could the same not apply to gunshot injuries? SNOM of document-ed gunshot injuries to solid organs (liver in particular) is not recommended.\textsuperscript{2,10}

What is the present status of SNOM for abdominal gunshot wounds? Undoubtedly there is a role for SNOM in a subgroup of patients with gunshot wounds to the abdomen. However, we feel that there is a need for more prospective studies to evaluate the indications and efficiency of SNOM related to the specific abdominal anatomical area. This is particularly relevant since the majority of the series presented in the last decade originate from the same trauma centre and have the same or similar authorship. The standard recommendation that experienced surgeons should repeatedly reassess the patients in a dedicated monitored area and that all patients should undergo a spiral CT scan, questions the practicality of SNOM. In the average South African hospital environment there is a lack of experienced medical staff, dedicated monitoring areas and diagnostic facilities (particularly spiral CT scanners). Therefore in South Africa there is a limited role for SNOM. However, in the correct circumstances where the appropriate skills and resources are available, it should be considered a safe option.

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REFERENCES


CONGRESSES, 2004

NASA (Neurology Society of SA)
KwaMaritane, 10 - 13 March

SASA (SA Society of Anaesthesiologists)
Sandton Convention Centre, 13 - 17 March

Salmagundi (Dermatology Society of SA)
Cape Town Convention Centre, 27 - 29 April

Cape Town Convention Centre, 6 - 10 August

SASMO (Educational Symposium — joint meeting of European School of Oncology and South African Society of Medical Oncology, ‘Multidisciplinary Management of Upper Gastrointestinal Tumours’)
Sandton Convention Centre, 18 - 20 November

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