

# Which Treatment for Abdominal Trauma in Pediatric Age

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**Abstract**— Abdominal trauma are present in 40% of multiple trauma patients and in relation to the position of damaged tissues are classified into superficial (bruises) and deep (affecting vessels, parenchyma and viscera) the purpose Of this work is to propose a valid diagnostic algorithm effective and safe. Materials and Methods From January 1997 to December 2000 were seen at the Surgical Clinic III of the University Hospital of Catania No 11 patients aged 8-13 years average age 10.5, with blunt abdominal blunt trauma. N 9 pts. (81%) were male, the remaining n 2 cases (19%) were female, the causes of trauma were accidental and contusion, the most affected organs were: spleen (52%) the liver (31%), kidney and ileum (18%). Results In abdominal trauma in children most frequently was found to parenchymatous organs (spleen and liver, kidney) The diagnostic approach is made by clinical examination based on a history that collects information that guide immediately to the affected organ from trauma for the purposes of defining what the exam is the most appropriate therapy. Discussion In patients with hemodynamic istabilità after evaluation of CT eco investigations, with the presence of peritoneal fluid proceed to invasive intervention after laparoscopic evaluation. In cases where we have a hemodynamically stable patient in whom the CT and echo tests show small and medium-sized lesions treatment is not implemented invasivo. La tab 1 summarizes the algorithmic Conclusions Conclusions The secondary blunt trauma to domestic traumatic causes or falls frequent accidental in children require special attention not only has specifics kills.

**Index Terms**— Pediatric Trauma Treatment.

## I. INTRODUCTION

Trauma is the most common cause of death and disability from 1 to 14 years, compared to all other major diseases. In the US: 22 million children / year they suffer a trauma. predisposing factors are hungry or tired or a new environment (moving house or vacation). 1,2 Nell'adolescenza the most frequent cause is traffic accidents (passenger - pedestrian - cyclist), falls on: 90% of injury accidents in the home, sports, mistreatment, scuffle. the trauma in childhood causes more serious injury due to the high energy consumption in a smaller area. (6) Because of the relationship between body surface and body volume of the transmitted energy causes a greater force applied to the body surface units. , in the presence of minor amounts of adipose tissue, of elastic tissue

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and a greater proximity of the internal organs of the abdomen .3,4 What trauma are present in 40% of cases polytrauma, and in relation to the location of damaged tissues they are classified into surface (bruises) and deep (affecting vessels, parenchyma and offal). In abdominal trauma it is necessary to reach an early recognition of possible haemoperitoneum or visceral lesions, modifying the initial diagnostic approach in relation to the mechanism that caused the trauma, the hemodynamic stability of the patient and objectivity abdominal Assuming the interest of all the organs until you prove otherwise trauma in childhood cause in 50% of cases of exitus, can quickly worsen and develop dangerous complications in the management of pediatric trauma priorities are the same, but the adult: child differs in physiological and psychological anatomical characteristics which alter their response to trauma and the consequent need for primary care management centralization (from the scene to the trauma Center) or often secondary (from the network to the hospital trauma Center). that for such issues in English-speaking countries is a health network was created with specialized centers for the treatment of this disease, the health aspect that Italy has not yet become a reality. and therefore it is therefore not possible to apply the method TRISS (Revised Trauma Score -Injury Severity Score) to assess the appropriateness of care that quickly and easily, gives an indication of the severity of trauma. The children then with underlying conditions (hepatosplenomegaly , Wilms, hemophilia) are the most exposed, with a discrepancy between the story of trauma and clinical sequelae. 5.6 The complex and unique diagnostic procedure – therapeutic management in the hospital (such as surveys, such treatments, such as priority) with a multidisciplinary team approach and clinical governance by a Team Leader, to be addressed in a time content (the well-known " golden hour). He has raised numerous controversies concerning both the treatment that the diagnostic process the purpose Of this work is to propose through a diagnostic algorithm valid effective and safe to specify guidelines to reach an early indication in the various types of surgical trauma

## II. MATERIALS AND METHODS

From January 1997 to December 2000 they were seen at the Surgical Clinic III of the University Hospital of Catania No 11 patients aged 8-13 years average age 10.5, with blunt abdominal blunt trauma. N 9 pts. (81%) were male, the remaining n 2 cases (19%) were female, the causes of trauma were accidental and contusion, the most affected organs were: spleen (52%) the liver (31%), kidney and ileum (18%). The common symptoms patients were represented by an

asthenia, with fundamental importance wrist increased pace They took the anamnesis relating to the type of trauma. L 'deposed clinical physical examination for a hypovolemia, with signs of peritonitis. The primary evaluation focused identification of life-threatening injury, the secondary assessment to enable all the other injuries; with these assessments was possible to get the full picture of the injuries. In hemodynamically unstable patients or bleeding Blood tests showed a progressive anemia with microscopic hematuria in renal trauma and an average reduction of GR 3460000, HCT 24.4 increase in GB 31,400. Was associated with an increase in liver enzymes GOT 1510, GPT 1230, 230 CPK, LDH 3523. in organ trauma. the logical use of imaging studies in paediatrics is predisposed as a diagnostic procedure the 'always abdominal ultrasound, CT abdomen with double contrast larger, and the tendency to conservative treatment, in order to preserve organ function in trauma to solid organs (liver, spleen, kidneys) even if bleeding. Therefore the echo abdomen confirmed in spleen trauma a liquid groundwater with modest collection rear, the CT showed the peritoneum full of blood with the Douglas full cable. referable to injury lacerated contusion. distributed in liver seat (31%), kidney (12%), spleen (52%)( fig 2 ,4 ) and ileal loops (6%). In 40% of cases the listed surgical interventions: stitching liver, splenectomy, segmental resection were carried, tamponade spleen, raffia of ileal loops. All other cases treated with conservative therapy. It remains of fundamental importance the ability to recognize when the conservative treatment should not be implemented due to a worsening. .in All observed patients it obtained a complete healing of traumatic injuries

### III. RESULTS

In abdominal trauma in children most frequently was found to parenchymatous organs (spleen and liver, kidney) The diagnostic approach is made by clinical examination based on a history that collects information that guide immediately to the organ affected by the trauma, for the purpose of defining what the exam is the most appropriate therapy. The respiratory evaluation, cardiovascular, abdomen, urinary app nervous system, associated to laboratory tests allow the quantification of the physical integrity of the young patient. Among the instrumental tests he identified the free abdominal ultrasound in payment for which was useful for the benefits of differentiating patients with severe internal injury and hypovolemia. CTE MRI has seen its use in the topographic classification of injuries and in monitoring the evolution of the trauma, invasive laparoscopy examination assumed its use even for therapeutic purposes. (affixing drains, sutures, small perforations, fluid intake ETCR) .the vulnerability of parenchymal organs was tied in the spleen is the anatomical position to its inherent fragility to which a mild trauma may have a lesion. The clinical picture rebelled suddenly after a short period of being with vague tenderness .In liver trauma the three degrees of injuries were determined subsequent to the outbreak of the liver parenchyma due to high pressure: The clinical picture therefore ranged from complete silence to the shock. The CT arteriography and monitoring in addition to the indices of liver enzymes has allowed us to evaluate the

lesions and their evolution. (Fig1,2)



Fig 1 TC Lesions Hepatic

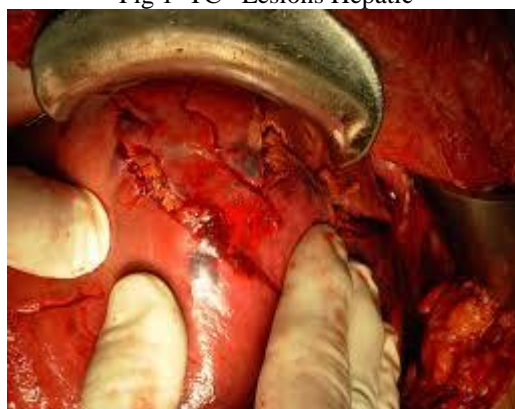


Fig 2 Lesion Hepatic Evolution

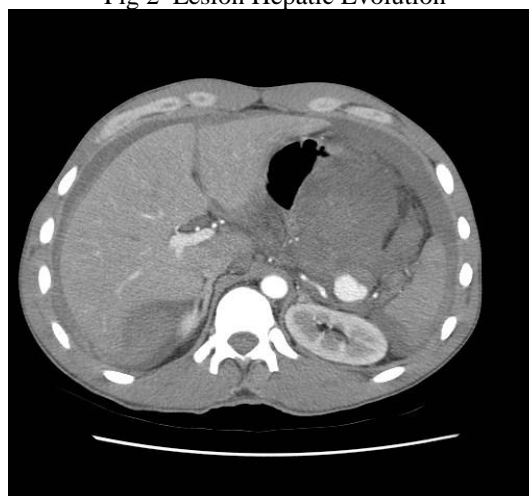


Fig 3: TC Lesion Spleen



Fig 4: TC Lesion Spleen Evolution 24 Hours

In renal trauma anatomical position is a protective factor, but the mechanisms that lead to injury were determined by the intense trauma which squeezed the kidney against the vertebral bodies determining the five degrees of injury. The clinical picture was represented for hematuria associated with the oppressive pain with a progressive anemia .In medical scans the echo and CT were monitoring the progression of trauma. The role of selective arteriography both diagnostic and therapeutic (1 -2 degree) was highly effective and useful. In trauma involving the ileal loops and that produce a typical lesion from bursting due to an increase of the intra-abdominal pressure exerted by the trauma. the symptomatology was silent in most of the cases observed and only in 2 cases n is presented with signs of peritonitis, it The CT detected the topographical site with the lesion of the ligament of Treitz and the ileocecal valve in addition to the essential role in the monitoring of ' evolution of the lesions.

#### IV. DISCUSSION

A high index of suspicion must always characterize the presence of minor trauma. While in the open trauma is easier the diagnostic-therapeutic conduct, in the case of blunt trauma, often since there is a conjunction of lesions in more apparatuses, the problem of diagnosis is more complex and difficult. With the variety of diagnostic tests currently available it can not be easy to define the most appropriate initial diagnostic approach. The fundamental clinical element, is the hemodynamic stability of the patient. Thus it becomes crucial to have the diagnostic evaluation survey to assess accurately the three major regions: the peritoneal cavity with its intrathoracic component, retroperitoneum and pelvis (7,8,9) The treatment of young patients has required specific knowledge due to physiological and anatomical differences .In apparatus evaluation breathed recognize argonico breath with the next ventilation it is essential as in small and predominantly diaphragmatic breathing. Therefore, any condition that alters the diaphragmatic capabilities including gastric distention caused by swallowing air for crying infant causes impaired ventilatory mechanics. In the activity cardiocirculatory it was necessary to evaluate the central arteries in the first moments by palpation because the wrist is not assessable to the periphery especially in children. The compensation of hypovolemia mechanisms are less effective and therefore misleading. poor ability to concentrate the kidney makes that diuresis is maintained or increases for infusion of glucose solution in the presence of leakage and hypovolemia. In young patients it is to then consider the rapidity of hypothermia in the presence of bleeding losses. This condition favors the rapid onset of acidosis with increased release of catecholamines .the innovations and research favored a non-invasive treatment indicated in young patients hemodynamically stable, with minor injuries. and the search for safe and valid identification of parameters pushed us to the evaluation of an effective diagnostic algorithm, reliably implemented in all closed abdominal injury. Laboratory tests can sometimes be misleading: the acute anemia may not initially be reflected in decreased hematocrit and hemoglobin; If the patient is stable, are useful radiological investigations; that can highlight free air intraperitoneal or retroperitoneal, the cancellation of the

psoas shadow aspects that are normally assessed during the TC. The factors that currently justify the use of CT, are the high specificity (site of the lesion, possible origin of the bleeding), the possibility of conservatively treat a part of minor or average load size of solid bodies in blunt trauma, the perfect study of retroperitoneal organs and recognition of associated injuries such as spinal and pelvic fractures. 10,11,12. The study shows no contrast more easily intraparenchymal hematomas, whose highlight can be otherwise lost. With intravenous contrast is studying the injuries of solid organs, vascular intake integrity and occasionally active bleeding at the wound site, morphology and functional integrity of the genitourinary tract. the complete study (direct and contrast) can be performed in 5 minutes. The good representation of the blood vessels also allows a more precise assessment of vascular trauma. use in retroperitoneal bleeding associated with pelvic fractures, to identify the site of bleeding and simultaneously perform hemostatic maneuvers (embolization or local injection of vasospastic). The ultrasound advantages are low cost, the speed of execution, lack of invasiveness, sensitivity, easy portability of equipment and examination repeatability. The limits are represented by the low specificity, low reliability for the study of the retroperitoneum, insufficient explorability under certain conditions (obesity, intestinal distension, subcutaneous emphysema) and operator dependence. The method is able to recognize collected liquid with intra-abdominal sensitivity of 80-95%, while the sensitivity to demonstrate specific organ lesions varies from 40 to 85%. Laparoscopy (LD) has found wide application in general surgery in recent times. 13,14,15 One of the biggest drawbacks is due to the unproven diagnostic accuracy and the inability to adequately explore the back of the peritoneum in patients with hemodynamic instability after evaluation of CT eco investigations, with the presence of peritoneal fluid proceed to invasive intervention prior laparoscopic evaluation. In cases where we have a hemodynamically stable patient in whom the CT and echo tests show small and medium-sized lesions treatment is not implemented invasive. La tab 1 summarizes the algorithmic.

Table1: The Algorithmic Treatment

Abdominal Trauma			
Hemodynamic Instability		Hemodynamic Stability	
Eco - CT -RMN		Eco - CT -RMN	
Vers. Peritoneal	Negative Minor Injuries	Injuries More Positive	Negative
Lap/Search Shock	Surgery/Medica l	Surgery/Laparoscopy	Waiting Negotiable. Cons

surgical treatment options implemented in splenic trauma were the sewing of the spleen, segmental resection and splenectomy, the latter had 'absolute indication only in case of impossibility to repair the injury, or in the presence of hemodynamic instability. this because when there is the need is best to leave the body which provides an immune response

that more easily counteracts bacterial infections by encapsulated agents that can lead exitus of the patient. In liver lesions the application of surgical necessity meant that it was targeted primarily to effective hemostasis, and only in 20% of cases finalized to segmental resections of devitalized liver tissue. Finally ileal perforations in the simple raffia and decompression with SNG has produced satisfactory results. The nutritional needs of the young patient presented two requirements cover both the needs of the basal metabolic rate than that anabolism linked to organic growth can be affected by factors latter pathologies that if underestimated can lead to malnutrition due to insufficient nutritional intake . Therefore it was always implemented both enteral and parenteral nutrition.

### V. CONCLUSIONS

Minor blunt trauma to domestic traumatic causes or frequent accidental falls in children require special attention not only has specific skills. clinical examination collects the most important information is the dynamic of the trauma that the recognition of clinical signs of trauma (contractures, hypovolemia, respiratory failure, neurological signs ETCR). But the symptoms are not always reported clearly. the Physical Examination: remains difficult to perform. instrumental investigations (eco ct, laparoscopy RMN) raise the question of priority of performance has been difficult to define the most appropriate initial diagnostic approach that otherwise makes reference to the hemodynamic stability of the patient, who is also the necessary condition to allow or exclude a possible conservative treatment in lesions of mild to moderate severity of solidi.16,17,18 viscera imaging plays an important role in trauma in childhood, so the surgical treatment is always indicated: in either stable or unstable patients with signs of peritonitis ( in that penetrating trauma closed), it is unstable in patients without signs of peritonitis, but with suspicion or evidence of abdominal bleeding, evidence of pneumoperitoneum with. evidence of hematemesis, hematuria, or rectal bleeding .both in penetrating trauma with evisceration, in demonstrating that preoperative (TC-ECO) untreatable injury conservatively or mininvasiva.19.20.21 technique in unrecognized injuries that can include, depending on the case studies, up to 25% of patients and that manifest belatedly, the tertiary assessment is always carried out by us, it is also recommended repeated If your child is sedated or unconscious or ventilated. Proper treatment of children with trauma includes not only the support of vital functions but also a psychological support, with the aim of fostering a good prognosis even from the behavioral point of view and the development of mental well-being. The child victim of trauma, when conscious, manifested severe suffering related to the terror, the pain, the fear of death, parents' expulsion, the presence of strangers. E 'task of health adapt to the different needs of the patient developmental, trying to reassure him, holding close, when possible, a parent and easing pain and anxiety. Even parents of traumatized children are victims of psychological and emotional trauma, for this reason it becomes essential an appropriate communication approach: you have to deal with a situation experienced by a high degree of emotion that can

lead to uncontrollable reactions, nausea, verbal attacks which should not be regarded as personal. 21,22,23 the algorithm with Linnhe guide proposals are in our view and experience an effective response is provided satisfactory results. It grows from the operators' s need to implement specific centers for these diseases in children that might reduce both surgical treatment versus conservative treatment, which stimulate the search for markers. Trauma is responsible for sudden biochemical changes occurring at the time of impact, and the severity of insult can be graded by measuring these biochemical modifications—specifically, ROS-mediated damage, energy metabolism depression, alteration of gene expression and ultimately variation of NAA concentration, a surrogate marker of neuron dysfunction. . Understanding the multidimensional cascade of injury offers therapeutic options including the management of mechanical (hyper-) ventilation, kinetic therapy to improve oxygenation and to reduce pressure, 24,25. Knowledge of these mechanisms allows us resizing of trauma mechanisms producing an excellent quality of care in addition to the cost savings to society.

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#### COMMENTS

Work deals with the search for a treatment algorithmic in trauma in children and proposes guidelines, and a diagnostic orientation .The timely in the diagnosis, and specific treatments that save many lives of young patients, puts the 'need to implement specific centers for those pathologies noted that the work with the many critical issues addressed. Interesting and challenging then the research on biochemical markers of trauma Innovative Original, and worthy.