

Original Research Article

Abdominal Vascular Injuries

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Abstract

This study a review of 64-patients with abdominal vascular injuries from January 2007 to December 2013. Where treated in the emergency department of the cardiothoracic and vascular surgery. Most of them young age 18-50years, average age (32years). Male 46-patients, female 18-patients. Penetrating injuries (45-cases 70.2%), blunt injury (3-cases 4.8%), accidental (16-cases 25%). Penetrating injuries (blast/shell injury 30-cases, gunshot 12-cases, stab wound 3-cases). Zone I (44-cases), zone II (4-cases), zone III (16-cases). According to organ injury scale Grade IV most common (38-patients 59.37%). Aortic artery injury 28-cases. Inferior vena cava (8-cases) combined injury with aorta (20-cases), renal artery (4), splenic artery (2), celiac trunk (6), left common iliac artery (3), external and internal iliac arteries (13). Small bowel injuries (12-cases), large bowel (6), spleen (2), renal (4), liver (8), ureter, bladder (7). Ligation (19-cases 29.68%), direct repair or by graft (49-cases 76.56%). Complication ongoing bleeding 7.81%, respiratory distress 15.62%, wound dehiscence 9.37%. Mortality rate (12) 18.75%, survival rate (52) 81.25%. Coagulopathy, metabolic acidosis, hypothermia, combined vascular injuries, and associated abdominal organs injuries increase the morbidity and mortality rates. Trauma surgeon should had a back-ground of the abdominal vascular anatomy, and the methods of the vascular anastomosis. Primary goal control of the bleeding rather than maintenance of the blood flow to the organs.

Key words: Aorta, Vena cava, Common iliac, Hemorrhage, Mortality, Penetrating

الخلاصة

هذه الدراسة مراجعة 64 مريضاً يعانون من إصابات الأوعية الدموية في البطن من كانون الثاني 2007، وحتى ديسمبر 2013. وكان العلاج في قسم الطوارئ لجراحة القلب 45 حالة والصدر والأوعية الدموية. معظمهم من سن مبكرة 18-50 سنة متوسط العمر (32) عاماً. نساء 18، رجال 46. إصابات اختراقية (45 حالة 70.2%) وإصابة غير حادة (3 حالات 4.8%)، إصابات عرضية (16 حالة 25%). إصابات اختراقية (الانفجار / شظايا 30، اطلاقات ناربية 12، طعن 3 حالات). المنطقة الأولى (44 حالة)، والمنطقة الثانية (4 حالات)، والمنطقة الثالثة (16 حالة). وفقاً لمقياس إصابات الاعضاء مرحلة الرابعة الأكثر شيوعاً (38) عاماً المرضى (59.37%). إصابات الشريان الأبهر 28 حالة. إصابات الشريان السفلي (8 حالات) مع الشريان الأبهر (20 حالة)، الشريان الكلوي (4)، الشريان الطحال (2)، الشريان البطني (6)، الشريان الحرقفي المشترك (3) والشرايين الحرقفية الداخلية والخارجية (13). إصابات الأمعاء الدقيقة (12)، الأمعاء الغليظة (6) والطحال (7). الكلي (4) والكبد (8)، الحالب، المثانة (19). ربط الأوعية الدموية (49 حالات 76.56%). مضاعفات نزف مستمر 7.81%، ضيق التنفس 15.62%، جرح مفتوح 9.37%. معدل وفيات (12) 18.75%، معدل البقاء على قيد الحياة (52) 81.25%. اضطراب تخثر الدم، الحامضية الأيضية، انخفاض حرارة الجسم، وإصابات الأوعية الدموية مجتمعة، مع أعضاء البطن المجتمعة، تزيد من معدلات الاعتلال والوفيات. جراح الطوارئ لديه معرفة وافية للتشريح الأوعية الدموية في البطن، وتقنيات إصلاح الأوعية الدموية. الهدف هو السيطرة على النزيف بدلاً من إعادة تدفق الدم.

الكلمات المفتاحية: الابر، الوريد الأوجف، معدل الوفيات، الاختراق، الشريان الحرقفي.

Introduction

Penetrating abdominal trauma more seen in the war injury today with injuries of the abdominal cavity by a gunshot ,shell injury, or stab wound.

The management of penetrating abdominal trauma has greatly changed over the last century.

Before World War I, penetrating trauma was treated by expectantly, and was most of them are fatal. Celiotomy became the treatment of choice during World War I ,but mortality remained high. By World War II, early Celiotomy resulted increase in a survival rate close 50% [1].

The 1950s the facility available of faster transport ,knowledge of the fluid ,and antibiotics, which further increased survival rates. By the late 1950s,mandatory Celiotomy was the rule for the management of the patients with abdominal penetrating trauma [1].

In 1960s.Shaftan suggested a new guide line in patient management. Resuscitation protocols reflect the impact of appropriate crystalloid administration, the blood transfusion, and an understanding for physiologic end points of resuscitation.

Damage control surgery (abbreviated laparotomy with physiologic resuscitation in the intensive care unit and staged abdominal reconstruction). More recently, the damage control concept has been also involved the resuscitation of severely injured patients with significant hemorrhage. Termed damage control resuscitation or hemostatic resuscitation, this approach arose from the recognition of early coagulopathy of trauma and its importance [2].

Damage control resuscitation principles include early given of massive blood transfusion protocols with fixed blood product ratios, and avoidance of given a large-volume crystalloid fluids, and appropriate use of permissive hypotension. Technologies help us to be less invasive and more rapid and specific diagnostic evaluations. Selective operative management and increasing application of angioembolization have served to further reduce surgical intervention [2].

Injuries to major abdominal vessels are uncommon but highly lethal vascular crises ,these injuries are also among the most difficult and challenging injuries managed by modern-day trauma surgeon. These patients usually arrive at trauma centers in sever shock secondary to massive blood loss that often unrelenting.Patients sustaining abdominal vascular injuries best exemplify that vicious cycle of the cardiac dysrhythmias, coagulopathy, shock, and acidosis [3].

Many of these patients had some state of cardiac arrest and require drastic life saving measures, such as emergency department, thoracotomy, aortic cross clamping and open cardiopulmonary resuscitation to maximize any chance of reaching an operating room alive[4,5,6].

The surgeon was advised to be guided in critical intraoperative decision making by location of the hematoma and specific maneuvers and techniques that are critical in expeditiously managing these complicated problem [7].

The surgeon must immediately perform three tasks during Celiotomy to avert exsanguinating hemorrhage within abdomen[8].Location of the vessels or vessels injured is identified. Surgical exposure of injured vessels is achieved, hemostasis and restoration of the critical blood flow are accomplished. Bleeding arteries or veins can either repaired or ligated; the surgeon's decision is made for the immediate hemostasis compared with risks of ischemia of the organs. Repairs of the vessels in a field contaminated with enteric contents complicated the decisions regarding the optimal replacement conduit. Increasing emphasis in the recent literature is placed on staged approach to the patients with severe intraabdominal injuries. In the initial operation, the goals are control hemorrhage and reestablish critically required reperfusion of the viscera. Surgery is then stopped after packing the abdomen . The patient is transfer to the intensive care unit, where hours may require to reverse coagulopathy,hypothermia,and acidosis before the patient is returned back to the

operating room for repair and management of additional injuries [9,10].

Although penetrating injuries more we seen, but the surgeons must be familiar with patterns of the blunt trauma, mediated injury to avoid devastating consequences of delayed management [11]. Endovascular solutions appear appropriate and preferred in certain cases of blunt abdominal aortic injury, which, however, may not be applicable due to device limitation in regard to patient anatomy and limited operating room capability. However, endovascular therapy can be pursued with limited fluoroscopy capability and consumable availability providing a solution that is expeditious and effective for select cases of blunt aortic injury [12]. The abdominal blood vessels by location of the retroperitoneal and anatomic proximity to the other organs, seem to be rarely injured alone. Multiple associated

injuries are the rule rather than the exception. Stomach, bowels, liver, spleen, and genitourinary injuries, it is estimated that approximately two to four associated intraabdominal injuries occur with abdominal vascular injuries in these cases, consideration must be given to 'second look' operations to assess the bowel viability [13-18].

Anatomical location of the injuries of the abdominal vessels can be estimated to the classification of the abdominal zones, (zone I, zone II Right & Left, zone III). As soon as the surgeon has identified and classified the hemorrhage or hematoma into one of the zones the zone must be approached to obtain vascular control and exposed the injured blood vessels to attempt definitive repair. Each zone requires different and complex maneuvers to expose these vessels. The diagram (1), below shows the classification of the zones.

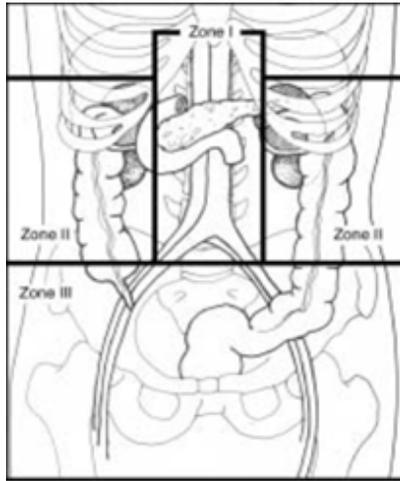


Diagram 1: The Abdomen Zones (I, II-Left/Right, III)

Once exposure the abdomen the proximal and distal control have been obtained, all vascular injuries should be graded, utilizing the American Association for

Surgery of Trauma-Organ Injury Scale (AAST-OIS) for vascular injuries [19], diagram(2).

Grade	Artery Injured	Vein Injured
II	Hepatic Splenic Gastric Gastroduodenal Inferior mesenteric Primary named vessels of superior mesenteric	Splenic Inferior mesenteric
III	Renal Iliac Hypogastric	Superior mesenteric Renal Iliac Hypogastric Vena cava (infrarenal)
IV	Superior mesenteric (trunk) Celiac axis Aorta (infrarenal)	Vena cava (intrahepatic)
V	Aorta (suprarenal)	Vena cava (suprahepatic) Vena cava (retrohepatic) Portal Hepatic (extrahepatic)
* Grade I injury includes the following: Non- named superior mesenteric artery or superior mesenteric vein branches; non- named inferior mesenteric artery or inferior mesenteric vein branches; phrenic artery/vein; lumbar artery/vein; gonadal artery/vein; ovarian artery/vein; other non-named small arterial or venous structures requiring ligation.		

Diagram2:American Association for the Surgery of Trauma Organ Injury Scale (AAST-OIS) for Vascular Injuries.

Diagnosis of the abdominal vascular injuries consider if the trauma between nipple and upper thighs, type of trauma, whether they present with a retroperitoneal hematoma or free bleeding within the abdominal cavity. Those with retroperitoneal hematoma may be presented either hemodynamically stable or within some degree of hypotension, responsive to early resuscitation. Whereas those with free retroperitoneal and intraabdominal hemorrhage present profoundly hypotensive.[13,15,16].

Laboratory tests provide little help in early diagnosis, an complete blood count(CBC), Arterial blood gas(ABG),assess patient PH,but it is good guide for the treatment of these patients.

The use of the ultrasound is useful in detecting the presence of intraabdominal free fluid:however, very little detailed information can be obtained from retroperitoneum and major blood vessels. A plain X-ray of the abdomen is of diagnostic value,particularly in patients sustaining shell, missile injuries, because

the location and the course of the missile can be evaluated [13].

A computed tomography(CT) scan may be obtained in hemodynamically stable patients, and of the blunt trauma. CT scan with contrast study can visualized the vascular insult direct of vascular injury. End-organ abnormalities implying an underlying vascular insult include identifying an area of relative hypo perfusion in solid organ[20].

Materials and Methods

This study encompassed 64-cases with abdominal vascular injuries in general, presented from January 2007 to December 2013 to the cardiovascular and thoracic surgical department as well as patients admitted to the emergency room ,beside the patients already in the operating room of the gynecology department, these included in this study.

We respectively reviewed all cases with abdominal vascular injuries 64-cases, 18-cases were females, while 46-cases were are males. The age incidence range from 18-50 years old ,were the average age was 32-year.These patients either referred

directly from the battle field or from the primary care unit, and from the same hospital from other department, during the surgery either emergency cesarean section or during emergency hysterectomy and other pelvic surgery.

The mechanism of the trauma mainly penetrating injuries, missile, shrap-nail. Bullet ,stab wounds. Other from road traffic accident(blunt injury).

The site of the injuries mainly abdominal (48)patients, pelvic vascular injuries (16)patients. The presentation mainly shock status,resuscitation done in the emergency room and in the operation room.The type of intervention and investigation was individually done.The percentage of solitary aorta, inferior vena cava, and mixed injuries. All these cases operation done for them with mortality 12-patients,25- patients with morbidity.

Results

The study of the 64-patients were admitted to our hospital and treated in the emergency department and operation done in the theatre of emergency ,other in the gynecological theatre,few of them done in the theatre of the cardiovascular and thoracic theatre.

We review retrospectively these cases from January 2007 till December 2013.Those patients the age incidence range from 18 years to 50 years , the mean age was 32-year.

The gender incidence as follow 46-patients were male (71.88%), while 18- patients were female (28.12%).

Penetrating injuries was the most common causes of the abdominal vascular injury, while the remaining causes due to either blunt or iatrogenic injuries, table(1).

Table 1 :Types of the Injuries

Types of injury	No. of patients	%
Penetrating	45	70.2%
Blunt	3	4.8%
Accidental	16	25%
TOTAL	64	100%

We mean the accidental causes of the abdominal vascular injuries that occurs during the surgery of emergency or elective hysterectomy, in cases of malignant tumors of the uterus, or in complicated cesarean section in multipara patients.

Blunt injury due to Road Traffic Accident as a part of multiple trauma included the abdominal vascular injury.

Penetrating injuries 45 patients ,due to different mechanism of trauma see in the table(2).

Table 2 :Types of Penetrating Injury

Penetrating injury	No. of patients (45)	% (70.4%)
Blast /Shell injury	30	46.8%
Gun-Shot	12	18.75%
Stab wound	3	4.6%

These patients are referral cases from other hospital, or directly from battle field from north and the west of Baghdad .The time interval between the accident and reaching our hospital it range from 1-hour to 10-hours.

Shock state 60-patients (93.75%), in different level of the shock, were all done for them cross-match, and given the intravenous fluid 0.9% normal saline. Whole blood, platelet, fresh frozen plasma are transfused preoperative, perioperative, and post-operative, 4-16units according to

the condition of the patients, while moderate or severe state of the shock. Most of the patients done FAST (Fast Abdominal Sonography Test), Chest X-rays, and six patients done for them Abdominal Computed-Scan (C-T SCAN), those with blunt trauma and stab wound injury. Those patients done for

them investigations included blood sugar, blood urea, serum ceratinine, electrolyte K+/Na+, liver function test. Laparotomy done in the emergency theatre, we found the abdominal vascular injuries according to the site as in the table(3).

Table 3 : Abdominal Vascular Injuries According to the Zone.

Zone	No. of patients	%
I	44	8.75%
II	4	6.25%
III –RIGHT/LEFT	16	25%
TOTAL	64	100%

The injuries either active bleeding, hematomas, or leaking hematoma, as in the table (4).

Table 4 : Types of Bleeding

Retro-Peritoneal Hematoma	40	62.5%
Active Bleeding	16	25%
Retro-Peritoneal Bleeding	8	12.5%
TOTAL	64	100%

According to the American Association for Surgery of Trauma- Organ Injury Scale (AAST-OIS) of vascular injuries, table (5).

Table 5 : AAST-OIS Vascular injuries of the abdomen.

GRADE II	4	6.25%
GRADE III	18	28.12%
GRADE IV	38	59.37%
GRADE V	4	6.25%
TOTAL	64	100%

The abdominal vascular injuries including the arteries and the veins ,these injuries either alone or combined. The arteries

injured alone (58-cases) as seen in the table (6).

Table 6 : Abdominal Arteries Injuries.

Supra-Renal Aorta	2	3.84%
Infra-Renal Aorta	26	50%
Renal Artery	4	7.69%
Splenic Artery	2	3.84%
Celiac Axis Artery	6	13.46%
Inferior Mesenteric Artery	2	3.84%
Left Common Iliac Artery	3	5.76%
External Iliac Artery	6	13.46%
Internal Iliac Artery	7	13.46%

Regarding the abdominal venous injuries either alone or a company with the arteries. Pure venous injury were was (12-

cases). But a company injury was (32-cases), table (7)

Table 7 : Abdominal Venous Injury

Name of Vein	Pure Vein Injury	Combined Artery/vein
Supra-Renal Vena-Cava	2	4
Infra-Renal Vena- Cava	6	16
Internal Iliac Vein	4	12
TOTAL	12	32

Associated with the abdominal vascular injuries, abdominal organs, bowel large or small ,liver, spleen, renal,ureter,urinary

bladder, or combined more than one organ, table(8).

Table 8 : Organs Injuries With Abdominal Vascular Injury

Spleen	2	3.12%
Large Bowel	6	9.37%
Small Bowel	12	18.75%
Liver	8	12.5%
Kidney	4	6.25%
Ureter	4	6.25%
Urinary Bladder	3	4.68%

Abdominal injuries both arteries and veins, ligation done , (19-cases 29.68%)ligation done, table(9).

Table 9 : Ligations of The Damage Vessels.

Splenic Artery	2	3.12%
Celiac Axis Artery	6	9.37%
Internal Iliac Artery	7	10.93%
Internal Iliac Vein	4	6.25%
LIAGATIONS/ Total	19	29.68%

Other procedures we done repairs either direct anastomosis or using a graft either Dacron graft or vein ,suture we use 6/0

Prolene monofilament in (49-cases),table(10).

Table 10 : Direct Repair/ Graft Interposition of Vascular Injuries

Name of Artery/Vein	Direct Repair	Graft Vein/Dacron	TOTAL
Aortic Artery	28	0	28 (43.75%)
Inferior Vena Cava	6	2	8 (12.5%)
Renal Artery	1	3	4 (6.25%)
External Iliac Artery	6	0	6 (9.37%)
Common Iliac Artery	2	1	3 (4.68%)
TOTAL	43	6	49 (76.56%)

Post-operative complications occur immediately or later of the operation, table(11).

Table 11 : Post-operative Complications

Intraabdominal Infection	3	4.68%
Respiratory Complications	10	15.62%
Ongoing Bleeding	5	7.81%
Wound Dehiscence	6	9.37%
Abdominal Compartment Syndromes	1	1.56%

The mortality rate (12-cases) 18.75%,and the survival rate were (52-cases) 81.25%,

according to the site of the trauma of the vessels injury, table (12).

Table 12:Mortality / Survival Rate

Supra Renal Aortic Artery	6	9.37%
Infra Renal Aortic Artery	2	3.12%
Retroperitoneal Zone I	4	6.25%
TOTAL /MORTALITY	12	18.75%
TOTAL/SURVIVAL	52	81.25%

The major causes of high mortality were identified as severe state of hypovolemic shock at the time of admission and the

difficulty in controlling the bleeding at the soonest time possible by the surgical residents..

Discussion

This article discusses anatomic regions within the abdomen where life-threatening vascular injuries occur. The pathophysiologic and diagnostic issues involved with each region are reviewed. Techniques are described for optimal exposure of major abdominal arteries and veins. This study done in department of the cardiothoracic and vascular surgery in Al-Kadhimiya Teaching Hospital-Baghdad from January 2007 till December 2013.

The age incidence were range from 18 -50 years, the average age was 32-year.Male gender 46-case(71.88%),female gender was 18-case (28.12%)

The incidence of the abdominal vascular injuries in the developed country the military conflicts is surprisingly low, generally less than 5% of all vascular injuries. In contrast approximately 30% of all vascular injuries observed in civilians occur in the abdomen. This is different in the third world still the political and terrorist still high, so the military injury so high compared to the civilian conflict striking. So the low-energy missiles from civilian handguns and short prehospital

transit in urban settings, thereby making it more likely that a civilian with penetrating abdominal vascular injury will survive long enough to reach surgical care. This study estimated that 60% of cases were from capital Baghdad which is realistic as it is mostly affected by terroristic assaults. Gunshot wounds and blast injuries of the abdomen have continued to increase , as the purchase of handguns in this country still not fully controlled, as well terroristic events and assassinations especially over the latest few years, the resultant increase in incidence and commonness of the abdominal vascular injuries as it has been evident from our result which due to the penetrating injuries 48-cases(75%). Blunt injuries 3-cases (4.8%)this mainly due to Road –Traffic accident(RTA).Penetrating injuries main cause was blast –shell injuries, 30-patients (46.8%),followed by gunshot 12- patients (18...75%),least by stab wound 3-patients (4.6%). The accidental abdominal vascular injuries occur during elective or emergency hysterectomy ,or as complication during cesarean section of multiparas pregnant patients, most of these operation done by

the resident young surgeon, so we have this large number of the accident.

The 3 ischemic-reperfusion criteria (preoperative hypotension, estimated blood loss of 6-liter or greater, or intraoperative resuscitation with 12-liters or more).

Patients who had at least 1 of the 3 ischemic-reperfusion criteria has higher in-hospital mortality(43%)(21) of those who had at least 1 critrion,the initial 24-hour mortality as well as the 30-day mortality was higher in those with a primarily closed abdomen relative to those with a 47% open abdomen [21].

Emergency department, the resuscitation of the patient with abdominal vascular trauma depends on his or her condition at arrival to the hospital. Insert large bore cannula into the upper extremities, or obtain central venous line for rapid infusion of warm isotonic fluid. Because a possibility of intra-abdominal venous injuries exists, should be aware to use lower extremity venous access. Review condition of the patient Fast Abdominal Sonography (FAST), chest X-ray, Computed Tomography (C-T) of the abdomen in blunt abdominal trauma.

The patient to expose chest and both thighs in the event that a thoracotomy or vein harvest is required. Perform a generous midline incision from xiphoid to the pubis needed to improve exposure . Arterial line may be helpful for monitoring blood pressure and arterial blood gases. Quickly evacuated blood clots and perform 4-quadrant packing. After initial stabilization, systemic remove the packing and evaluate the injuries. Use aortic compression to obtain proximal clamp of the aorta ,then we do (Mattox maneuver) or an extensive Kocher maneuver. Celiac axis injured was ligated, were was safely .but unfortunately were unable to control the bleeding from suprarenal aorta and suprarenal vena cava. That were the mortality rate high in these injuries 12-petients (18.75%).

The injuries infrarenal of both aorta and vena cava,(Cattel-Braasch maneuver) dividing the white line of Toldt adjacent to

the cecum. Direct repair of the aorta using 6-0 prolene,one case of the inferior vena cava used peritoneal patch to close the defect. Renal artery damage were we repair with vein graft 3-patients one done by direct repair because small tear. Splenic artery complete laceration we do ligation and splenectomy. Inferior mesenteric artery ligation done. A planned second look operation 24-48 hours after the initial surgery done to complete a damage control sequence.

Most of the patients with abdominal vascular injuries were was at zone I major injury to the aorta and vena cava vein either supra-renal or infra-renal either alone or combined, those supra-renal had high mortality rates, because we found difficult to control the bleeding. Zone II,III we have god results either by doing ligation of the internal iliac artery or vein,splenic artery ligation with splenectomy.graft of the common iliac artery done,other by direct repair, urinary bladder sutured using 2/0 vigreal, ureter re-anastomosis with double J ureteric catheter ,small bowel sutured by double layers, large bowel injuries done for these temporal colostomy. These injuries associated with penetrating injuries directly disrupt the vessel wall or create intimal flaps. Because of the anatomical position of the major vascular in the abdomen have high possibility of associated with other organs.

The complications of the trauma and the surgery commonly we found the respiratory complication,ARDS (acute respiratory distress syndrome), chest infection , due to inability to cough ,and most of them were was heavy smoker. Ongoing bleeding due to massive blood transfusion, or DIC (disseminated intra vascular coagulation). Abdominal compartment syndrome in one case due to multiple venous ligations. Intra-abdominal infection due to the bowel spillage and those had abdominal dehiscence.

Survival rate were 52-patients (81.25%),were the mortality rate 12-patients(18.75%) most of them were was males. A comparative study see in the

table (13). Literature data penetrating trauma volumes are increasing around the world. The major causes of high mortality were depend of hypovolemic shock at the time of admission and difficulty in

controlling the bleeding at the early time possible by the surgical residents. Multiple arterial and venous injuries increase mortality. Associated abdominal injury of many organs also increase mortality rates.

Table 13 :Abdominal Aorta Injuries Reported In The Literature

Author	Mortality (%)	No. of Patients	Year
DeBakey[22]	67	3	1946
Patman[23]	50	6	1964
Perdue[24]	82	11	1968
Buscaglia[25]	87	15	1969
Drapanas[26]	50	12	1970
Rich[27]	NR	3	1970
Billy[28]	32	30	1971
Perry[29]	31	26	1971
Lim[30]	62.5	32	1974
Mattox[31]	62	26	1974
Cheek[32]	NR	25	1975
Hardy[33]	NR	22	1975
Kelly[34]	NR	7	1975
Mattox[35]	64	28	1975
Buchness[36]	5	20	1976
Phillips[37]	33	3	1979
Myles[38]	52	32	1979
Lassonde[39]	44	27	1981
Kashuk[40]	56	18	1982
Sirinek[41]	69	29	1983
Brinton[42]	33	15	1984
Mattox[43]	NR	249	1989
Millikan[44]	56	25	1985
Accola[45]	72	74	1987
Collins[46]	44	9	1988
Burch[47]	NR	7	1990
Frame[48]	73	56	1990
Jackson[49]	64	11	1992
Lopez-Viego[50]	62	129	1992
Demetriades[51]	76	67	1996
Richardson[52]	51	41	1996
Asensio[53]	79	63	1999
Davis[54]	60	77	2001

- NR :Not reported

Hemorrhagic shock often leads to changes in the physiology and body respond to the trauma lead to the lethal triad of the

trauma, which is metabolic acidosis, accompany by coagulopathy and hypothermia. Metabolic acidosis in trauma

patients is the result of lactate overproduction due to massive blood transfusion of old stored blood, beside of the decreased oxygen delivery as a result of hypovolemic shock. Acidosis cause depression of myocardial contractility, and impairment of coagulation. Furthermore body temperature, below 34°C inhibits platelet function and slows coagulation factor activation. The vicious cycle is responsible for 80% of the death in patients with major vascular injury and must be rapidly corrected to prevent a dismal outcome

Conclusion

Trauma more common in our country. The emergency surgeons are occasionally faced with a patients with abdominal vascular injuries. Important surgical issue in the successful management of these injuries a familiar with abdominal anatomy beside the blood vessels of the abdomen and the techniques of the vascular repair. The decision of the surgical exploration be performed without delay, that the vascular injury be explored rapidly with control of hemorrhage upon entering the abdomen, that efforts be made to reestablished perfusion initially to the structures at the highest risk of anoxic injury using shunt or temporary Cather, and an understanding that it is occasionally necessary to perform while the general condition of a patient is being stabilized, then we proceed with definitive repair.

The primary goal in the management of these patients should be first bleeding control rather than maintenance of the blood flow to the organs. The principles of abbreviated laparotomy with planned second look operation should be used in some patients with major abdominal vascular injuries. The decision to reestablish vascular continuity at later time should be balance anticipated functional outcome against potential complications.

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