

Retrospective Review of First 10 Hemorrhagic Shock Patients Treated with HemaShock™

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Background

- In the last 3 years the HemaShock™, an extremity exsanguination tourniquet was placed on 10 patients who presented to the emergency department in extremis due to massive blood loss.
- The following is a retrospective charts review of these patients, followed by a preliminary summary and statistical analysis.

Methods

- Each patient description includes:
 - Clinical information including mechanism of injury/disease,
 - Patient hemodynamics prior to HemaShock™ placement
 - HemaShock™ placement
 - Patient hemodynamics after HemaShock™ placement
 - Description of definitive care
 - Patient outcome and disposition
 - Technical comments
 - Discussion of HemaShock™ use in the case and critique

Patient EI-HS-001-

Clinical information including mechanism of injury/disease

- Head-on collision MVA occurring at approximately 10:23. Upon arrival Patient was unresponsive, had no palpable pulse, no spontaneous respiration and was considered by attending MD to be "in extremis". Deformities of the left femur and upper arm were noted. Pupils were dilated and fixed. Monitor showed PEA. IO was placed in right tibia by EMS. Patient was intubated in ED and femoral central line was started. No cardiac mechanical activity was detectable by US. Fluids and O- blood were infused via IO and central line under pressure. Patient weight is 81.8 kg.

Patient hemodynamics prior to HemaShock™ placement

- Pulse was not palpated; PEA;

HemaShock™ Placement

- First HemaShock™ was placed upon arrival to the resuscitation room, prior to femoral central line insertion. The Second HemaShock™ was placed after femoral line insertion and verification and removal of the IO in the other leg.

Patient hemodynamics after HemaShock™ placement

- No effect of HemaShock™ on pulses or BP.

Patient EI-HS-001

- **Patient outcome and disposition**

- Patient was pronounced dead at 11:12 am, 27 minutes after ED arrival.

- **Technical comments**

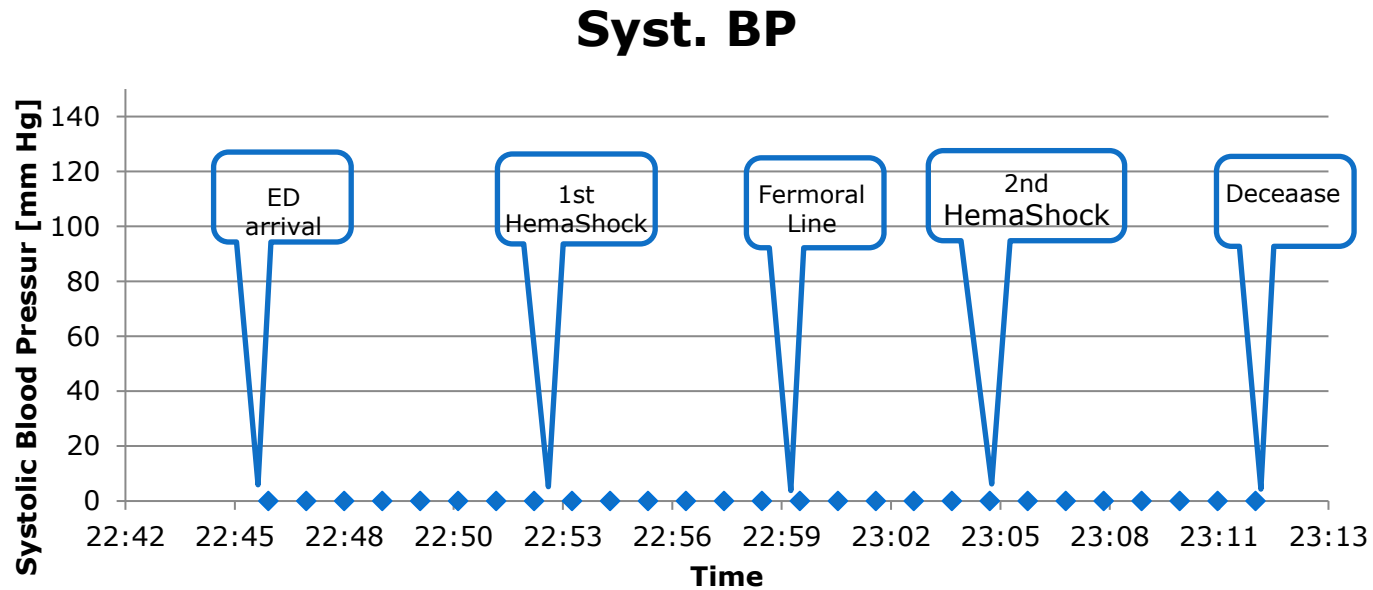
- Placement of HemaShock™ by first time user, (NSO MD, female) was uncomplicated and quick.
- Presence of HemaShock™ did not interfere with ability to insert femoral central line
- Blood ordered for the case arrived after patient was deceased (not given)
- HemaShock™ was placed on leg with fractured femur with no buckling of Fx or other difficulties
- During a 26 minute resuscitation, the HemaShock™ did not interfere with any other resuscitative efforts, or cause any delay.

- **Discussion of HemaShock™ use in the case and critique**

- No adverse effects of HemaShock™ were noted in autopsy (HemaShock™ was left on patient per routine procedures for coroner inspection).
- Patient arrived to ED essentially in traumatic cardiac arrest (PEA), pronounced dead in ED 27 minutes post arrival
- Cause of death by autopsy was "Blunt impact injuries to torso". Patient sustained multiple rib fractures, burst laceration of right ventricle of the heart, laceration of pericardium, left hemothorax, fracture of left femur, fracture of left humerus.
- Summary: No hemodynamic effect of the HemaShock™ in a traumatic hemorrhagic shock/cardiac arrest due to blunt impact to torso. No HemaShock™ application technical difficulties or adverse effect of HemaShock™ use in this case.

Patient EI-HS-001

- Blood Pressure chart



Patient EI-HS-002

- **Clinical information including mechanism of injury/disease,**
 - A 73 years old female was found unresponsive in bed by her daughter at approximately 23:55. Patient arrived via EMS to ED at 00:28 with "very faint pulse", agonal breathing, faint and pale with pupils that are fixed and unreactive to light. Patient was intubated and ventilated and IV fluid boluses (2 liter NS) given and dopamine drip is started. BP at 01:15 BP is 61/25, abdomen noted to be distended, first unit of uncrossed matched unit is ordered. Transfusion actually starts at 01:40. Pt is in CT from 01:44 to 02:20. Upon return to the ED 2nd and 3rd units of RBC are given. CT reveals hemoperitoneum with ruptured splenic artery aneurism. HemaShock™s are placed on both legs at approximately 3:08→3:22 and two additional units of RBC are started (#4 & #5). At 3:56 dopamine drip is stopped. Patient is moved to invasive radiology at 4:45 with HemaShock™s on both legs. Her Hgb level was 4.0 g% upon arrival (00:35) with Htc of 12.4%. Total CO2 was 18 with anion gap of 14 (elevated). At 01:17 lactic acid was 10.1 mmol/L (normal 0.5-2.2).
- **Patient hemodynamics prior to HemaShock™ placement**
 - BP 57/37 and 53/35 mm Hg. Pulses are barely palpable, Dorsalis Pedis pulse only detectable by Doppler.
- **HemaShock™ placement**
 - HemaShock™s were placed on both legs at 3:08 with no difficulties (first-time user).
- **Patient hemodynamics after HemaShock™ placement**
 - Systolic blood pressure increased to 81 mm Hg immediately after HemaShock™ placement.
 - Attempt to start removing the HemaShock™ in IR suit prior to definitive care by surgeon (06:12) by rolling both HemaShock™s down to knee level resulted in drop in BP to 50/31. The HemaShock™ were rolled back up resulting in BP increase. The HemaShock™s were finally removed after completion of laparotomy (approximately 08:00) resulting in over 4.5 hours of HemaShock™ placement.
- **Description of definitive care**
 - Invasive radiology embolization of the splenic artery aneurism was attempted from 04:50 till 07:00 with no success. At 7:10 the patient was taken to OR where splenectomy and splenic artery ligation were performed.

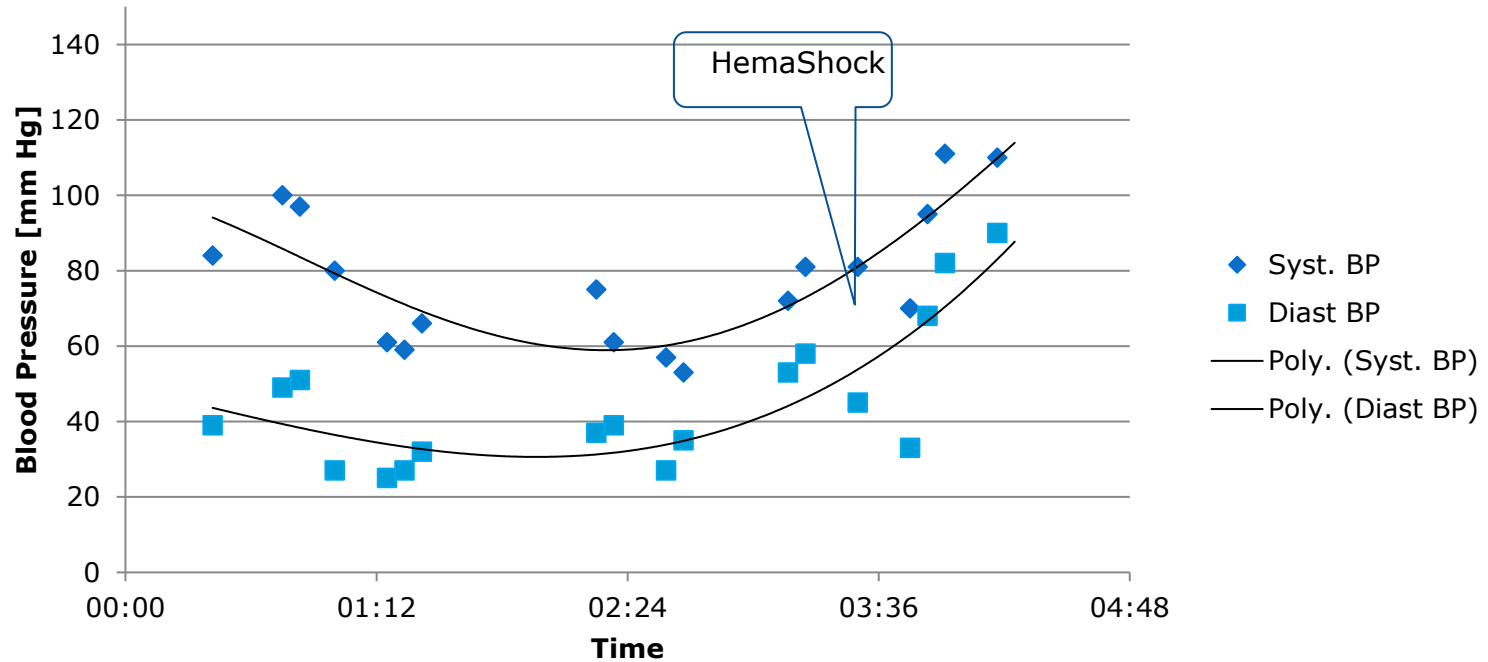
Patient EI-HS-002

- **Patient outcome and disposition**
 - Patient survived surgery and was discharged to home 5 days later. Patient sustained slight drop foot in her Rt foot.
- **Technical comments**
 - HemaShock™ placement by first-time user (AH. MD, Female) was not difficult and was properly done
 - Placement of HemaShock™ (plus IV fluids and RBC units) facilitated discontinuation of dopamine drip
- **Discussion of HemaShock™ use in the case and critique**
 - Extended HemaShock™ time could have been avoided by placing the yellow time labels on the patient's forehead or chest
 - First attempt to remove HemaShock™ was prior to definitive care and resulted in immediate drop of BP.
 - More gradual attempt to remove HemaShock™ (i.e. only one HemaShock™ to knee level, not two) could have prevented the sudden drop in BP.
 - Initially patient was considered too high a risk for surgery or intervention until BP was brought above 80 by using the HemaShock™.
 - Surgeon: "Patient tolerated procedure surprisingly well".

Patient EI-HS-002

- Blood Pressure chart

Blood Pressure



Patient EI-HS-003

- **Clinical Background**

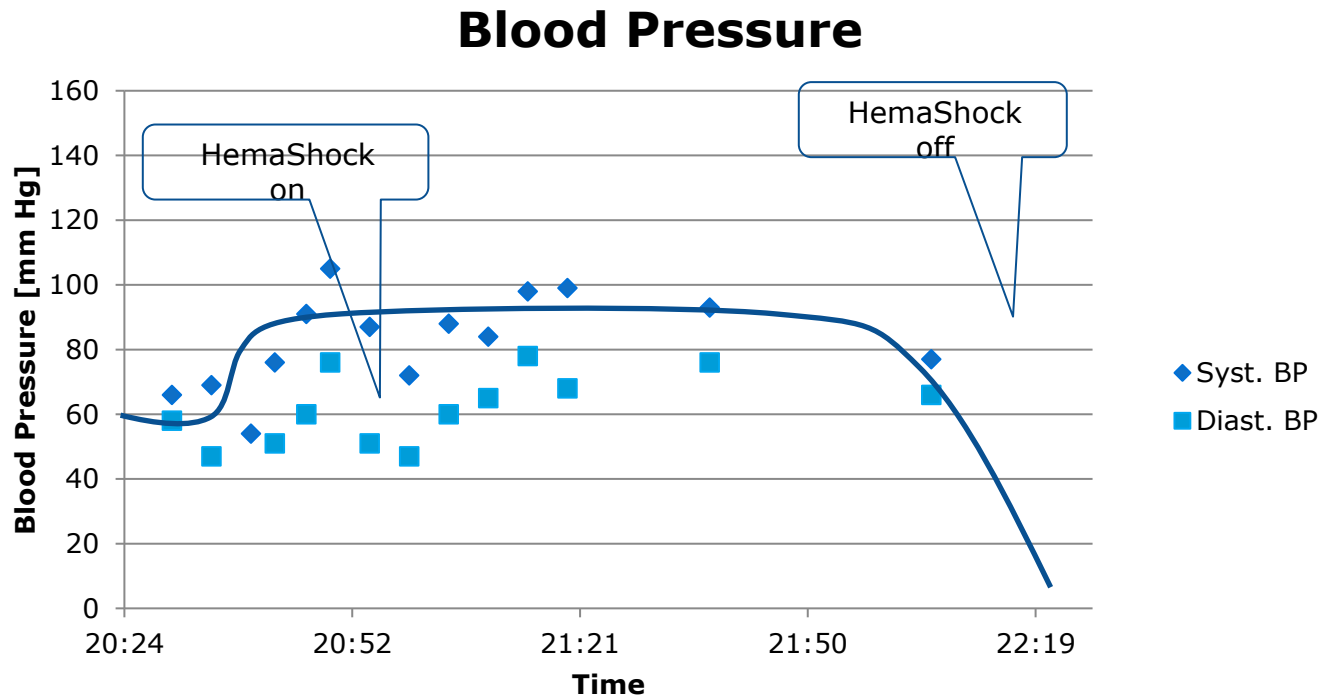
- A 76 year old presented with neck pain radiating to the mid chest for 60 minutes prior to ED arrival at 18:13. Had BP 145/89 on presentation. Patient is taken to CT at 19:49. While in CT, sudden worsening of pain, and BP dropped to 66/58. No BP response to fluids and blood. On CT aneurism of the aortic arch is seen with extravasation and left hemothorax. Patient's family declined surgery and patient was moved to ICU for comfort care where she died

- **HemaShock™ placement**

- Applied by first time user with no complications. Both HemaShock™s were used at the same time
- Vital signs improved with HemaShock™, with BP immediately coming up to 91/60 and then 105/76. Patient survived to the ICU for comfort measures. On removal of the HemaShock™ the BP dropped from 93/76 to 77/66 and patient died the next day.

Patient EI-HS-003

- Blood Pressure chart



Patient EI-HS-003

- **Description of definitive care**
 - Surgical repair was declined due to high risk and anticipated low quality of life.
- **Patient outcome and disposition**
 - Patient was transferred to ICU where she died.
- **Technical comments**
 - HemaShock™ was readily placed by AP MD, (female) a first-time user.
 - Presence of HemaShock™ did not interfere with insertion of Femoral Vein triple lumen catheter nor with intubation.
 - No difficulty in removing HemaShock™ (by rolling down)
 - HemaShock™ use was successful in increasing blood pressure quickly and effectively while transfusion of blood products was slow and ineffective
 - The drop of BP upon removal of HemaShock™ demonstrates the titratability of patient's blood pressure when HemaShock™ is used
- **Discussion of HemaShock™ use in the case and critique**
 - This case demonstrates that the use of HemaShock™ temporarily stabilizes patient while diagnosis and review of possible intervention can be done.

Patient EI-HS-004

- **Clinical background,**
 - A 20-year-old male weighing 370 pounds with GSW to chest in full arrest. No Vital Signs and asystole on monitor.
- **Patient hemodynamics prior to HemaShock™ placement**
 - No pulse or BP
- **HemaShock™ placement**
 - HC Extra-large was used, but brought only to distal thigh due to large size of patient. Both units were placed at the same time.
- **Patient hemodynamics after HemaShock™ placement**
 - No effect
- **Description of definitive care**
 - ED thoracotomy revealed ruptured and destroyed left ventricle with no chance of survival.
- **Patient outcome and disposition**
 - Deceased in ED.
- **Technical comments**
 - This case demonstrates that HemaShock™ can be used in a large/morbidly obese patient. HemaShock™ placed as high as the distal thigh. Presumably, displacing as much blood from the legs as with a leaner patient, with the HemaShock™ brought all the way to the groin level.
- **Discussion of HemaShock™ use in the case and critique**
 - This case demonstrated that the placement HemaShock™ on both legs, on these types of patients, simultaneously is appropriate.

Patient EI-HS-005

Clinical background

- An 84-year-old male with 12 day old right subclavian axillo-femoral arterial bypass graft shunt. The anastomosis at the subclavian site ruptured at night and bled out most of his blood volume 15 minutes prior to ED arrival which was at 22:18. Presented to EMS in hemorrhagic circulatory arrest with BP of <40 mm Hg. Left tibia IO infusion device was inserted. He had no vital signs upon arrival to ED with no additional bleeding from anastomosis site. Hgb was 5.3. Patient was intubated and CPR started. Resuscitated with HemaShock™ and taken to surgery. Hemorrhagic Shock/Junction Hemorrhage
- **Patient hemodynamics prior to HemaShock™ placement**
 - Narrow complex tachycardia without pulse, initially no measurable BP, no pulse in femorals or carotid, unresponsive. Then Systolic BP was 53 mm Hg.
- **HemaShock™ placement**
 - First HemaShock™ placed at 22:30, 12 minutes after ED arrival
- **Patient hemodynamics after HemaShock™ placement**
 - Systolic BP to 74 and 101 mm Hg immediately after 1st HemaShock™ placement. Thirty minutes later patient had a fall of BP to 54 mm Hg (presumably due to increased PEEP). 2nd HemaShock™ placement raised systolic BP readings to 99 and 78 mm Hg. When pressure rose above 100 blood was gushing from the anastomosis and HemaShock™s were gradually removed.
- **Description of definitive care**
 - Patient was transferred to OR at 00:44 for immediate surgical repair of anastomosis

Patient EI-HS-005

- **Patient outcome and disposition**

- Within 3 hours of end of operation patient developed DIC and profound hypotension. No additional care was provided.

- **Technical comments**

- This case demonstrates the titratability of pressure with HemaShock™ usage.
- When there is an I.O. port the HemaShock™ should be placed on the opposite extremity.

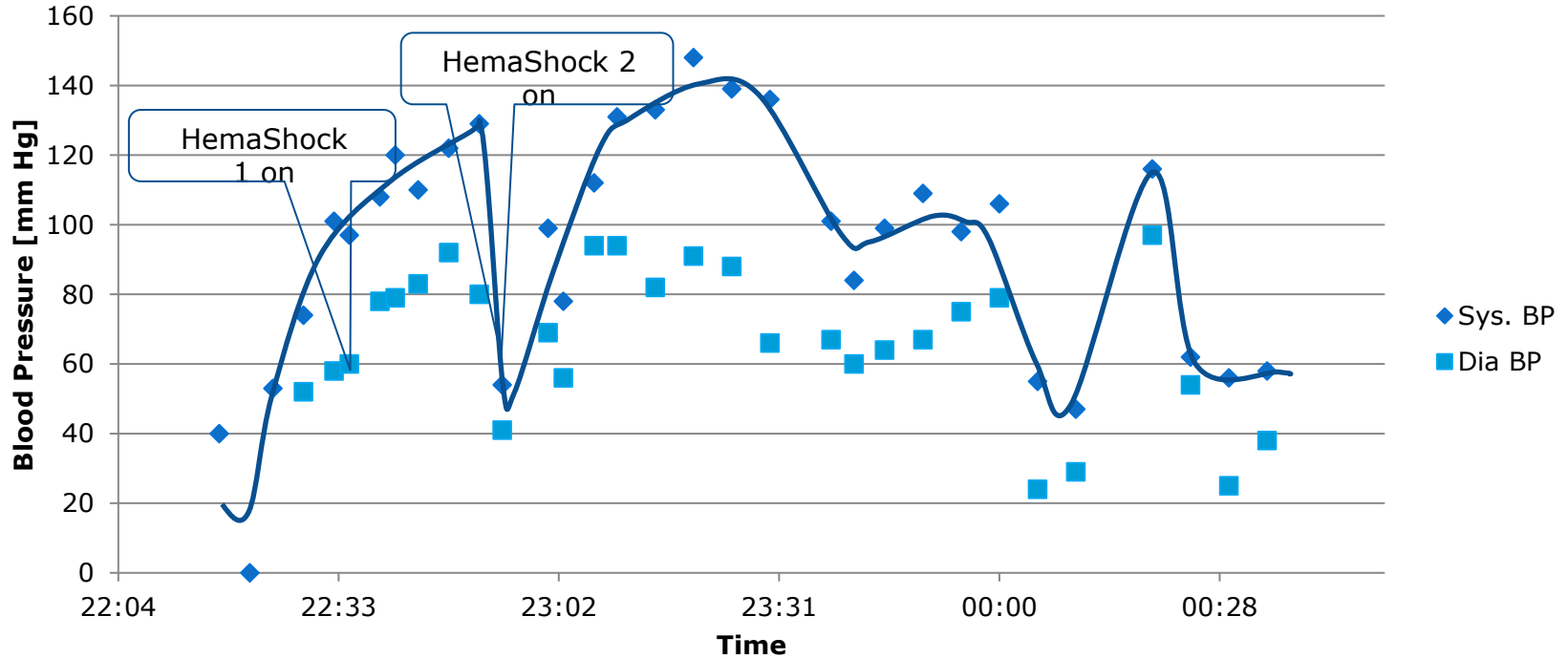
- **Discussion of HemaShock™ use in the case and critique**

- This case is a junctional hemorrhage (subclavian artery hemorrhage); and demonstrates that a severe hemorrhage into a cardiac arrest can be resuscitated and survived to the OR for definitive care.
- The unexpected abrupt hypotensive episodes after placing the patient on IPPV with PEEP demonstrates the negative effectives of ventilator settings that include PEEP in a patient who is hypovolemic.
- The ability to quickly raise BP by the use of the HemaShock™ may prolong survival to definitive surgical care.

Patient EI-HS-005

- Blood Pressure chart

Blood Pressure (Patient HS_005)



Patient EI-HS-006

- **Clinical information including mechanism of injury/disease,**
 - An 81 year old female, passenger in high speed MVA, brought to ED in extremis at 16:21, unable to intubate in the field. Found upside down, dangling from seatbelt. Brought in sinus tachycardia without a pulse. Major crush injury to Right arm and Right thigh. Patient had multiple ribs fractures and bilateral hemothoraxes.
- **Patient hemodynamics prior to HemaShock™ placement**
 - No palpable pulse. Sinus tachycardia on monitor.
- **HemaShock™ placement**
 - At 16:22 HemaShock™s placed on both legs.
- **Patient hemodynamics after HemaShock™ placement**
 - ROSC within one minute with palpable pulse. Blood pressure 110/34 with pulse of 99/min. Patient was tachycardic, then became bradycardic with PEA, then down to arrest at 10:56. resuscitated 6 times, eventually died.
- **Description of definitive care**
 - Not advanced to next level of care. Autopsy showed bilateral hemothoraces, multiple rib fractures, pulmonary contusion.

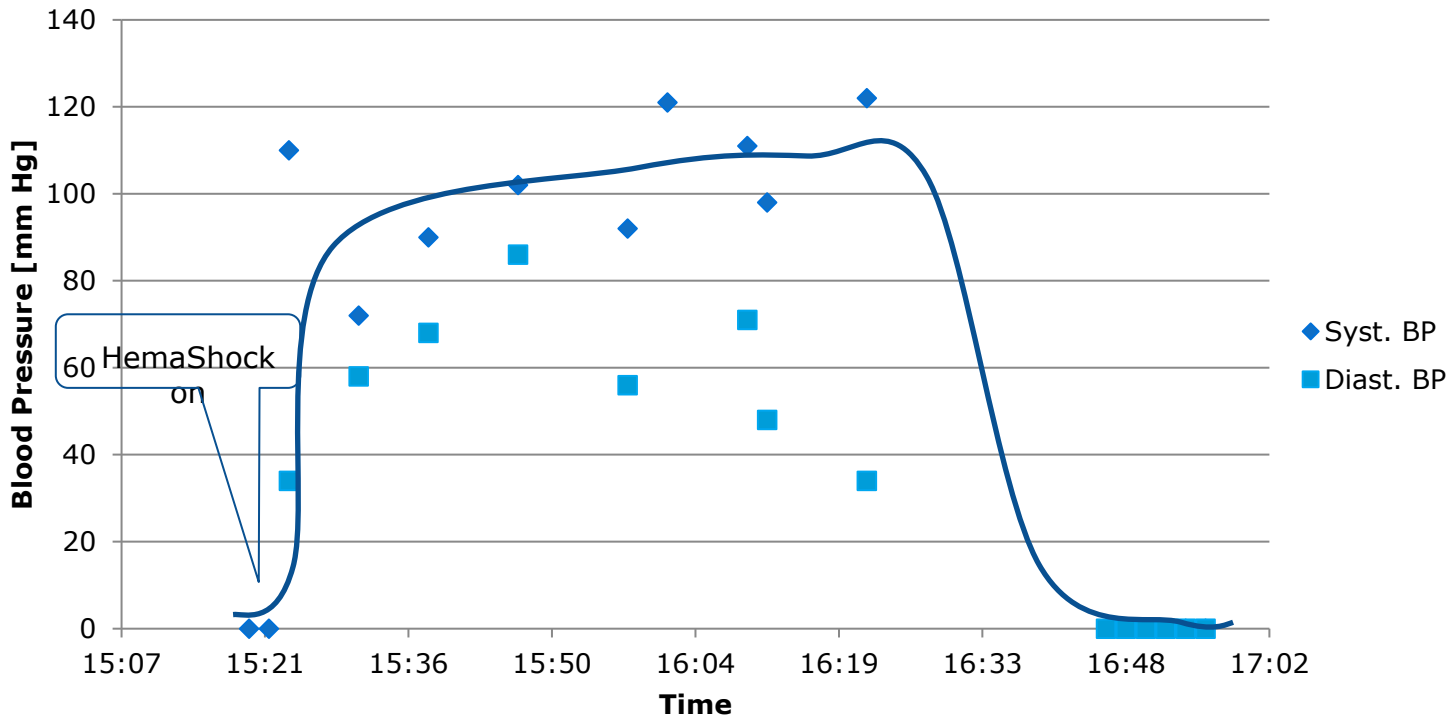
Patient EI-HS-006

- **Patient outcome and disposition**
 - Deceased.
- **Technical comments**
 - HemaShock™ did not interfere with placement of Central Line;
 - HemaShock™ was successfully used on a fractured femur.
- **Discussion of HemaShock™ use in the case and critique**
 - Patient's blood pressure increased quickly in response to HemaShock™ placement and was sustained until she had multiple hypotensive episodes and finally asystole.
 - In patients where internal bleeding in the chest or abdomen is possible, BP should not be elevated above 90 systolic to avoid increased uncontrolled occult bleeding. To do so, the HemaShock™s are placed one at a time with BP monitoring after the first unit is in place.

Patient EI-HS-006

- Blood Pressure chart

Blood Pressure (Patient HS_006)



Patient EI-HS-007

- **Clinical information including mechanism of injury/disease**
 - A 37 years old patient brought to ED from a motorcycle accident scene in full arrest at 15:35. Hemoperitoneum by US were noted. Ambulance called at 14:50.
- **Patient hemodynamics prior to HemaShock™ placement**
 - Traumatic arrest, no pulse.
- **HemaShock™ placement**
 - HemaShock™s were placed on both legs upon arrival to ED with no difficulties ~15:40
- **Patient hemodynamics after HemaShock™ placement**
 - Cardiac activity with heart valves motion noted. Then BP 87/70 was recorded at 15:53; 66/40 @ 16:00; and 102/68 at 16:02. 40/24 at 16:08.
- **Description of definitive care**
 - None

Patient EI-HS-007

- **Patient outcome and disposition**
 - Deceased at 16:30
- **Technical comments**
 - HemaShock™s did not interfere with placement of femoral arterial line
 - HemaShock™s placement was done soon after patient's arrival to ED.
- **Discussion of HemaShock™ use in the case and critique**
 - Patient had some electrical cardiac activity upon ED arrival (PEA). The blood pressure temporarily responded to HemaShock™ placement (together with fluids and dopamine).

Patient DE-HS-008

- **Clinical information including mechanism of injury/disease,**
 - A 34 years old male presented to ED at 20:00 with LLQ stab wound and evisceration. Significant bleeding noted and fluids resuscitation initiated with 2 liters of crystalloids and 4 units of blood, but BP was deteriorating rapidly. Blood loss estimated to be >3 liters.
- **Patient hemodynamics prior to HemaShock™ placement**
 - Hypotensive with systolic BP ~60 with tachycardia – Hemorrhagic shock
- **HemaShock™ placement**
 - By ER doctor with no difficulty. 2 HemaShock™s were placed at the same time.
- **Patient hemodynamics after HemaShock™ placement**
 - BP increased to >100 mm Hg. With slowing of heart rate
- **Description of definitive care**
 - Patient was taken to OR for emergency laparotomy. Repair of transected jejunum and lacerated mesentery and greater omentum tear.

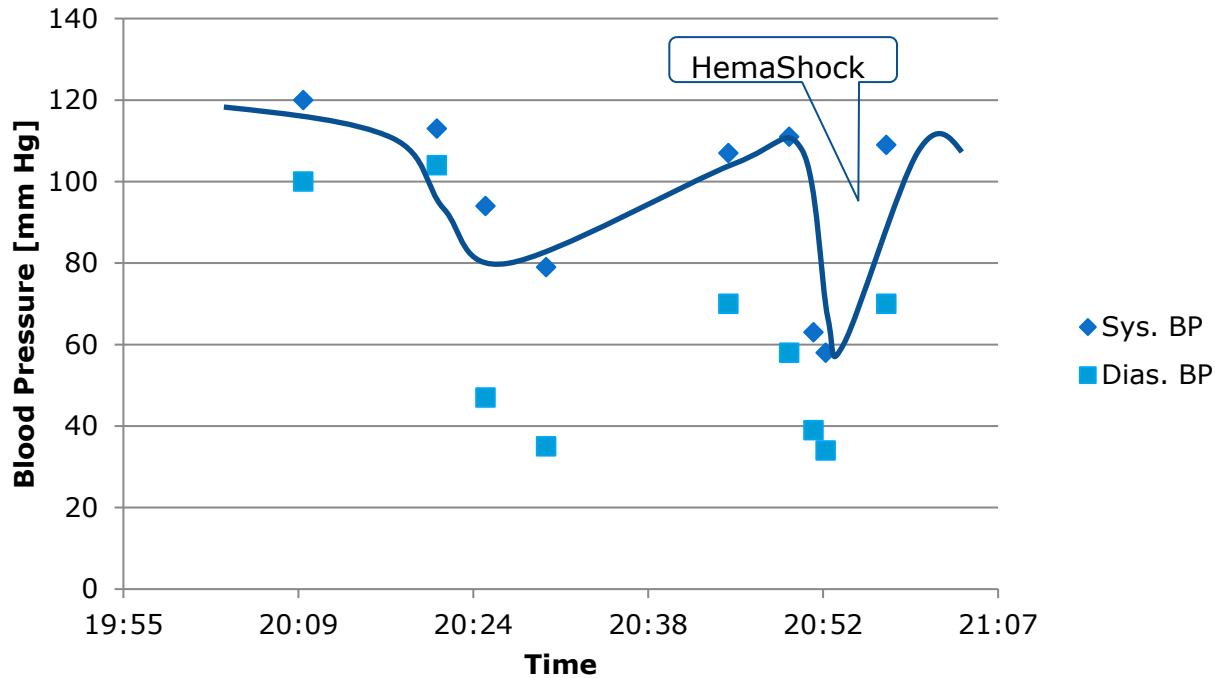
Patient DE-HS-008

- **Patient outcome and disposition**
 - Hemostasis achieved in OR and patient was transferred to ICU and survived to be discharged.
- **Technical comments**
 - No difficulties encountered with placing the HemaShock™ on legs quickly and effectively.
 - ER doctor placed both HemaShock™s at once without taking BP after the first is applied. As such BP shot to 109 syst.
 - No side effects of HemaShock™ placement on limbs. No report of drop foot or skin damage.
- **Discussion of HemaShock™ use in the case and critique**
 - ED doctor wrote: "... This (rise in BP due to HemaShock™ placement) occurred at a critical moment when we could not keep up with the fluid demands of the case and PRBC's were unavailable for several minutes. Without question to all present, the MBV saved this man's life. He would have never made it to the OR or survived the first 20 minutes of surgery without the HemaShock™'s."

Patient DE-HS-008

- **Blood pressure chart**

Blood Pressure [Patient HS_008]



Patient EI-HS-009

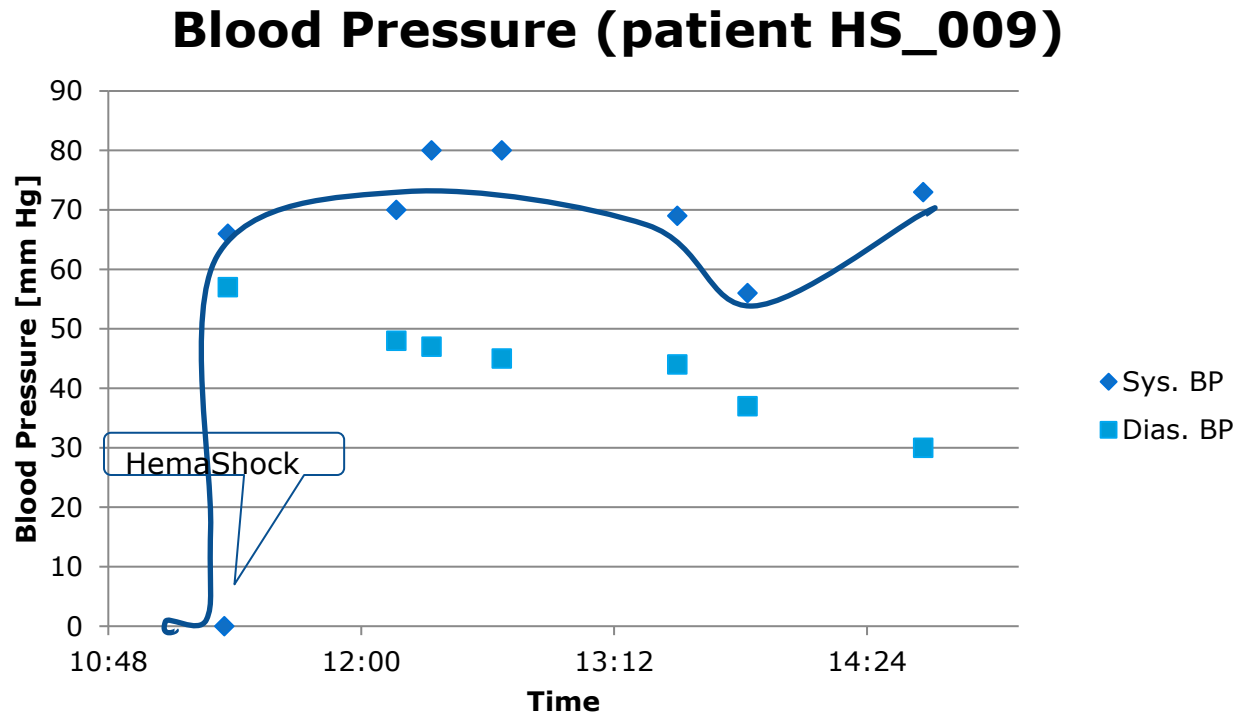
- **Clinical information including mechanism of injury/disease,**
 - A 62 years old male who collapsed and brought to the ED with no detectable pulse at 11:21. Patient had PEA with no palpable pulse or measurable BP. HemaShock™ was placed on patient converted from VT to atrial fibrillation.
 - The patient was thought to have cardiac arrest secondary to coronary disease and was treated accordingly, but it was found that he has a GI bleeding, liver disease and essentially normal ejection fraction. First EKG on 10:32 showed VT, then at 10:43 turned to atrial fibrillation and at 11:55 to normal sinus rhythm. Echocardiography showed normal ventricles with 65-70% ejection fraction. On autopsy the patient was found to have Hepatocellular carcinoma that ruptured with 2000 ml of hemoperitoneum leading to exsanguination.
- **Patient hemodynamics prior to HemaShock™ placement**
 - No palpable pulse or measurable blood pressure. VT on EKG
- **HemaShock™ placement**
 - Not difficulties
- **Patient hemodynamics after HemaShock™ placement**
 - Blood pressure increased to 66-80 mm Hg (systolic)
- **Description of definitive care**
- Patient was moved to ICU where he died at 10 am the following day

Patient EI-HS-009

- **Patient outcome and disposition**
 - Patient was moved to ICU where he died at 10:00 am the next day
- **Technical comments**
 - Patient was small (48 kg). HemaShock™ was effective nevertheless.
- **Discussion of HemaShock™ use in the case and critique**
 - Patient condition upon arrival was near death. The use of the HemaShock™ facilitated ROSC. He eventually died from exsanguination into the peritoneal cavity which was only detected on autopsy.

Patient EI-HS-009

- Blood Pressure chart



Patient BM-HS-010

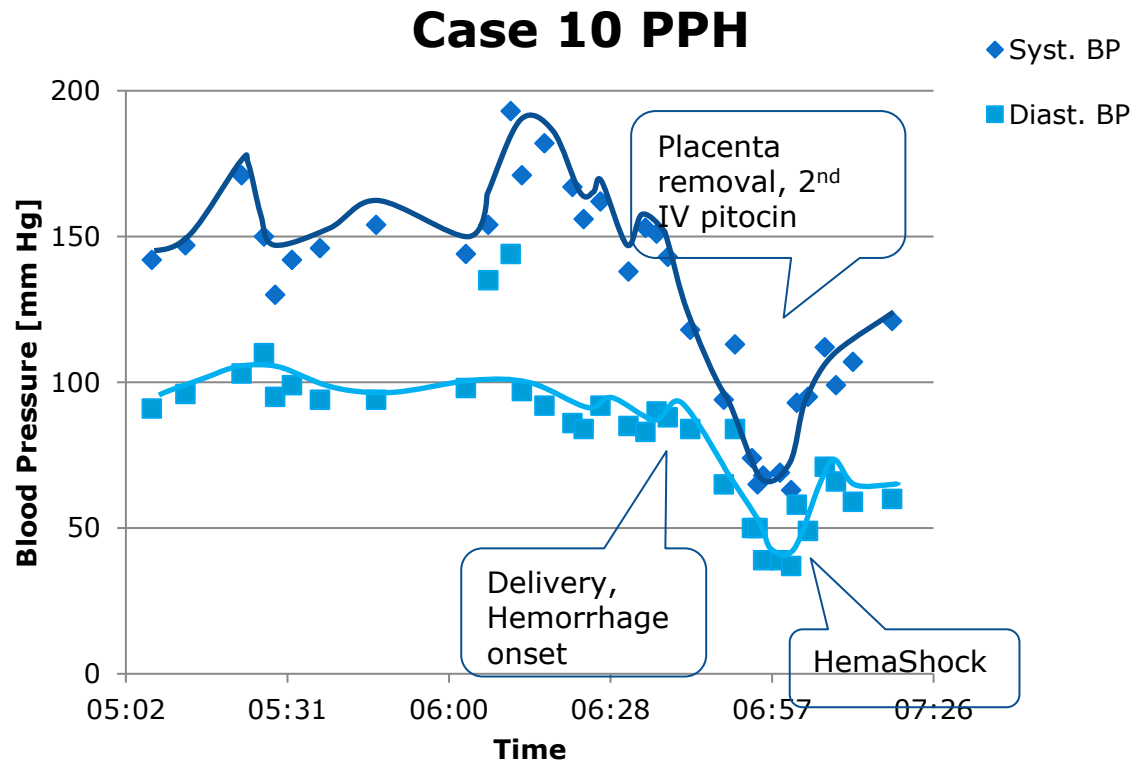
- **Patient outcome and disposition**
 - 21 years old G1/P0 arrived to rural hospital ED in precipitous delivery of a healthy newborn with delayed placental delivery.
 - Patient in severe hemorrhagic shock due to post-partum hemorrhage
- **Patient hemodynamics prior to HemaShock™ placement**
- One leg, no difficulty.
- **HemaShock™ placement**
 - One HemaShock™ was placed followed by increase in BP
- **Patient hemodynamics after HemaShock™ placement**
 - Blood pressure increased from 63 systolic to 93-95 mm Hg immediately after placement of HemaShock™
 - Blood pressure increased to 112/71 where it stabilized. Two IVs and Pitocin drip were running. Blood was not available. The placenta was then removed and the bleeding stopped
- **Description of definitive care**
 - Patient and child were air-lifted to a higher level facility and discharged home the next day. No side effects of HemaShock™ placement.

Patient BM-HS-010

- **Discussion of HemaShock™ use in the case and critique**
- **What was the Patient's condition prior to HemaShock™ placement?**
 - The patient was in severe hemorrhagic shock (systolic BP 63 mm Hg; Heart Rate 147 BPM) due to gushing vaginal bleeding following a term delivery with slightly delayed placenta delivery (22 min).
- **What is the natural course of such condition?**
 - This is an obstetrical emergency. The uterus does not contract effectively until the placenta is delivered or removed. The open sinuses at the placental bed can bleed large amounts (1-2 liters) very rapidly if the uterus is atonic. Uterine contraction is the only effective physiological mechanism to stop the bleeding. This contraction is primarily by an intrinsic uterine mechanism that is not activated until the placenta is out. As such, treatment to support blood pressure with volume expansion is the first step with extrinsic Pitocin and Metergin being used to promote uterine contraction blood and blood products in high rate via large bore venous catheters are often needed.
- **What are the physiological compensatory mechanisms that help reverse the course?**
 - Maternal blood volume is up to 50% larger at term. As such, even loss of 2 liters of blood can be tolerated. The drop in blood pressure can reduce the bleeding to a degree. The sympathetic control constricts peripheral vessels and cause extreme compensatory tachycardia as seen in this case. Finally, once the uterus contracts, it auto-transfuses between 500 to 1000 ml of blood from the uterus into the central circulation, (not much different from the action of the HemaShock™).
- **What are the complications?**
 - If exsanguination continues with no effective uterine contraction, the arterial supply to the uterus should be ligated, or a hysterectomy performed, but DIC is the dire fatal complication that may develop rapidly and irreversibly.
- Based on the above, we can conclude that the placement of the HemaShock™ (on one leg) in this patient provided a time bridge until the removal of the placenta finally facilitated the effective contraction of the uterus. As such, there were no complications of the severe blood loss and temporary tissue hypoperfusion. The pause after one HemaShock™ was placed and the gradual removal of the device while monitoring the patient's hemodynamic status of the patient were according to the HemaShock™ product instructions. There were no side effects and the patient was discharged the following day.

Patient BM-HS-010

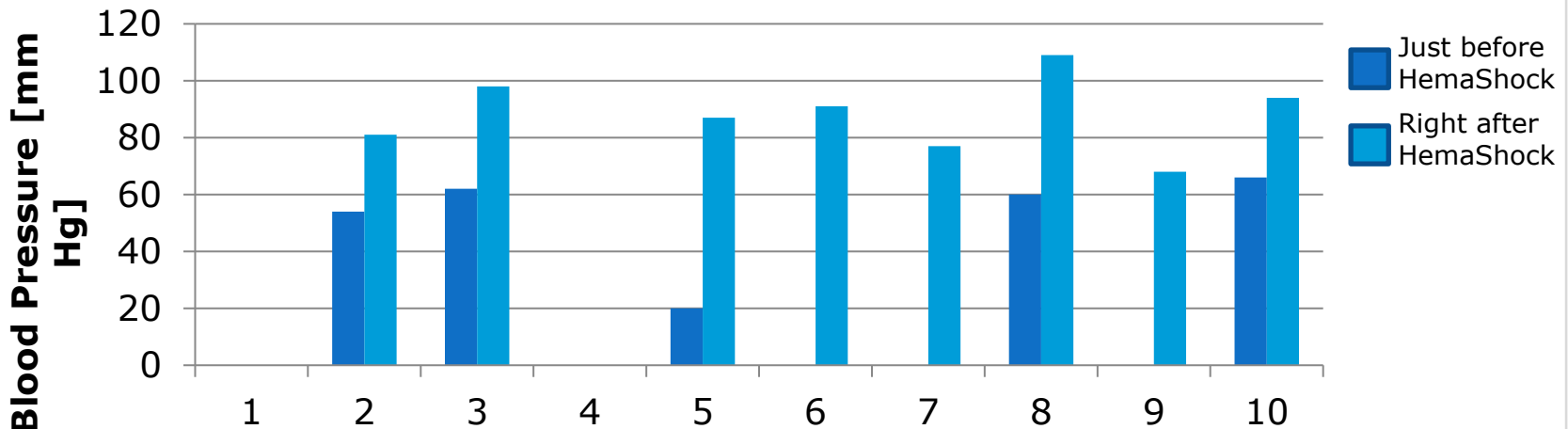
- Blood Pressure charts



Summary of 10 Hemorrhagic Shock Cases

- Systolic blood pressures before and following HemaShock™ placement in 10 hemorrhagic shock patients. In 5 patients there was no pulse or measurable blood pressure upon ED arrival. In 8/10 patients there was a BP response to HemaShock™ placement. In 6/10 cases it was possible to proceed to next level of care (OR/ICU/transfer).
- **In 3/10 cases the patient was discharged to home.**

Systolic Blood Pressure Pre- and Post HemaShock



Patients Summary (1-6)

Patient	Condition upon ED arrival	BP-syst. just before HemaShock™ was placed	BP-syst. Just after HemaShock™ placement	BP up by 15 mmHg Y/N	Cause of Hemorrhage	Immediate effect of HemaShock™	Condition at 6h post HemaShock™ placement	Disposition
EI-HS-001-	Pulseless, no BP	0	0	N	Laceration of Rt ventricle; hemothorax	No effect of HemaShock™	Deceased 27 min after ED arrival	N/A
EI-HS-002-	Hypotensive, unresponsive, distended Abdomen	57 ; 53	81 ; 81	Y	Ruptured splenic artery aneurism	Immediate increase of BP by >25 mm Hg	Patient in ICU post splenectomy; tolerated well	Discharged home in 5 days
EI-HS-003-	Stable VS. hemo-mediast./ thorax	69; 54	91; 105	Y	Ruptured aortic arch aneurism	Immediate BP increase by > 25 mm Hg	Patient is in ICU	Deceased in ICU after surgery was declined
EI-HS-004-	GSW to the chest. Full arrest	0	0	N	Penetrating wound of Left Ventricle	No effect of HemaShock™	Deceased in ED	N/A
EI-HS-005-	Unconscious, BP 40 / undetectable	40; 0	74; 101	Y	bleeding from axillary anastomosis	Immediate BP increase by >25 mm Hg	Taken to OR for repair, then to ICU	Deceased in ICU from DIC
EI-HS-006-	MVA unconsciousness Undetectable pulse	0; 0	110; 72	Y	Multiple ribs fractured, Fx of femur and humerus	Immediate BP increase by >25 mm Hg	Kept with sustained circulation for >60 min. Deceased in ED	N/A

Patients Summary (7-10)

Patient #	Condition upon ED arrival	BP-syst. just before HemaShock™ was placed	BP-syst. Just after HemaShock™ placement	BP up by 15 mmHg Y/N	Cause of Hemorrhage	Immediate effect of HemaShock™	Condition at 6h post HemaShock™ placement	Disposition
<u>EI-HS-007-</u>	MVA unconscious, no pulse	0; 0	87; 66	Y	Hemoperitoneum Head trauma, C-spine trauma	BP increase by >25 mm Hg	CPR for 55 minutes with ROSC for 15 min.	Deceased in ED
<u>DE-HS-008-</u>	LLQ abdominal stab wound with 3.5 L blood loss and shock	63; 58	109	Y	Hemoperitoneum Jejunum transection, mesentery bleed	BP increased by >25 mm Hg	Transferred to OR for definitive care	Discharged to home
<u>EI HS-009</u>	Massive GI bleeding	0;0	66;70	Y	bleeding from CA of liver. hemoperitoneum	BP increased by >25 mm Hg	Transferred to ICU	Deceased in ICU next day
<u>BM-HS-010</u>	Massive Postpartum hemorrhage	69,63	93,95	Y	Uterine atonia, delayed placenta delivery	BP increased by >25 mm Hg	Patient and newborn flown to tertiary medical center	Discharged to home in good condition

Preliminary statistical analysis

t-Test: Paired Two Sample for Means		
	BP-syst. just before HemaShock™ was placed	BP-syst. Just after HemaShock™ placement
Mean	26.2	70.5
Variance	916.8444444	1509.166667
Observations	10	10
Pearson Correlation	0.610485306	
Hypothesized Mean Difference	0	
df	9	
t Stat	-4.452792312	
P(T<=t) one-tail	0.000796878	
t Critical one-tail	1.833112933	
P(T<=t) two-tail	0.001593755	
t Critical two-tail	2.262157163	

Preliminary statistical analysis

- We used the last two measurements of systolic blood pressure just before and the two just after the application of the HemaShock™ to estimate the statistical significance of the effect of the HemaShock™ on blood pressure.
- None of the patients were excluded, so the group includes the two cases in which there was no effect at all (#1 and #4), despite the fact that both had asystole upon arrival and perforated heart chamber(S) (GSW, MVA).
- The difference between the mean values (post vs pre) is 44 mm Hg with standard deviations of 30.5 and 38.2, respectively. The two-sided t-test gives **p=0.00159** for this small group.

HemaShock™/MBV training videos



- Placement:
 - <http://www.youtube.com/watch?v=wKWA5IRIRqs&list=UUYUdKv4V5SxsSTXglqnbSAg&feature=c4-overview>
- Removal
 - <http://www.youtube.com/watch?v=XxSuQLW8YA&list=UUYUdKv4V5SxsSTXglqnbSAg&feature=c4-overview>