

Duplicate

MANAGEMENT OF SHOCK

I. EVALUATION

When confronted by a severely injured or critically ill patient who appears to be in shock, the physician must take immediate steps to evaluate the patient's condition. Based on this evaluation, the physician must begin a logical series of countermeasures. Accessible hemorrhage must be stopped by applying a compression dressing, by using a tourniquet or by clamping off vessels. A clear airway and adequate ventilation must be established and maintained. This may require an airway, an endotracheal tube, or a tracheostomy. If intubation cannot be done promptly, tracheostomy must be performed immediately for respiratory control and therapy.

The chest must be auscultated for heart and respiratory sounds. This procedure should be repeated at regular intervals. An electrocardiogram should be taken.

II. TREATMENT

Following these preliminary steps, the physician should begin definitive treatment. The first step is to provide a route to replace lost fluid and administer drugs. At the same time, a sample of blood should be obtained for cross matching, and hemoglobin, hematocrit and electrolyte determination.

FLUID REPLACEMENT

The immediate goal is to replace circulating blood volume. Saline solution, plasma or plasma expanders should be given as indicated until matched blood arrives.

VENOUS CATHETERIZATION

We who regularly treat shock victims have found that central venous catheterization is extremely useful in evaluating and managing the shock state. Utilizing the direct route provided by a venous catheter has a number of advantages:

1. In oligemic hypotension, decreased intravascular volume may make simple venipuncture awkward and time-consuming . . . and, because of vasospasm, infusion may be difficult.
2. Introduction of a catheter directly into the intracaval lumen facilitates rapid replacement of fluids - as well as rapid withdrawal of blood, when necessary.
3. Cardioactive drugs may be infused by catheter instead of by intracardiac injection through the chest wall. Vasoactive drugs and electrolytes can also be given effectively by this route.
4. Catheterization permits repeated monitoring of central venous pressure, now accepted as an important method of detecting changes in circulatory patterns. It also provides

an indication of the heart's ability to handle venous return.

CATHETERIZATION ROUTES

1. External jugular vein
2. Subclavian vein
3. Brachial vein
4. Saphenous vein

Catheters are available in precut lengths for easy insertion. Proper placement can be facilitated by measuring the catheter against the patient's body. It is also possible to advance the catheter until pulsation of the blood column shows that the right ventricle has been reached, and then pull back. Placement can be verified by x-ray.

Replacement fluids should be infused as rapidly as possible, using the central venous pressure as a guide. The amount of fluid required is often greater than the amount estimated to have been lost. If the clinical signs of shock persist, after the venous pressure has begun to rise, fluids should be given more cautiously. One way to do this is to administer aliquots of one hundred to two hundred milliliters over periods of ten minutes.

A central venous pressure rise of more than five centimeters during the period of a single infusion is an indication of critical limitation of cardiac reserve, and cardioactive medication - such as intravenous digitalis -

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may be required. However, if the central venous pressure rises by five centimeters or less and declines to within two centimeters of the initial value during a ten-minute period after the infusion is discontinued, repeated fluid challenge, using the same technique, is appropriate.

URINE OUTPUT'

After a venous catheter is in place and fluid replacement started, a urinary catheter should be inserted and the bladder drained. Urine output should be measured and samples screened for red and white blood cells and bacteria. If significant bacteriuria is present, the physician should administer an antibiotic immediately. Probably, the infection is due to a gram-negative organism. An appropriate antibiotic could be given parenterally in large doses until bacteriological data are complete. At the same time, a pharmacological dose of hydrocortisone or its synthetic equivalent adequate to protect the patient against the effects of bacterial endotoxins should be given.

Urine output should be measured continuously, because a deterioration in renal function could signal a failure in visceral circulation. Conversely, a step-up in urinary flow could indicate an improvement in tissue perfusion. If should is effectively reversed, urine output should increase to a rate of thirty milliliters or more per hour.

Even after the apparent signs of shock have been reversed and specific treatment of the cause has begun, continuous observation is still necessary - because shock tends to be a labile condition and can progress rapidly to death.

DRUG THERAPY

In the treatment of shock, blood replacement is more important than increasing blood pressure. As a result, the administration of vasoactive drugs should be considered only after blood volume has been restored.

In addition, management of the critically ill, depends on control of hypoxia and the acid-base balance. The use of one of the compact blood-gas analyzers now available will permit rapid measurement of oxygen, carbon dioxide tension and pH.

Generally, acidosis will reverse itself in the presence of adequate tissue perfusion. Alkalizing agents such as sodium bicarbonate solution should be given primarily to assist resuscitation in cases of intervening cardiac arrest.

SUMMARY

The physician treating shock must pursue an aggressive, orderly series of procedures.

1. Stop accessible hemorrhage by using a pressure dressing, by applying a tournique or by clamping off vessels.

2. Insure adequate ventilation, using an airway, an endotracheal tube, or by performing a tracheostomy if necessary. If ventilation is not adequate, positive-pressure or volume-control apparatus should be used.

3. Start rapid restoration of intravascular fluid volume immediately with saline solution, plasma or plasma expanders. When indicated, switch to whole blood as soon as a cross match can be made.

4. Use an intracaval catheter to measure central venous pressure and continue to observe changes in blood pressure, and peripheral skin temperature and color.

5. Catheterize the patient's bladder and check urinary output frequently for volume and specific gravity.

6. Maintain efforts to preserve normal cardiac function. Establish a continuous monitoring program. Take an electrocardiogram as soon as possible and repeat this procedure at regular intervals.

7. Decide on the pharmacological agents to be employed - electrolytes, vasoactive drugs, cardioactive agents, antibiotics, steroids, or other types of medication.

8. Take specific action against conditions which may have caused or complicated the shock state.

The successful recognition and management of shock presents an immediate and pressing challenge to the physician. This challenge can be met by alert, reasoned and aggressive management of the shock syndrome. By following the procedures outlined the physician can greatly reduce the possibility of death due to shock.