



SPLENIC TRAUMA- SAVAGE VS SALVAGE AN UPDATE ON THE NON-OPERATIVE MANAGEMENT OF HIGH GRADE SPLENIC TRAUMA

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ABSTRACT

The spleen is one of the most frequently injured intra-abdominal organs in blunt abdominal trauma. Since the first documented case report of a splenic trauma in 1902, for over 7 decades – surgical management has been the gospel. Only over the past 3-4 decades with the overwhelming mortality accompanying post splenectomy in the form of OPSI, have the medical dictums finally started to search reason in other non-surgical approaches. With the advent of modern imaging technology with non-invasive tests and our increasing knowledge of the immunological functions of the spleen in the human body has actually paved the pathway for the development of norms for splenic salvage. Non-operative management has showed a decrease in overall mortality and morbidity although it bears with itself its own repercussions. This update studies the existing literature and delves into solving the practical dilemma that accompanies the management of splenic trauma

KEYWORDS: Splenic trauma, NOMSI, Splenectomy, OPSI,

INTRODUCTION

Trauma has been the leading cause of quietus since ages especially in the younger majority^[1]. Out of all the emergencies that present to the casualty, abdominal trauma accounts for around 15% of the cases and spleen is the most commonly affected solid organ^[2]. Since 1970, NOMSI (non-operative management of splenic injury) has been upcoming into practice with a multitude of research being done digressing its aspects. In true veracity, most of the existing literature stills stagger towards a surgical management with extreme restraints for a non-operative management. The vapidly associated with such an approach in spite of coveted evidence favouring NOMSI in terms of reducing mortality and morbidity is absolute banality. Here in we present a case of advanced grade 5 splenic trauma with initial destabilization which was decided to be taken for conservative management and the possible aptitudes which made the approach a striking success.

CASE PRESENTATION

A 14-year-old boy presented with alleged history of a head on collision with a two-wheeler and sustained head injury. He had loss of consciousness for a period of 30 min with multiple grade 1 brush abrasions over the abdomen, knee

and hand. He had a history of left sided ear bleed following injury. Patient was admitted as a case of road traffic accident with blunt trauma abdomen with head injury and was evaluate with directivity. There was no history of seizure, vomiting, hearing or vision abnormalities. There were no complaints of breathing difficulty or chest pain. He had no complaints of decreased urine output or haematuria. Patient vitals were stable with full GCS. Cardio-respiratory examination was normal. On per abdominal examination– mild non tender abdominal distension was present with normal bowel sounds on auscultation. Per rectal examination was normal with no active bleed or injuries.

Patient was evaluated primarily with chest and abdominal x-rays which showed no obvious abnormality for which patient was immediately taken up for NCCT brain and abdomen following eFAST detecting hemoperitoneum.

On NCCT abdomen he was found to have grade 5 splenic injury and then CT angiogram was done which showed devascularisation of 75% of the splenic parenchyma mostly on the posterior region with transected posterior splenic artery pedicle and partially intact anterior pedicle with no active extravasation.- Multiple lacerations of depth (> 3cm) noted within the spleen with multiple sub capsular and intra parenchymal non-enhancing hypo densities (HU ~40) s/o -



hematomas, without obvious extra-capsular or peri-splenic hematoma with minimal hyper dense ascites (HU ~60) - s/o hemoperitoneum noted - f/s/o AAST Grade - V splenic injury

Patient was initially given adequate hemo-resuscitation and given his stable blood parameters and inactive radiological abdomen-was closely monitored with titrating hemograms from four times a day to once alternate day and was planned to administer conservative management. Repeat USG abdomen was repeated which initially showed increase in the size of heterogeneous collection compared to previous USG. CT angiogram was repeated on a later date which showed healing, recovered splenic laceration with a resolving hematoma with increased enhancement of spleen. Patient improved symptomatically and was henceforth discharged with advice of strict restricted immobility for the next 3 months with fortnightly follow up with USG abdomen to see for the status of the hematoma.

DISCUSSION

Spleen is the most commonly injured organ in a case of blunt trauma abdomen. Studies show that out of all cases of abdominal trauma presenting to an emergency casualty, 13% of the cases are reported to have an intra-abdominal organ injury and spleen takes up 60% of the prevalence in this paradigm. Reports from the last decade, showed a trend of splenectomy with anyone above the grade of 2 in the AAST scale with hemodynamic stability. Since the 1970's, the treatment of any blunt splenic trauma has grown from a monochromic surgical approach for near about every patient to a more stratified conservative approach being applied for hemodynamically stable patient. Furthermore, the overwhelming evidence regarding the accompanying morbidity that comes with a splenectomy in the form of OPSI^[3]. This has led medical professionals from all over the world to give a thought towards the risk benefit ratio of this approach and has enshrined upon more conservative practices whenever viable.

The first case of a blunt trauma injury to the spleen in the form of a splenic rupture was published by Eisendrath in 1902. Since then, decades have seen, surgical treatment being done to prevent a catastrophic exsanguination with a post op mortality rate peaking around 40% in comparison to that associated with cases taken up with non-surgical management soaring up to 90%^[4]. But as time passed, medical research and its advances regarding the understanding of the immune function of the spleen in preventing deadly infections from capsulated organisms through the monocytic—phagocytic system which was well identified with the overwhelming incidence of post op sepsis and mortality seen post splenectomy with rates going up to 90%. In addition to all, a missed splenic injury has been deemed the most common cause of preventable death after a blunt trauma abdomen. Because of a wide diversity in how a case of splenic trauma presents to the casualty- vivid awareness about the full extent of various presentations and their relative importance is paramount in the diagnosis and management of all forms of blunt splenic injuries.

Assessment of Splenic Trauma

Spleen being the most common organ to be affected in a case of blunt trauma abdomen- a high degree of clinical suspicion has to be kept. As soon as, a splenic trauma is anticipated, evaluation is done to know the relative status of the spleen in order to take a decision regarding the surgical vs non-surgical management for the patient. In practicality, the investigation of choice is a CECT Abdomen with CT angiogram if required in a hemodynamically stable patient. It has contributed to the possibility of a non-operative management for such patients over the years. Some series studies in the earlier part of this century have shown the non-operative management increasing from 11 to 70% for the same degree of injury^[5, 6].

The most commonly used scale for assessing the severity and degree of splenic injury was established by the American Association for the Surgery of Trauma (AAST)^[7, 8]. In medical literature, evidence suggests the most frequent forms of splenic injury being grade 2 and 3 followed by grade 1, 4 and 5. Once radiological and clinical assessment is done with, the management of the patient virtually sways on the basis of the clinical stability of the patient, presence of associated intra-abdominal injuries, the ability of the medical centre in providing stringent monitoring in case a non-surgical approach is decided upon and finally the availability of an emergency operation theatre for immediate operative therapy in case the case deteriorates.

Non Operative Management

The advent of this form of management dawned with increased understanding regarding the immunologic functions of the organ. Preserving the function of the spleen was observed to serve a graded vitality regarding post op sepsis, OPSI, requirements for blood transfusions, therapeutic laparotomy, overall reduced hospital stay, lower hospital costs and decreased stress on the patient as a whole.

A patient being decided on a non-operative management would require immediate ICU admissions followed by vital stabilization with adequate fluid resuscitation. A low in admission haemoglobin warrants blood transfusions but can be held off in the absence of radiological evidence of active exsanguination and unstable dropping haematocrit. Depending on the radiological features in the earlier scan, patient can be taken in for intervention procedures such as angioembolization. Although debatable evidence exists, patient should be put on restricted mobility status with relative positional physiotherapy to reduce complications following a sedentary course like deep vein thrombus, pulmonary atelectasis, bed sores etc.

CRITERIA FOR NOMSI

The standard criteria established as a consensus for NOMSI are^[9, 10]:

1. Hemodynamic homeostasis / readily stabilizable.
2. Absence of abdominal signs as guarding, rebound and rigidity.
3. Requirement of blood transfusions ≤ 4 units;
4. No history of loss of consciousness following trauma
5. Age of the patient must be less than 55 years.
6. Radiologically documented splenic trauma.



In cases as such, after proper assortment, a patient could be surgically triaged to be taken for a particular line of management with the above-mentioned criteria being the barricade for such an attempt. Approach with caution should be taken as cases near borderline could sway in either direction necessitating emergency reversal of the plan of management.

ASSESSMENT PARAMETERS FOR NOMSI

According to Longo, Uranus and Sartorelli^[3, 11] whose research added on to the said predictive parameters for a successful NOMSI included: -

1. Hemodynamically stable/ readily stabilizable;
2. Blood transfusions < 4 units;
3. Age < 55 years;
4. Early resolution of splenic abnormalities
5. Obvious on radiological investigations with no features of hematoma expansion on subsequent scans.
6. No lack of consciousness/ no brain injuries;
7. No associated intra- or retroperitoneal
8. Injuries that would require surgical intervention;
9. No rebound or guarding;
10. Complete recovery of bowel movements.

It has been theorized that any hemoperitoneum present as a result of blunt trauma abdomen secondary to injury to any intraabdominal solid organ is supposed to get absorbed into the vascular moiety by the 5th day. Any evidence of blood beyond that could actually suggest a missed injury or a possible herald of a rebleed^[12]. In spite of all the prodigal inclination of the recent times towards NOMSI, there have been documented evidences where catastrophic failure of the said therapy has complicated the management of a patient of trauma and more even decreased the chances of survival for the given set of patients. Thereby to segregate the conditions that can be given a trial of NOMSI and to be aware as to when to intervene surgically is of utmost importance.

CONTRAINDICATIONS TO NOMSI

The relative contraindications for NOMSI^[11, 13, 14] which are basically criteria for a more cautious approach while assessing and establishing the adequate modality of treatment: -

1. Multisystem trauma increases the chances of failure of a conservative approach.
2. Severe brain damage upscale chances of failure of NOMSI.
3. Concurrent lesion interfering with the splenic lesion and possibly requiring surgical intervention
4. Age>55 years.
5. Diseased spleen.

In terms of absolute medical contraindication for a NOMSI approach, are represented by a single modality which is Hemodynamic instability.

ADVANTAGES OF NOMSI

The benefits of NOMSI^[15, 16, 17] are:

1. Low morbidity and mortality; splenic preservation leads to lower early infections in adults.
2. Avoidance of a non-therapeutic laparotomy and no immediate/late complications that usually accompany

a laparotomy.

3. Minimal Blood Transfusions.
4. Reduction in the overall in hospital stay.
5. Immunological homeostasis and prevention of OPSI.

DISADVANTAGES OF NOMSI

The potential drawbacks of NOMSI would include: -

1. Overlooked injuries
2. Unpredictable time period for a second potential rebleeding
3. Low splenic conservation rate following surgery after unsuccessful NOMSI.
4. A surgeon on call 24/7 and permanent clinical monitoring
5. Debates about the time period necessary for a complete recovery

It has been postulated that in case of a delayed surgical exploration, there is an increased risk for haemorrhagic exsanguination, major vascular requirements in terms of blood transfusions, heightened chances of refractory shock and increased chances of death. In 90% of cases the failure of NOM is evident in the first 50 hours from the initial insult. With respect to this vehement disability, Velmahos^[18] identified 4 independent risk factors for an unsuccessful NOMSI: -

1. High splenic Injury Severity Score.
2. Hemoperitoneum of over 300 ml.
3. Positive eFAST.
4. Necessary blood transfusions at regular interval to meet a constant required haemoglobin status

Statistically calculated rate of failure of NOMSI swore to 96% when all 4 factors are present. The complications associated with such a modality remains to be late onset intra-abdominal exsanguinations, delayed splenic rupture, splenic artery pseudo aneurysms, intra-parenchymal cysts and splenic abscess formation with a combined incidence of around 7.5%.

CRITERIA FOR IMMEDIATE SURGICAL MANAGEMENT

In the background of all this information, Meyers^[19], Uranus^[20] and Wisner^[21] pinpointed the following criteria for mandatory emergency surgery in order to further decrease therapeutic dilemma

1. Persistent hemodynamic instability (despite aggressive fluid resuscitation).
2. Early recurrent hypotensive events (after adequate resuscitation).
3. Macroscopically positive diagnostic peritoneal lavage (in association with the previous criteria).

The guidelines given by the Eastern Association for the Surgery of Trauma (EAST) clearly denies any contradiction of a conservative approach in patients with grade 4 and 5 injury if hemodynamically stable^[22, 23] but vast medical research review has shown a linear relationship between the severity of the splenic injury and the rates of failures of non-operative modality applied to such cases. According to the existing evidence, failure rates have been determined at 4.8% for grade 1 to overwhelming 75% for grade 5.



In the case reported, although patient was requiring high volumes of transfusions with parametrically unstable hemodynamic at the beginning, young age, availability of round the clock care and an emergency operation theatre for laparotomy in case of an exsanguination heeded the management towards a conservative approach. Patient was looked upon and monitored with utmost vigilance and after a daunting period of 20 days patient finally walked out of the hospital without an incision on the abdomen. In addition to this, tertiary centres being able to supply with ample resources for vigilance can opt for NOMSI with some risk as it is considerably less morbid for the patient. Although the literature might be tilted a bit towards the operative approach but for the sake of the patient and the quality of life that is conferred to him post splenectomy, a non-surgical approach should always be given a trial in the presence of the slightest window for observation.

CONCLUSION

A grade 5 splenic injury usually makes a surgical treatment redundant and previous near total literature is in support of that. But with this case report, we herald the fact that with appropriate medical perspicacity and strict monitoring of clinical admonitions- a case of grade 5 splenic trauma can be treated conservatively. In view of the prevailing perils of splenectomy and the overwhelming morbidity that accompanies the procedure in the form of OPSI; recent dictum warrants therapeutic adaptation into a more conservative approach whenever and wherever possible versus a surgical ministrations.

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