
Communications

Hypoplastic Left Heart Syndrome

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Hypoplastic left heart syndrome is one of the common causes of mortality in infants with congenital heart disease, accounting for approximately 22 percent of infant deaths from congenital heart disease in the neonatal period.¹ The syndrome is probably more common than realized, since the majority of the infants with this syndrome die within the first week of life, sometimes without definitive diagnosis. This report describes a documented case in a newborn male infant, demonstrating how the diagnosis can be made and confirmed at the bedside using echocardiography and a flush aortogram.

Case Report

A 5-lb, 8-oz male term infant was born to a 21-year-old gravida 2, para 1 white woman under saddle block anesthesia. The mother's prenatal course and birth history were normal. The baby was delivered from a left occiput anterior position with an Apgar of 9 at one and five minutes. Bulb suction was used for resuscitation. On examination the baby was found to have a cleft of the soft palate. There were no other apparent abnormalities. The cardiovascular examination was normal. The following morning a grade 1 to 2 systolic murmur was heard over the left precordium. The baby was pink and comfortable in room air. The liver was 2 cm below the right costal margin. At

approximately 38 hours of age the baby was re-examined and found to have a respiratory rate of 40/min and a heart rate of 130 beats/min. The liver was felt to be 3.5 cm below the right costal margin, and a chest film was obtained. As a result of the enlargement of the heart and the increase in pulmonary vascularity, the baby was transferred to Kosair-Children's Hospital Tertiary Care Nursery for evaluation and treatment. Upon arrival the baby was observed to be slightly tachypneic with a heart rate of 150 beats/min. The liver was noted to be 5 cm below the right costal margin. The patient was diagnosed as being in congestive heart failure, and he was digitalized using digoxin (Lanoxin) at 0.04 mg/kg as the total daily dose. He was also given a dose of furosemide (Lasix) at 1 mg/kg by intravenous route. At approximately 52 hours of age the patient was seen by the pediatric cardiologist. Upon examination the baby was observed to be in mild cardiorespiratory distress with no overt cyanosis. The first heart sound was normal. The second heart sound was loud and single at the upper left sternal border. The liver was 5 cm below the right costal margin. The peripheral pulses in the upper extremities were very feeble, and the pulses in the lower extremities were not palpated. The electrocardiogram revealed a heart rate of 150 beats/min and an abnormal frontal axis of +35°. The baby was clinically judged to have severe left ventricular outflow tract obstruction. An echocardiogram showed an absence of the mitral and aortic valves with severely hypoplastic ascending aorta (Figure 1) and left ventricular cavity. The echocardiographic diagnosis of hypoplastic left

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ALDOMET® (Methyldopa|MSD)

Tablets, containing 125, 250, or 500 mg methyldopa; Oral Suspension, containing 250 mg methyldopa per 5 ml and alcohol 1%.

Contraindications: Active hepatic disease, such as acute hepatitis and active cirrhosis; if previous methyldopa therapy has been associated with liver disorders (see Warnings); hypersensitivity.

Warnings: It is important to recognize that a positive Coombs test, hemolytic anemia, and liver disorders may occur with methyldopa therapy. The rare occurrences of hemolytic anemia or liver disorders could lead to potentially fatal complications unless properly recognized and managed. Read this section carefully to understand these reactions. With prolonged methyldopa therapy, 10% to 20% of patients develop a positive direct Coombs test, usually between 6 and 12 months of therapy. Lowest incidence is at daily dosage of 1 g or less. This on rare occasions may be associated with hemolytic anemia, which could lead to potentially fatal complications. One cannot predict which patients with a positive direct Coombs test may develop hemolytic anemia. Prior existence or development of a positive direct Coombs test is not in itself a contraindication to use of methyldopa. If a positive Coombs test develops during methyldopa therapy, determine whether hemolytic anemia exists and whether the positive Coombs test may be a problem. For example, in addition to a positive direct Coombs test there is less often a positive indirect Coombs test which may interfere with cross matching of blood. At the start of methyldopa therapy, it is desirable to do a blood count (hematocrit, hemoglobin, or red cell count) for a baseline or to establish whether there is anemia. Periodic blood counts should be done during therapy to detect hemolytic anemia. It may be useful to do a direct Coombs test before therapy and at 6 and 12 months after the start of therapy. If Coombs-positive hemolytic anemia occurs, the cause may be methyldopa and the drug should be discontinued. Usually the anemia remits promptly. If not, corticosteroids may be given and other causes of anemia should be considered. If the hemolytic anemia is related to methyldopa, the drug should not be reinstituted. When methyldopa causes Coombs positivity alone or with hemolytic anemia, the red cell is usually coated with gamma globulin of the IgG (gamma G) class only. The positive Coombs test may not revert to normal until weeks to months after methyldopa is stopped.

Should the need for transfusion arise in a patient receiving methyldopa, both a direct and an indirect Coombs test should be performed on his blood. In the absence of hemolytic anemia, usually only the direct Coombs test will be positive. A positive direct Coombs test alone will not interfere with typing or cross matching. If the indirect Coombs test is also positive, problems may arise in the major cross match and the assistance of a hematologist or transfusion expert will be needed.

Fever has occurred within first 3 weeks of therapy, occasionally with eosinophilia or abnormalities in liver function tests, such as serum alkaline phosphatase, serum transaminases (SGOT, SGPT), bilirubin, cephalin cholesterol flocculation, prothrombin time, and bromsulphalein retention. Jaundice, with or without fever, may occur, with onset usually in the first 2 to 3 months of therapy. In some patients the findings are consistent with those of cholestasis. Rarely fatal hepatic necrosis has been reported. These hepatic changes may represent hypersensitivity reactions; periodic determination of hepatic function should be done particularly during the first 6 to 12 weeks of therapy or whenever an unexplained fever occurs. If fever and abnormalities in liver function tests or jaundice appear, stop therapy with methyldopa. If caused by methyldopa, the temperature and abnormalities in liver function characteristically have reverted to normal when the drug was discontinued. Methyldopa should not be reinstituted in such patients. Rarely, a reversible reduction of the white blood cell count with primary effect on granulocytes has been seen. Reversible thrombocytopenia has occurred rarely. When used with other antihypertensive drugs, potentiation of antihypertensive effect may occur. Patients should be followed carefully to detect side reactions or unusual manifestations of drug idiosyncrasy.

Pregnancy and Nursing: Use of any drug in women who are or may become pregnant or intend to nurse requires that anticipated benefits be weighed against possible risks; possibility of fetal injury or injury to a nursing infant cannot be excluded. Methyldopa crosses the placental barrier, appears in cord blood, and appears in breast milk.

Precautions: Should be used with caution in patients with history of previous liver disease or dysfunction (see Warnings). May interfere with measurement of: urinary uric acid by the phosphotungstate method, serum creatinine by the alkaline picrate method, and SGOT by colorimetric methods. Since methyldopa causes fluorescence in urine samples at the same wavelengths as catecholamines, falsely high levels of urinary catecholamines may be reported. This will interfere with the diagnosis of pheochromocytoma. It is important to recognize this phenomenon before a patient with a possible pheochromocytoma is subjected to surgery. Methyldopa is not recommended for patients with pheochromocytoma. Urine exposed to air after voiding may darken because of breakdown of methyldopa or its metabolites.

Stop drug if involuntary choreoathetotic movements occur in patients with severe bilateral cerebrovascular disease. Patients may require reduced doses of anesthetics; hypotension occurring during anesthesia usually can be controlled with vasopressors. Hypertension has recurred after dialysis in patients on methyldopa because the drug is removed by this procedure.

Adverse Reactions: *Central nervous system:* Sedation, headache, asthenia or weakness, usually early and transient; dizziness, lightheadedness, symptoms of cerebrovascular insufficiency, paresthesias, parkinsonism, Bell's palsy, decreased mental acuity, involuntary choreoathetotic movements; psychic disturbances, including nightmares and reversible mild psychoses or depression. *Cardiovascular:* Bradycardia, prolonged carotid sinus hypersensitivity, aggravation of angina pectoris. Orthostatic hypotension (decrease daily dosage). Edema (and weight gain) usually relieved by use of a diuretic. (Discontinue methyldopa if edema progresses or signs of heart failure appear.) *Gastrointestinal:* Nausea, vomiting, distention, constipation, flatulence, diarrhea, colitis, mild dryness of mouth, sore or "black" tongue, pancreatitis, sialadenitis. *Hepatic:* Abnormal liver function tests, jaundice, liver disorders. *Hematologic:* Positive Coombs test, hemolytic anemia. Bone marrow depression, leukopenia, granulocytopenia, thrombocytopenia. Positive tests for antinuclear antibody, LE cells, and rheumatoid factor. *Allergic:* Drug-related fever, lupus-like syndrome, myocarditis. *Dermatologic:* Rash as in eczema or lichenoid eruption; toxic epidermal necrolysis. *Other:* Nasal stuffiness, rise in BUN, breast enlargement, gynecomastia, lactation, hyperprolactinemia, amenorrhea, impotence, decreased libido, mild arthralgia, myalgia.

Note: Initial adult dosage should be limited to 500 mg daily when given with antihypertensives other than thiazides. Tolerance may occur, usually between second and third months of therapy; increased dosage or adding a diuretic frequently restores effective control. Patients with impaired renal function may respond to smaller doses. Syncope in older patients may be related to increased sensitivity and advanced arteriosclerotic vascular disease; this may be avoided by lower doses.

For more detailed information, consult your MSD Representative or see Prescribing Information. Merck Sharp & Dohme, Division of Merck & Co., Inc., West Point, PA 19486

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sions and conditions using two-dimensional echocardiography, most physicians continue to use single-film retrograde umbilical aortography to confirm the diagnosis.

A few centers are experimenting with palliative surgical procedures,¹² but most subscribe to the philosophy that the severe nature of the anatomic malformation in this cardiac lesion prohibits a reasonable survival, with or without surgery. In these centers only supportive therapy is recommended. Once the diagnosis has been made and confirmed, the parents are informed of the lethal nature of their infant's cardiac malformation with as much tenderness and caring as possible. Every effort is made to keep the baby comfortable while at the same time discontinuing life-support drugs such as digitalis and avoiding cardiopulmonary resuscitation. When possible, the babies are transported back to the referring hospital so that they can be with their mothers. In those rare babies that continue to do well after the mother is discharged, hospice is involved and the baby is permitted to die a natural death at home.

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