

# Collapse as a medical emergency

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WHILE THE TITLE of this short paper embraces a very wide field of medicine, I feel I must at the outset make it clear that the title should really read "Iatrogenic causes of collapse in medical practice". This immediately narrows the field to encompass the problem of the patient who collapses, faints or otherwise suffers an impairment of consciousness as a direct result of treatment administered by us as medical practitioners or by our agents. The problems which immediately present themselves must be faced and dealt with without delay whether this occurs in a hospital, nursing home, private clinic or on a domiciliary visit. I will conclude these opening remarks by presenting you with an unpleasant fact of life which should be uppermost in your minds throughout this article and in your daily practice. When it comes to medical mishaps, the difference between the hospital doctor and the private physician is that the former (to a great extent, at least) enjoys and is protected by corporative responsibility while the latter is solely

responsible for the results of his actions. As with the American President, in the immortal words of Harry S. Truman, "The buck stops here" — so with the private practitioner.

I do not think it is necessary to elaborate on a definition of collapse — when it happens it is only too obvious. But for the sake of completeness and in the light of what is to follow, let us include the whole spectrum from the subjective sensation of unease as felt by the patient to the ultimate, dramatic and sudden loss of consciousness which follows immediately upon medication administered by the physician.

Let us first deal with the possible causes of patients collapsing or threatening to do so after medication.

It is common experience that many patients complain of giddiness, or faintness, immediately after an injection, some even before the piston of the syringe is pushed home. This most often occurs

if the patient is standing or sitting and is commonest in adolescent males. It is unwise to give an injection to a patient other than in the lying position. Sooner or later, a nervous individual will topple over and injure himself in falling. This is a simple vaso-vagal syncope or faint. It is a wise precaution to insist on (especially new) patients lying down for any injection (other than vaccination) and resting for a few minutes before getting up. It is wise to ask the patients if they feel light-headed or giddy. It is better to ask them than to suffer the embarrassment of having the patient brought back to your office in a faint some minutes later. I stress this seemingly trivial point because injections are so commonplace (and in demand) in this country that we tend to take them lightly. If you miss a simple syncope and are presented with it some minutes later, you may mistakenly be alarmed into thinking that you have a case of allergic shock on your hands. In my personal experience, this is the commonest cause of faintness or collapse and it is the injection rather than the medication which causes it.

Next in frequency as a cause of faintness or collapse is the specific effect of a drug upon the central nervous system, the autonomic nervous system or the cardiovascular system. I am still not referring to the phenomenon of allergy, which will come later. While there are patients who will exhibit idiosyncrasy to common drugs (without previous warning) there are drugs which can be predicted to cause upset in even the most normal of subjects. Such drugs may cause sudden orthostatic hypotension, vagal stimulation or arrest, cardiac arrhythmias or arrest or autonomic nervous system disorder. These effects are due to their inherent pharmacological properties but may be more marked in certain individuals or certain diseased states. I will not attempt (nor is there time to do so) to elaborate beyond saying that it is axiomatic in therapeutics that the physician should know the properties of the drug he is using.

I will, however, with apologies if I give the impression of belabouring the point, mention a few drugs in common use which, while they are safe and desirable to use in certain indications, require a little forethought before giving parenterally.

**Largactil** in outpatient practice, if given by injection, can cause profound hypotension and prostration. What is disconcerting is that this may not come on for 15 to 30 minutes after the injection.

Likewise **Hydergine**, but in the case of this drug, the hypotensive phase is transitory and if the patient is made to lie supine for at least 15 minutes, there is no subsequent postural hypotension.

Parenteral **Quinine** can safely be given to an outpatient if he is kept supine for 10-15 minutes. I have given this drug by intra-muscular injection to well over a thousand patients without mishap, but they all had to rest for 10-15 minutes.

**Intravenous Calcium** is very commonly used in this country (even by the quacks!) and it is well to remember that cardiac arrest can result if the patient is taking digitalis — I know of patients taking digitalis preparations from unqualified persons and they may not volunteer this to the physician. Ask if they are taking any drugs for their heart before giving intravenous calcium.

I have four personal rules for intravenous therapy:

1. Only use it if there is no alternative.
2. Always use a disposable syringe (to avoid residues of possible allergens in a re-sterilised needle).
3. Insist on the patient lying supine for at least ten minutes.
4. Time the injection with a watch and stop at intervals to see if there are side effects.

Exercise extreme caution in the use of parenteral Chloroquine, especially in children. Chloroquine can cause sudden, fatal vasomotor collapse and cases are on record (Martindale). I personally know of two fatal collapses in young children within the past two years after intra-muscular Chloroquine and what makes it doubly tragic is that in neither case had the blood been examined for the malaria parasite.

In our second group, we spoke of collapse due to the pharmacological properties of the drug used and ill results possibly following neglect to bear these properties in mind but our last group is the one which is probably the most pertinent to our article — allergic collapse, including anaphylaxis.

I have probably strained your patience with what may have appeared a lengthy prologue or even an irrelevance. However, I do not think so. We must put allergy and allergic reactions in their proper perspective — they are but a part of the spectrum and not necessarily the most common but they are indeed the most frightening and, at times only, the most serious.

For the sake of brevity, we will classify allergic reactions as immediate, delayed and remote. We will only consider the first two here. In everyday practice, the substances we are most likely to use which cause allergy are the penicillins, some of the related compounds and the sulphonamides. The only common serum to cause trouble is Anti-Tetanus Serum (A.T.S.). There are others but not

## COLLAPSE AS MEDICAL EMERGENCY

in every day or casual use. One final substance is Vitamin B<sup>1</sup> or Thiamine. It is not always certain that the reaction to this substance (which can be suddenly fatal) is purely allergic or due to vasomotor collapse. In some cases of collapse after B Complex injection, it may be the nicotinic acid fraction which causes widespread vasodilation and collapse.

Having discussed the causes, let us now consider treatment. Treatment, of course, will depend on recognition of which phenomenon is taking place. Is it vaso-vagal syncope, is it vasomotor collapse or is it anaphylaxis immediate or delayed? It may appear sententious to restate a universal principle that prevention is better than cure but sententious or not, it is true.

If an injection is called for (leave aside A.T.S. and penicillin for the present) ask yourself is it essential? If you are dubious about the patient's tolerance of a specific substance or even the necessity of giving it parenterally, then suggest an injection is not necessary. If the patient insists upon an injection and your experience tells you that without the injection his faith in the rest of the procedures will be impaired, then give something that will do no harm, even some good, such as pure cyanocobalamin (B 12) or even an antihistamine. If you wish to use a specific drug which normally has no known side effects, find out how he responds to injections (i.e., is he nervous, does he get giddy?) and make him take it lying down. Use sharp, good needles. If there is a history of allergy, use disposable syringes. Be careful to aspirate before injecting to avoid injecting into a vein. When giving intravenous injections, always use disposable syringes, fresh phials (avoid multi-dose vials) and inject slowly. Make the patient lie supine for 10-15 minutes. However, if you wish to avoid trouble, the best way is not to look for it. Do not give injections which have a reputation for trouble and do not inject patients with a history of accident after previous injections. Do enquire closely as to a patient's history of allergies, asthma, urticaria and food intolerances. Such histories can be most significant.

Let us now deal briefly with the three major causes of catastrophe in medical (both hospital and private) practice, i.e. A.T.S., Penicillin and Vitamin B 1.

As to A.T.S. — there is always time to think before giving it. There is no emergency — except in cases of doctors far from hospitals. In any case, A.T.S. is given far too often for trivial reasons,

minor scratches and abrasions. If you **must** give it, do a careful skin test (0.02 cc.) intradermally. Wait a full half-hour and if no reaction, wait another full half-hour before releasing the patient.

I never give parenteral penicillin. I know of no emergency where penicillin must be given. It is still undoubtedly the most widely useful, cheap, effective and (statistically) safe antibiotic. I say statistically because the number of fatal reactions (immediate) which occur when compared with the, possibly, billions of injections which have been given, are infinitesimally small. But such statistics are of little consolation to you or to the relatives if a fatal reaction takes place. One penicillin injection can hardly be life saving today, (with so many available alternative antibiotics) so why take the risk? If you feel he needs a course of penicillin injections, send him to the hospital for a sensitivity test and treatment. Please remember that while a coroner may be most particular in ascertaining whether a skin test was performed and a **suitable time limit allowed to pass** to ascertain a positive or negative reaction, these tests are often not only invalid but people have died in anaphylaxis after a single drop of penicillin has been installed into the conjunctiva to detect allergy. If you must use penicillin injections in private practice, at least cover yourself by the skin test and at least half an hour to read the result. My advice is: do not use penicillin injections in private practice. People in hospital may smile at this caution but remember when a patient in the hospital is ordered a penicillin test and injection, it passes down the chain of command and if there is a reaction, the corporate responsibility comes into force and the, truly, regrettable incident is forgotten in the mass of patients which pass through the hospital. If it happens in your office, it will be remembered for a long time that Dr. X killed a patient with an injection. Sad but true.

The only serious and near fatal reactions to injection that I have had in nearly 20 years have all been due to Vitamin B. I know of others less fortunate. Again, like penicillin, it is used in vast quantities without ill effects, but if you wish to avoid trouble be wary of it. There is an almost superstitious regard in this country for the properties of Vitamin B complex, both on the part of the laity and the profession. I feel much of it is due to the rapid beneficial effect in patients suffering from malnutrition immediately after the Pacific War. Patients speak of Vitamin B complex the way they still speak, in the kampongs at least, of M & B — the cure of all illness.

### Treatment

Treatment depends on recognition of the condition. The vaso-vagal syncope, often quite profound, is recognised by the sudden pallor of the patient, coldness of the extremities, bradycardia (sometimes tachycardia), light sweating and the quite literal swooning away. Put the patient flat on his back, no pillow, raise his legs (knees straight) at right angles to his body. He usually recovers fast but may feel giddy for some time if he gets up. No other treatment is usually necessary. This pallor and giddiness may persist for one hour.

Hypotension from vaso depressor drugs will usually respond to the same treatment but if the effect is profound longer supination is required. If the blood pressure does not quickly return to at least 100 mm. systolic, a parenteral injection of Aramine may be required.

Vasomotor collapse from drugs of the Vitamin B Group, Amidopyrine, or too rapid injection of parenteral iron is characterised by profound collapse, loss of pulse, greenish pallor, and literally drenching sweat which forms pools of water on the floor, air hunger and, may be, incontinence of urine and faeces. This is a real emergency which requires rapid treatment. First, as always, put the patient flat with the head low, if possible. Raise the feet to a right angle with the body (have an assistant keep the legs in this position). See the air way is clear. Listen for a heart beat. It may be very faint. If you have oxygen, give it preferably with a resuscitator (failing this, give mouth-to-mouth respiration if the respiration is failing). If you can get a vein, give intravenous hydrocortisone or dexamethasone. Follow this with Aramine. If you cannot get a vein, do not waste time but give Aramine and Dexamethasone into the trapezius muscle over the shoulder where the central circulation is more likely to be still active. These measures usually work. I would stress in most cases the manoeuvre of supinating the patient with the legs held high is the most immediate, important and practical. Above all in such cases (including allergy to follow), do not resort to bundling the patient into a car or an ambulance. In such dire emergencies, he is going to be saved by you or not at all. If immediate response is not rapid, treat, as in the following emergency, i.e. anaphylaxis.

### Anaphylaxis and the Anaphylactoid Reactions

**Anaphylaxis** is an acute, often explosive, systemic reaction occurring in a previously sensitised person after receiving foreign serum, certain drugs or diagnostic agents, desensitising injections, or insect stings.

**Anaphylactoid Reactions** are clinically similar to anaphylaxis, but can occur after the first injection of certain drugs (histamine, polymixin, stilbamidine, contrast media and Vitamin B<sub>1</sub> and some of the amidopyrine derivatives).

### What happens in Anaphylaxis?

1. Sudden decrease in effective plasma volume due to acute vasodilatation and escape of plasma into the tissues.
2. Fluid escapes into the pulmonary alveoli and may produce pulmonary oedema.
3. There may be obstructive angio oedema of the upper air ways.
4. In a prolonged reaction, myocarditis may occur. (Death in such cases is due to cardiac arrest or ventricular tachycardia — the moral is swift treatment to prevent this stage being reached.)

### Symptoms and Signs of an Anaphylactic Reaction

1. The symptoms may come on between one to 15 minutes.
2. The patient complains of generalised discomfort, is agitated and becomes flushed.
3. Palpitations, parasthesiae, throbbing head and ears, pruritus, tingling sensation, tight chest, coughing, sneezing and dyspnea are common complaints.
4. Within one or two minutes, the full blown picture of shock may be present.
5. At this stage, the patient may be incontinent and have convulsions.
6. The next stage is lack of response.
7. Death.

All of these stages are very rapid and if you have not taken vigorous action by at least stage '5', you are probably too late.

### Diagnosis

The diagnosis must be made before shock develops (i.e. when a patient has any reaction to a drug always **anticipate** Anaphylaxis). First and foremost, the patient with anaphylaxis is **flushed** and has a **rapid** pulse in contrast to the patient with vaso-vagal syncope who develops pallor and bradycardia.

### Treatment

A rapid diagnosis and early treatment increase the chances of preventing shock developing. If the reaction is apparently mild, give Adrenaline 0.3 ml. by subcutaneous injection. (It is understood that the patient is always put lying flat, legs raised, clear air way). Mild or not, prepare for the worst! Have 0.5 ml. of Adrenaline loaded and mixed with

## COLLAPSE AS MEDICAL EMERGENCY

10 ml. of normal saline, ready for intravenous (slow) injection, if necessary. Have a saline transfusion ready for use, Metaraminol and Dexamethasone available for rapid loading and injection and, if possible, oxygen and an air way.

Now here is the crux of the matter. Apart from possible oedema of the air way, what is going to kill your patient is shock. **Do not let it develop.**

If the immediate measures of supination, elevation of the legs and subcutaneous Adrenaline do not produce **immediate improvement** (or if the reaction is severe from the outset or if the reaction took place after the patient has left the office and is already in shock when you see him) then treat for shock.

While an assistant is rapidly assembling the saline transfusion, give Adrenaline 0.5 ml. in 10 cc. normal saline **intravenously**, slowly. Follow or accompany this by setting up a rapid inflow of saline (or a volume expander such as Haemaccel). The best treatment of shock is rapid fluid replacement — saline can be quite adequate for if the venous pressure is rapidly restored, then cardiac output and arterial pressure will rise at the same time. Do not rely on pressor drugs alone to raise the blood pressure for without a rapid replacement of fluid at the same time, you are literally flogging a dead horse. Give the pressor substance **with** the fluid replacement, i.e., slow injection of Metaraminol (Aramine) 0.5 mg. to 5 mg.

There are those who question the value of intravenous corticosteroid in the critical first few minutes. However, provided their use does not delay other immediate and essential treatment (above), they should be used as they do no harm and possibly shorten the total duration of the reaction. Use Hydrocortisone succinate 200 mg. or Dexamethasone 8 mg. by intravenous injection.

Once the pressure has returned to normal, the crisis is usually over but as there may be delayed

reactions to come, it is better to put the patient in hospital.

Now all the above measures are eminently practicable in any doctor's office but as this emergency leaves no time for searching for your resuscitating materials, have them at hand always. If you have not done so yet, do so first thing tomorrow.

The emergency tray or trolley should have the following:—

1. Disposable sterile syringes, 2 cc., 5 cc., 10 cc.
2. Adrenaline ampoules (1 in a 1000 strength.)
3. A plastic, disposable transfusion set of normal saline or glucose saline.
4. A similar set of a volume expander, such as Haemaccel.
5. Ampoules of Aramine.
6. Ampoules of Dexamethasone or Hydrocortisone.
7. Ampoules of Antihistamine.
8. An air way.

I would add that I believe every doctor should have oxygen equipment standing at the ready in the consultation room. For rapid emergency treatment, a "minuteman" resuscitator, which will breathe for the patient, is ideal.

Apart from the oxygen equipment, all the above are inexpensive items — their value lies in the speed with which they are used and their ready availability to hand in an emergency.

To conclude, it is useful (in fact, essential) to train the more reliable members of your staff in how to act in such an emergency by several "mock" emergencies. Train the staff to recognise the incipient collapse, to supinate the patient while rapidly alerting you or a colleague. Drop everything to attend to this emergency. Be tolerant of false alarms for if a nervous employee calls wolf too often, it will not be he or she who is bitten but the patient (and therefore you yourself).

### References

Martindale (1967) Extra Pharmacopoeia. P. 316.

### Suggested for Emergency Tray:

1. **Aramine** (Merck Sharp & Dohme) Metaraminol bitartrate 10 mg./cc.
2. **Oradexon** (Organon) Dexamethasone Sodium Phosphate, 5 mg./cc. or **Decadron** (Merck Sharp & Dohme) Dexamethasone Sodium Phosphate, 4 mg./1 cc. (2 cc. vial).

3. **Solu-Cortef** (Upjohn) Hydrocortisone Sodium Hemisuccinate, 100 mg. in mix-o-vial for instant intravenous use.
4. **Haemaccel** (Hoechst Malaysia) Plasma volume substitute. 500 ml. in disposable infusion set.
5. **Steriflex** No. 3 or No. 6 (Allan & Hanburys) Sodium Chloride and Dextrose or Dextrose 5% in disposable plastic infusion set.
6. **"Minuteman"** Resuscitator — Malayan Oxygen Ltd.