DRUGS AND OBSTETRIC SHOCK

by

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Eastman (1955) defines "Obstetric shock" simply as shock which is too great to be explained by blood loss. Some of the modern potent drugs used for a number of conditions in pregnant women are attended with the potential risk of being factors of obstetric shock. Drugs used for effective control of hypertension in pregnancy have handicapped the obstetric surgeons and the anaesthetists, by producing sudden hypotension after stress of labour or anaesthesia. Obstetricians and anaesthesiologists demanded a smooth induction of anaesthesia for obstetric surgery. The latest anaesthetic like Fluothane or Cyclopropane, while satisfying the above ideal, have themselves produced a shock syndrome in quite a number of cases. The steroids used for a variety of conditions have introduced the imperative enquiry of their prior administration in women under labour or undergoing operative manipulations. To reduce the hazards of prematurity due to irritable uterus (inducing premature onset of labour), drugs like chlorpromazine or isoxsuprine have been used with success but a dangerous drop of blood pressure in some cases has outweighed the advantages in them.

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Hypotensive Drugs Used in Hypertensive Conditions of Pregnancy

While the duration of action of most antihypertensive drugs is short, greatest care has to be exercised with the thiazide derivatives, the rauwolfia compounds (reserpine and so on) and guanethidine ("ismelin"), than with others. The thiazide derivatives (chlorthiazide) decrease the vasomotor response to adrenaline and noradrenaline, and exert a depressant action on the peripheral vascular system (Prezios et al, 1959). This is thought to be due to changes in sodium and potassium concentration in the peripheral vascular wall and in the serum (Crandell, 1962). Hazards of anaesthesia and prolonged stress of labour are increased by these electrolyte changes.

Reserpine (serpasil) depletes the catecholamine stores both centrally from hypothalamic centres and peripherally from the postganglionic sympathetic nerve endings; and these stores take from 10 to 14 days to be replenished. Because of this, there may be alarming fall in blood pressure during anaesthesia or the strain of labour. For this reason, the drug should be withdrawn two weeks before the expected date of delivery or any proposed operation. Drugs such

as Brethylum tosylate ("Darenthin") and Guanethidine sulphate ("Ismelin"), which selectively block adrenergic transmission, although better than ganglion-blocking drugs (Vegolysin or Ansolysin or Mecamylamine, "Mevasine") produce marked postural hypotension. Inactivation of the peripheral sympathetic nervous system may persist for 5 to 7 days after the withdrawal of guanethidine (Crandell, 1962).

A few eclamptic patients under chlorpromazine (largactil), promethazine (phenergan) and pethidine regime of treatment suddenly develop hypotension and features of shock (personal observation). Chlorpromazine is also attended with the possibility of producing excessive fall of blood pressure when used to control post-operative shivering particularly after the use of halothane.

Since several of the antihypertensive drugs cause an increase in cardiac vagal tone, adequate atropinization is essential before these patients are anaesthetised. Special care is also necessary in employing controlled respiration in patients who have had antihypertensive drugs. The risk of hypoglycaemia is increased by the administration of drugs which block the sympathetic nervous system (Crandell, 1962).

Analgesics and Anaesthetics

Pethidine extensively used as an analgesic in labour, inadvertently injected into vein, has been known to produce profound peripheral vascular collapse or shock due probably to liberation of histamine.

Deep ether anaesthesia during labour produces atony of the uterus, and is a potent cause of post-partum haemorrhage and shock; if given for a prolonged period this is supposed to open the pre-capillary sphincter and favour the stagnation of circulatory blood volume in the vast capillary lake, leading to reduction of effective circulatory blood volume.

Cyclopropane is capable of producing analgesia in 3 to 4 per cent concentration. Anaesthesia is maintained with a mixture of 10 to 20 per cent cyclopropane with oxygen with minimum metabolic upset. With its advantages in inducing rapid anaesthesia and in being ideal for the foetus because of the allowance of high concentration of oxygen, cyclopropane has the disadvantage of producing cardiac arrythmias and shock in excitable patients presumably due to the sensitization of myocardium to epinephrine and many other factors. The post-operative cyclopropane shock syndrome may be easily mistaken for true secondary shock. The differentiating points are absence of tachycardia and the state of relative well-being in cyclopropane cases. There is some evidence that the post-anaesthetic shock is due to abrupt reduction of this abnormally high carbon dioxide tension produced during anaesthesia due to inadequate ventilation. As safeguards against hypotension, many use small amount of ether towards the end of anaesthesia and gradually replace the high oxygen concentration by air (in the closed system) before discontinuing the anaesthesia (Beckman 1963); also adequate pulmonary ventilation must be maintained by assisted respiration to eliminate carbon dioxide. Administration of nitrous oxide and

sufficient oxygen with intermittent injection of pethidine and muscle relaxant along with controlled or assisted respiration reduces post-operative shock to a great extent.

Halothane (Fluothane) in spite of its ability to induce smooth and rapid anaesthesia, and to permit a much quicker recovery, may produce hypotension. This drug causes reduction in cardiac output, lowering of arterial pressure and of stroke volume due primarily to myocardial depression (Severinghaus and Cullen, 1958). In addition to these pharmacological actions, it has been observed that unless halothane is administered in low concentrations which are rigidly controlled (Affert et al., 1959; Russel, 1958), an unusually high incidence of uterine flaccidity with concomitant serious uterine bleeding can result (Embrey et al., 1958, Russel, 1958).

Steroids

The recent introduction of hydrocortisone and allied drugs in the treatment of rheumatic, allergic, and skin conditions in pregnant women has exposed the parturients, in labour or under anaesthesia or during operation, to the risk of sudden shock if the steroid is suddenly withdrawn. This is because of the depression of the anterior pituitary by the prolonged administration of the drug resulting in a period of adrenocortical inactivity after sudden cessation of therapy with these agents. Hypopotassaemia under steroid therapy (unless corrected) may be an associated factor. To prevent such occurrence during anaesthesia or labour, the drug should gradually be withdrawn long before the expected labour, or operation. Shock in these conditions is effectively controlled by intravenous administration of hydrocortisone.

Inhibition of Premature Labour by Isox-suprine (Duvadilan)

Isox-suprine has been used with fair percentage of success in preventing premature onset of labour because of its inhibitory action on the smooth muscle of the uterus (Bishop and Wourterz, 1961, Karim, 1963). Lish et al (1960) demonstrated that the effective inhibitory action on uterine activity was independent of the hormonal status of the uterus; and postulated that isox-suprine acts primarily by activating the beta-adrenergic receptors of the muscle cells in laboratory animals.

The drug, when used in the intravenous drip at a rate of 500 microgram per minute or more, produced serious hypotensive effect (Beckman 1963). Karim (1963), using this drug by intramuscular and intravenous injections in 10 milligram every 3 hours for 3 injections, got a drop of blood pressure in 35 per cent of cases when administered intravenously. This is also the personal observation of the author when used to prevent the onset of premature labour (in 5 out of 12 cases — vide table). Given by intramuscular injection, the drop was not marked and the blood pressure came to normal level in one to one and half hour (Karim, 1963).

Oxytocics

Pituitrin is, of course, not used at present as an oxytocic, because of the availability of better oxytocics like oxytocin. As Pitocin and Syntocinon

TABLE I

"Drugs and Obstetric Shock"—B.N.B. (B.S.M.C.H.)

Drugs	Total number of cases	Route of administration	Indication for the use of the drugs	Number of cases of shock and reasons	Treatment adopted for shock	Result
CHLORPROMAZINE .. (along with promethazine and pethidine)	43	Intramuscular injection (intermittent)	Treatment of eclampsia.	3 (severe hypotension).	Withdrawal of the drug (from the treatment of eclampsia).	All cured
RESERPINE	56	Oral (for 3 to 4 weeks preceding labour)	Pre-eclampsia.	(i) 4 cases after stress of normal labour. (ii) 5 cases after operative delivery (forceps).	(i) Nor-adrenaline drip (2 ml in 540 ml of 5 per cent glucose) in shock after normal labour (ii) Nor-adrenaline drip in the above dose with hydrocortisone hemisuccinate for the five Forceps cases.	Lowered blood pressure came to normal level after infusion with one bottle and sustained level of blood pressure reached by 6 to 10 hours
STEROID .. .. (Prednisolone)	3	Oral (long continued)	(i) Rheumatoid arthritis—2 cases (ii) Asthma—1 case.	All 3 cases after stress of labour.	Hydrocortisone hemisuccinate in 5 per cent glucose drip.	All cured
ISOX-SUPRINE* ..	12	Intramuscular injection (intermittent) 10 mgm every 3 hours for 3 injections	To prevent premature labour.	5 cases (mild type of shock).	Simple withdrawal of drug.	Temporary hypotension-blood pressure normal within half to one hour after withdrawal.

* Private cases.

are comparatively free from vasopressic principle, their use is less likely to be associated with shock syndrome. Pituitrin produces coronary spasm, particularly in anaemic subjects, leading to sudden shock.

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References

1. Albert, C. A., Anderson, G., Wallace, W., Henley, C. E., Winshed, A. W. and Albert, S. N.: Obst. & Gynec. **13:** 282, 1959.
2. Beckman, Harry: Pharmacology, The Nature, Action and Use of Drugs, ed. 2., Philadelphia and London, p. 349-350, 1963, W. B. Saunders Company.
3. Bishop, H. and Wouterz, B.: J. Am. Med. Ass. **178:** 812, 1961.
4. Crandell, D. L.: J. Am. Med. Ass. **179:** 495, 1962.
5. Eastman, N. J.: Editorial Comment. Obst. & Gynec. Survey. **10:** 685, 1955.
6. Embrey, M. P., Garret, W. L. and Pryer, D. L.: Lancet. **2:** 1093, 1958.
7. Karim, M.: J. Obst. & Gynec. Brit. Comm. **70:** 992, 1963.
8. Lish, P. N., Dungan, K. W. and Peters, E. L.: J. Pharmacol. Exp. Ther. **129:** 191, 1960.
9. Preziosi, P., Biandi, A., Loscalzo, B. and de Schozepdryer, A. F.: Arch Internat Pharmadyn. **118:** 467, 1959.
10. Russel, J. T.: Anaesthesia. **13:** 241, 1958.
11. Severinghaus, J. W. and Cullen, S. C.: Anaesthesiology. **19:** 165, 1958.