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OBSTETRICAL MANAGEMENT OF THE PREGNANT CARDIAC PATIENT

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The gradual ebb of toxemia, infection, and subsequently hemorrhage, as the predominant causes of maternal mortality has placed cardiac disease in a prominent position. It accounts for about 25% of maternal mortality. Further decrease of this mortality rate depends upon present and future clarification of normal and abnormal cardiovascular and respiratory physiology during pregnancy. Such knowledge makes successful management of both the pregnancy and cardiac disease more feasible with the outcome a dual reward of a living mother and a healthy child.

The make-up of an obstetrical clinic's cardiac population differs from area to area, but in general averages 80 to 85% rheumatic heart disease with the sole or predominant lesion mitral stenosis in 70%. The remainder consists of congenital cardiac defects such as patent ductus arteriosus, coarctation of the aorta, tetralogy of Fallot etc., the rarer acquired cardiac diseases as luetic, thyrotoxic, and hypertensive cardiovascular disease, myocardial insufficiency and coronary occlusion.

PHYSIOLOGY:

Striking changes are evident in many organ systems during pregnancy designed to accommodate both maternal and fetal metabolic needs. Although much valuable investigative work has been done in this field, it remains a fertile area for additional clinical research.

Changes in the cardiovascular system are predictable and measurable, and in many ways, resemble an arteriovenous shunt. The cardiac output, heart rate, and blood volume increase during normal pregnancy becoming significantly elevated in the second trimester and reach a peak six to eight weeks before term. Thereafter they drop gradually with the optimal levels at term, thereby providing an additional cardiac reserve for stresses of parturition. Cardiac output at its peak increases 30 to 50%. Oxygen consumption increases somewhat less, approximately 20%, reaching its highest four to six weeks before term. The red cell mass increases steadily, but proportionately less than plasma volume, resulting in decreased hemoglobin and hematocrit levels which are most depressed at the peak of the cardiovascular load. Total body fluid increases steadily to term.

Pulmonary changes are likewise significant. The increased ventilation of the pulmonary tree facilitates excretion of fetal and maternal metabolic wastes, particularly carbon dioxide. The vital capacity generally increases, but most important, does not decrease during pregnancy. This occurs despite a presumed interference with respiration by the enlarging abdominal tumor. Many feel this test is particularly useful in detecting early edema and insipient cardiac failure before other clinical signs become evident.

During labor, oxygen consumption, heart rate, and cardiac output increase somewhat proportionately to the severity and number of uterine contractions. The

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Valsalva Maneuver comes into play during the "bearing down" and expulsive phases of the second stage, but cardiac output itself does not increase concomitantly.

Delivery causes a sudden change in hemodynamics. The release of pressure obstructing the return of venous blood from the legs, as well as the release of upwards of 500 cc. of blood from the uterine veins and sinuses into the general circulation may effect a sudden heavy burden upon the heart.

Following an immediate partial readjustment within 24 hours after delivery, there is a gradual return to the "normal" non-pregnant status, which is generally complete by four to six weeks.

These alterations in pregnancy, labor, and delivery, are usually well tolerated by the healthy patient, but not so by the patient with mitral stenosis. In this condition, the stenotic mitral valve impedes left ventricular filling during diastole. The pressure in the left atrium is secondarily increased with retrograde extension of this pressure into the pulmonary venous and capillary beds. Thus the additional load as imposed by a normal pregnancy with increases of heart rate, cardiac output, or total circulatory blood volume can further accentuate this defect, and automatically places the patient with mitral stenosis closer to pulmonary edema and failure. If, in addition, other stresses are added that shorten diastole or increase these cardiovascular changes, an already dangerous situation may be compounded with fatal outcome for the mother and the fetus.

DIAGNOSIS AND CLASSIFICATION:

Approximately 3 to 4% of an obstetrical clinic's population will have significant cardiac disease. About half of these will be unaware of any cardiac problem. This emphasizes the importance of the initial history and physical examination that is performed by the obstetrician. Both definite and potential disease must be evaluated by the cardiologist. Joint cooperation between the obstetrical and medical departments has been shown to improve dramatically the maternal and fetal salvage.

Cardiac evaluation and diagnosis must be established. Early evaluation will generally indicate which patients may transcend pregnancy satisfactorily, which may not, and those who are liable to difficulties. Such procedures as cardiac catheterization, chest x-ray, and fluoroscopy should be done where indicated regardless of the duration of gestation. The resulting functional and organic disease classification will determine, in effect, the care and stringency to be followed by both patient and physician. Functional capacity is, in general, the most important clinical guide to prognosis during pregnancy.

MANAGEMENT:

Careful present day medical management can carry most patients with mitral stenosis through pregnancy successfully. Sterilization is seldom indicated or advocated in pure mitral stenosis. If interruption becomes necessary, the earlier the procedure is done the less the risk to the patient. Cardiac surgery has been shown to be preferred when feasible over interruption. The status of the stenotic valves and the change of function following mitral commissurotomy offer a guide to imme-

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diate prognosis. When possible, mitral commissurotomy should be performed between pregnancies.

Each case of mitral stenosis must be individualized both as to diagnosis and management, though general principles do apply. In most of these patients, it is the pregnancy, and not the labor and delivery that decides the fate of the patient. The cardiac patient with minimal disease and minimal functional impairment needs little aid beyond adequate counseling, routine prenatal visits, and the usual cardiac evaluation. Those with significant disease with either minimal or severe functional impairment will require frequent visits to the obstetrician and cardiologist as well as intensive counseling as regards medical and personal care, and family management during the pregnancy.

Primarily, attention is directed towards control of the blood volume, cardiac rate and output, as these effect directly the incidence of cardiac decompensation. A past history of cardiac failure may predispose the patient to more difficulty during the ensuing pregnancy, but regardless of previous history, failure can occur in any patient at any time during pregnancy. The greatest hazzard occurs approximately eight to ten weeks prior to term and immediately following delivery.

The cardiac reserve must be maintained, not necessarily at the optimal condition, but with a sufficient margin for safety. The patient's family responsibility including physical and emotional stresses must be minimized. To help attain this, aid may be obtained through the patient's family, Nursing or Social Services, and Cardiac Rehabilitation Centers.

Specific measures include dietary restrictions. Limitation of salt both in diet and in medication is the most potent tool for control of blood volume and edema. Diuretics also aid in their control. Adequate protein intake helps maintain the proper homeostatic and osmotic balance. Excessive weight gain must be avoided.

Rest is of prime importance. The patient should receive adequate nocturnal rest, and this may be accomplished with sedatives if necessary. Additional rest periods are indicated by her daily activities. Total bed rest may be necessary in some cases during the entire pregnancy.

Infections and anemia must be treated vigorously. Respiratory infections and severe anemia necessitate hospitalization for their active control as they may precipitate acute cardiac failure. Parenteral iron or transfusions with whole blood or packed cells must be resorted to when oral iron is ineffective. Decompensation during pregnancy is treated essentially as in the non-pregnant patient.

Admission to the hospital at 37 to 38 weeks of pregnancy may be valuable for rest and evaluation prior to delivery. Elective induction of labor is generally contraindicated as the optimal time for cardiac function and peak reserve is not reached until term. Should premature rupture of the membranes occur at term, Pitocin induction may be initiated after a preliminary rest period. Labor should be permitted to progress normally, but the second stage should be shortened by the judicious use of forceps. The use of analgesics as Demerol, and sedatives may be used in moderation, but Scopolamine and other antispasmodic stimulants must be used sparingly and in

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minimal doses, because of their effect upon the pulse rate. Pudendal block, caudal, and ether anesthesia are listed in order of preference. Excessive blood loss and shock must be prevented. Parenteral fluids and blood must be given cautiously.

Placing the legs in stirrups prior to delivery decreases a portion of the sudden flooding of the cardiovascular system. Should cesarean section be done, rotating tourniquets to three of the four extremities may permit more gradual readjustment of the circulating blood volume. The postpartum stay should be of sufficient duration to guard against complications of infection, anemia etc. During this period of time, the patient can be given further instructions as regards to care of her newborn infant, household duties and convalescence. Nursing is generally contraindicated in the severe cardiac.

Once convalescence has occurred, pregnancy does not seem to accelerate the course of heart disease.

CONCLUSIONS:

1. Present day management of the patient with mitral stenosis generally permits satisfactory conduct and termination of pregnancy.
2. Early evaluation is necessary to determine the course to be followed, i. e., interruption, sterilization, or cardiac surgery. Sterilization for mitral stenosis now is seldom indicated.
3. Functional capacity is in general the most important clinical guide to prognosis during pregnancy.
4. Decompensation during pregnancy is essentially treated as in the non-pregnant patient.
5. Pregnancy is best terminated by labor and elective forceps delivery. Cesarean section is utilized only for obstetrical reasons.

BIBLIOGRAPHY

- Adams, J. Q.: Cardiovascular physiology in normal pregnancy; studies with dye dilution technique, *Am. J. Obst. & Gynec.* 67:741, 1954.
- Bergman, P., and Sjöstedt, S.: Heart disease in pregnancy, *Acta obst. et gynec. scand.* 33:117, 1954.
- Buck, I. M.: Rheumatic heart disease in pregnancy; recent concepts, *Bull. Margaret Hague Matern. Hosp.* 9:127, 1956.
- Burwell, C. S.: Special problem of rheumatic heart disease in pregnant women, *J.A.M.A.* 166:153, 1958.
- Burwell, C. S., and Metcalf, J.: *Heart Disease and Pregnancy.* Boston, Little, Brown, 1958.
- Glover, R. P., McDowell, D. E., O'Neill, T. J. E., and Janton, O. H.: Mitral commissurotomy in relation to pregnancy, *J.A.M.A.* 158:895, 1955.
- Gorenberg, H.: Rheumatic heart disease in pregnancy, *J.M. Soc. New Jersey* 53:58, 1956.
- Gorenberg, H., and Chesley, L. C.: Rheumatic heart disease in pregnancy; remote prognosis in patient with "functionally severe" disease, *Am. J. Obst. & Gynec.* 68:1151, 1954.
- Guttmacher, A.: Heart disease in pregnancy; an obstetrical viewpoint, *Am. Pract. & Digest Treat.* 6:1475, 1955.
- Hendricks, C. H., and Quilligan, E. J.: Cardiac output during labor, *S. Forum* 6:455, 1955.
- Igná, E. J., Detrick, M. F., Lam, C. R., Keyes, J. W., and Hodgkinson, C. P.: Pregnancy and cardiac operations, *Am. J. Obst. & Gynec.* 71:1024, 1956.
- Mendelson, C. L.: Disorders of heartbeat during pregnancy, *Am. J. Obst. & Gynec.* 72:1268, 1956.
- Mendelson, C. L.: Heart disease in pregnancy, *S. Clin. North America* 37:321, 1957.
- Rose, D. J., Bader, M. E., Bader, R. A., and Braunwald, E.: Catheterization studies of cardiac hemodynamics in normal pregnant women with reference to left ventricular work, *Am. J. Obst. & Gynec.* 72:233, 1956.
- Shannahan, W. R., Romney, S. L., and Currens, J. H.: Coarctation of aorta and pregnancy; report of ten cases with twenty-four pregnancies, *J.A.M.A.* 167:275, 1958.