

## ***Surgery in Africa - Monthly Review***

### **Is Splenic Preservation after Blunt Splenic Injury Possible in Africa? June 2010 Update and September 2005 Review**

*(Ed. Note: The original article was published in the Monthly Reviews in September 2005. The purpose of this update is to review developments since that time and offer some comments on the experience in Africa).*

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#### **1. Update 2010**

##### **1.1. NOM in Children**

Non-operative management of splenic injuries in children has become well established over the past two decades with many studies reporting  $\geq 95\%$  success rates. The evolution of current practice is well documented. (1) Moog in a review of 88 children managed for splenic injury reported only one case of operative intervention. (2) Hemodynamic stability remains a key requirement for NOM; while the position of NOM in cases with higher injury grades and the need for ICU requirement remain less resolved. These decisions should depend on the individual merits of each case. (3, 4) Splenic artery embolization (SAE) has enjoyed increasing acceptance in the past five years. (5) (See [1.4 Angiography](#))

##### **1.2. NOM in Adults**

The success of NOM in children encouraged the drive towards the same approach in adults even though the risk of OPSI is low in adult trauma patients. NOM has become the preferred approach in hemodynamically stable patients. (6, 7) However clinical evidence of ongoing blood loss or instability should be addressed with prompt surgical intervention. (6) Careful patient selection is of utmost importance in NOM. Predictors of success remain debatable. Bala studied 64 patients and found that admission systolic blood pressure and associated injury to less than 3 extra abdominal regions were predictors of success; while the need for blood transfusion was a strong predictor for splenectomy. (8) In a large retrospective review, age greater than 55 years, ISS higher than 25, along with admission to a level III or IV trauma hospital were associated with significant risk of failure of NOM. (9) While these issues remain unresolved, the success rates of NOM for splenic injuries have continued to improve, even in low-volume tropical countries. (9, 10) In a 15 year review of NOM, success rates moved from 77% to 96%. (11) The authors noted an increasing use of SAE to be contributory to improved success rates.

Failure of NOM is defined as need for surgical intervention after initially being selected for observation. This may be secondary to hemodynamic instability, peritonitis or persistent decline in hemoglobin after transfusion requirement  $\geq 2$  units of blood. (12) The optimum time for observation of blunt splenic patients in hospital has not been determined. Most patients who fail NOM do so within 48 hours. (12) Observation for 3-5 days would be an acceptable compromise.

There is no evidence based answer to the question of when an individual, who underwent successful NOM for splenic injury, should return to contact sports but many centres still favor the traditional 3 months.

##### **1.3. Abdominal Ultrasound versus CT**

Abdominal CT scanning remains the gold standard diagnostic test if NOM is to be pursued. CT abdomen helps to delineate severity of organ injury and the presence of a vascular blush in the spleen is often taken to be sign of ongoing bleeding. It is also being used for the follow up of patients with splenic injury, but its role in this regard remains to be validated. The draw backs of CT include the need for patient stability and the potential for missed injuries to hollow viscera.

FAST has continued to be used for detection of hemoperitoneum in unstable patients. However there has been increasing interest in Contrast Enhanced Ultrasound Scan (CEUS). It provides a good alternative to multislice CT scan. (13) CEUS is available at the bedside, accurate for detection of solid organ injury, able to detect active bleeding while avoiding the risk of ionizing radiation. (14) A multicentre study has also shown the sensitivity of CEUS. (15)

##### **1.4. Angiography**

SAE has gained increasing focus in recent years with several studies showing that it improves success rates when incorporated into the NOM protocol. (16-19) There have also been studies showing SAE to have an unclear role in NOM. Habrecht found no difference in outcome when SAE was included or removed from the NOM protocol. (20) Also, in an 8 year review of NOM, Akpofure found no clear role for SAE. (21) Complications of SAE

include total or partial splenic infarction, splenic atrophy, post procedure bleeding, and pleural effusion. For these reasons the need for caution has been stressed. (22)

## 2. Splenic Trauma in Africa

The management issues, highlighted in the 2005 Review concerning splenic trauma in Africa, are still present, but some changes have occurred in the past five years. At the University of Benin Teaching Hospital for instance a publication in 2001 (23) showed that all patients with splenic injury were subjected to surgery. Currently over 90% of pediatric blunt splenic injuries are managed using NOM in this institution. We recently published our initial experience of NOM in adult patients. (24) In that study we identified challenges encountered in the management of splenic injuries in Nigeria to include delayed presentation, under-utilization of CT, unavailability of interventional radiology, inadequate ICUs, limited vaccination, discharge against medical advice and poor follow-up. Despite these problems NOM is possible in Africa at least in the major trauma centres where the majority of severely injured patients are managed.

In our Trauma unit at the University of Benin Teaching Hospital, adult patients with blunt abdominal trauma, who are not hemodynamically compromised, are entered into the NOM Protocol.

1. A chart for hourly monitoring of pulse rate, blood pressure, respiratory rate, urinary output, GCS, and clinical reassessment of the abdomen if conscious is opened at the commencement of protocol. This is usually done by the trauma registrar and intern with intermittent reviews by the consultant trauma surgeon
2. Abdominal ultrasound scan is done on the first day in the ED and at least another one in 48 hours.
3. Initial CT scan of the abdomen where the patient can afford it.
4. Serial hematocrit determinations three times daily at 7am, 2pm and 10pm.
5. The patient monitoring is done in the Trauma bay or the Emergency ward which is attached to the Emergency Room under the management of the Trauma Unit.
6. The patient is X-matched for 3-4 units of blood in the blood bank and held.
7. Anesthetists review the patient on day 1 and remain on standby to take the patient for laparotomy should the need arise.
8. Similarly the Operating Room is kept aware of the case while NOM progresses.
9. If NOM is successful the patient is discharged on Day 5 with counseling on contact sports and the need to return promptly to hospital if there is any untoward development.
10. Both NOM and splenectomy patients are followed up for as long as possible but at least for 2 years.

The failures we have recorded followed hemodynamic instability, decreasing hematocrit or onset of peritonitis. The patients underwent prompt laparotomy for splenic salvage or splenectomy depending on operative findings.

Splenectomy patients receive vaccination against Pneumococcus, Haemophilus and Meningococcus, but oftentimes we have challenges here and not all the patients eventually get these vaccines prior to discharge. But we have not had any case of OPSI in all the ones that kept follow-up schedule. What are the facts on blunt splenic injuries in Africa?

1. Majority still result from road traffic accidents.
2. Most surgeons working outside University Teaching Hospital Centres still treat splenic injuries by operative intervention and usually splenectomy.
3. Materials for splenorrhaphy such as fibrin glue or Dexon mesh are unavailable, but Surgicel is available in many centres. Partial splenectomy is very uncommon as a result.
4. NOM has become established in children and is gaining popularity in adults.
5. Interventional radiology as a specialty is unavailable in sub-Saharan Africa and so SAE as part of NOM is absent.
6. Most hospitals that treat trauma can meet monitoring needs, if there is a knowledgeable and dedicated in-house surgeon to direct protocol and management.
7. CT has become available in all teaching hospitals and in many secondary and private facilities, but there is an affordability crisis. Patients cannot afford to pay for the services and so CT is under-utilized in blunt abdominal trauma.
8. DPL is unpopular here, but ultrasound facilities and personnel are in abundance in most parts of Africa.
9. Professional trauma and acute care surgeons are in short supply and indeed the specialty is still in the teething stage, with much suspicion and challenge from other surgical specialties, but general surgeons abound.
10. One recommendation that was made in the original review is that techniques of splenorrhaphy be taught in African surgical training programmes. This procedure has always been and is still being taught. The reason limiting its applicability is explained above.

In conclusion there are remarkable changes in the approach to management of blunt splenic injury in Africa. The role of NOM is increasingly being recognized, but local limitations make the wide scale application lag behind the pace of the developed world.

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