EMSP 1355: Trauma Management
Shock Paper

Description
You will research the medical literature related to shock and will respond to a series of detailed questions related to the pathophysiology and management of this disease process.

Objectives
This exercise will help the student to gain:

1. Experience in researching the medical literature
2. Experience in technical report writing
3. In depth knowledge of the pathophysiology and management of shock

Directions
Read these instructions fully before beginning your research.

Formatting
Hand-written papers will **NOT** be accepted. Answers should be typed, double-spaced and single sided. Use only standard fonts (Times New Roman or similar) in standard sizes (10-12).

Title your document as follows: **EMSP 1355: Trauma Management: Shock Paper**. This should be in **bold** at the top of the first page. Do **NOT** attach a separate cover page. Place your name and the semester, i.e. Spring 2001 in the footer of each page, along with the page number. Place a single staple in the upper left-hand corner of the document. Be sure to use a large enough staple to assure the document stays intact. Do **NOT** use a binder of any kind other than the single staple.

Retype each question in **bold**. Skip a space and then begin your answer. Be complete! Answer each question on a separate page or pages. Do **NOT** put multiple questions on one page.

Your grade will depend on how completely you answer each question. You will receive no points for incomplete or unanswered questions. Discuss each topic as thoroughly as possible. Read the questions carefully and be sure you have answered **all** parts of each question

You may do group **research**. However, this is **NOT** an invitation to copy your buddy's paper. Your paper **must be your own individual work. Duplicate answers or papers that are just alike or substantially alike will be assigned a grade of "0".** Please review the policy on academic dishonesty in the Student Handbook.

You must phrase your answers in your own words. Your work should **NOT** be made up of just a string of quoted paragraphs out of books. **Do not copy phrases out of the book, unless you use quotes and footnote the material. You must include a bibliography showing all references.**

Spelling counts! Grammar counts! Most word processors come with spelling and grammar checkers. Please use them.

Sources
Your textbook may be used as a reference but **NOT** the only reference. You may **NOT** use you paramedic textbook for any more than one reference per question. Each question must have at least 2 references. List each reference as a footnote to each question. You must use the Internet for at least two references. You must use at least five references that are either articles from peer-reviewed health-care journals or medical (not paramedic) textbooks. At the end of your paper, under the title Bibliography, list all of the references used. Sources should be documented in MLA format. You may reference this format on the Internet at

http://bvsd.k12.co.us/schools/chs/library/home.html. A copy of the most used citation formats is included in a handout titled: Centaurus Writer's Style Guide.

QUESTIONS

1) Define shock. Then, in outline form, divide the types of shock into categories based upon cardiac, fluid volume, respiratory, and vascular etiologies. There are many possible arrangements. Present an arrangement that makes logical sense to you.

2) Define cardiac output and describe how it is computed.

3) Define preload. Describe how preload affects cardiac output?

4) Define afterload. Describe how afterload affects cardiac output?

5) Define peripheral vascular resistance. What are the principal structures regulating peripheral vascular resistance? How is this accomplished?

6) How do peripheral vascular resistance and cardiac output affect blood pressure?

7) Describe metabolic energy production, how aerobic metabolism differs from anaerobic metabolism, and how these relate to shock.

8) What is the Fick Principle? Discuss the Fick principle with regard to each of the following:
   a) pulmonary function
   b) cardiac function
   c) blood volume
   d) the vascular system
   e) gas diffusion

9) What is the autonomic nervous system? What are its major subdivisions?

10) Discuss alpha 1 and alpha 2 receptors, and beta 1 and beta 2 receptors. Tell where they are located, how they are stimulated, and what effects they cause when stimulated.

11) What is a sympathomimetic drug?

12) What is a sympatholytic drug? If a patient is taking a sympatholytic drug, what effect will this have on his/her ability to compensate during shock?

13) Describe the **physiologic actions, responses, and/or changes** that take place in each of the following organs or systems **as the body compensates** for hypoperfusion. **<u>If differences occur in early and late shock, discuss what happens at each stage.</u>**
   a) baroreceptor reflexes
   b) chemoreceptor reflexes
   c) respiratory system
   d) autonomic nervous system
   e) heart
   f) microcirculation (capillaries)
   g) extracellular fluid
   h) kidneys
   i) adrenal glands
   j) pituitary gland, early and as shock progresses

14) Discuss the roles each of the following in shock:

a) ACTH
b) Epinephrine
c) Norepinephrine
d) Renin-angiotensin-aldosterone mechanism
e) ADH (vasopressin)
f) Histamine
g) Lactic acid

15) Discuss the actions of precapillary and postcapillary sphincters **in both early and late shock.** Explain why they do what they do. Discuss the hemodynamics of their actions.

16) Rank the following in the order of their occurrence in shock.
a) loss of efficient vasoconstriction
b) inadequate perfusion of tissue with blood
c) stasis and backflow
d) unrestricted capillary filling
e) interference with metabolic processes- anaerobic metabolism producing acids
f) "sludging"

17) Describe what happens to blood pressure in the **early** stages of shock and in the **decompensation** stage**.** Explain **<u>why</u>** each change occurs. Discuss differences in blood pressure changes in hypovolemic, cardiogenic, neurogenic, septic, and anaphylactic shock.

The next several questions require you to "discuss the physiologic mechanisms" by which something happens. This means "what are the mechanics" of what is going on in the body. What happens first, second, third, fourth, and so on? How does what happens first affect a target organ or sensing mechanism, for example; how does what happens first affect what happens second, et cetera. Be thorough. Probe deeply into resource materials to find the answers.

18) Discuss the physiologic mechanisms that produce thirst in shock.

19) Discuss the physiologic reasons why patients in shock may be restless and anxious.

20) Physiologically why is skin pale in **some** shock patients and not in others? Discuss and contrast skin signs in hypovolemic, cardiogenic, neurogenic, septic, and anaphylactic shock. How and why may skin signs be different in the pregnant patient?

21) Discuss in detail why kidneys may fail if shock is not reversed within as little as 30 minutes to one hour. Discuss the effects of kidney failure on other organ systems.

22) Define "DIC" and describe each step in development of the condition, with cause and effect. Discuss how it impairs bodily function, and how it might be treated.

23) Define "ARDS", and describe each step in development of the condition, with cause and effect. Discuss how it impairs bodily function and how it might be treated. Give several other names for this condition. Discuss the physiological differences in the causes of ARDS and non-cardiogenic pulmonary edema from left ventricular failure and cardiogenic pulmonary edema. Discuss treatment approaches appropriate to each.

24) **List in order and in detail** the steps taken in treating a patient in hypovolemic shock.

25) **List in order and in detail** the steps taken in treating a patient in cardiogenic shock.

26) **List in order and in detail** the steps taken in treating a patient in septic shock.

27) **List in order and in detail** the steps taken in treating a patient in neurogenic shock.

28) **List in order and in detail** the steps taken in the treating a patient anaphylactic shock.

29) Compare and contrast the treatments for hypovolemic, cardiogenic, septic, neurogenic, and anaphylactic shock. Discuss the physiologic basis for these differences in treatment.

30) Describe in detail why use of the anti-shock suit may be contraindicated in patients with thoracic trauma. Your answer should discuss the hemodynamics involved.

31) Describe the "pros and cons" of use of the anti-shock suit. Discuss **indications** and **contraindications** for the PASG. Discuss its use in the following situations:
    a) abdominal aortic aneurysms
    b) lower extremity fractures
    c) pelvic fractures
    d) evisceration
    e) blunt and penetrating abdominal trauma
    f) blunt and penetrating thoracic trauma
    g) cardiac tamponade
    h) pneumothorax
    i) hemothorax
    j) septic shock
    k) uncontrolled external bleeding
    l) controlled external bleeding
    m) internal bleeding
    n) head injury

32) Discuss in detail the following potential hazards **from the use of the PASG.** Discuss the **causes and effects** of each condition and treatment of each.
    a) metabolic acidosis
    b) compartment syndrome
    c) respiratory insufficiency

33) List in order the steps in the procedure for inflating the antishock suit.

34) List in order the steps in the procedure for deflating of the antishock suit. Discuss the physiologic rationale for this particular sequence of steps.

35) Summarize the goals in the treatment of shock. Develop your summary in the context of the underlying physiologic mechanism that produces shock.