hypertension, and noncompliance. The single most important factor influencing fetal well-being is the euglycemic status of the mother. It has been found that reasonable metabolic control that begins before conception and continues during the first weeks of pregnancy can prevent malformation in an IDM. Elevated levels of hemoglobin A1c during the periconceptional period appear to be associated with a higher incidence of congenital malformations. In the case of gestational diabetes, macrosomia is the most common finding; serious complications are rare (Mitanchez, 2010).

Hypoglycemia may appear a short time after birth and in IDMs is associated with increased insulin activity in the blood (see also Table 8-4). The serum glucose level that corresponds to clinical hypoglycemia has not been well defined. Because some infants experience metabolic complications at higher levels than previously thought, some researchers recommend that serum glucose levels be maintained above 45 mg/dl (2.5 mmol/L) in infants with abnormal clinical symptoms and as high as 50 mg/dl in other infants (Rozance and Hay, 2010; Sperling, 2011). The American Academy of Pediatrics recommends that symptomatic infants receive treatment if their blood glucose is less than 40 mg/dl (Adamkin and American Academy of Pediatrics, Committee on Fetus and Newborn, 2011).

Hypoglycemia in IDMs is related to hypertrophy and hyperplasia of the pancreatic islet cells and thus is a transient state of hyperinsulinism. High maternal blood glucose levels during fetal life provide a continual stimulus to the fetal islet cells for insulin production (glucose easily passes the placental barrier from maternal to fetal side; insulin, however, does not cross the placental barrier). This sustained state of hyperglycemia promotes fetal insulin secretion that ultimately leads to excessive growth and deposition of fat, which probably accounts for the infants who are large for gestational age, or macrosomic (Ogata, 2010). When the neonate's glucose supply is removed abruptly at the time of birth, the continued production of insulin soon depletes the blood of circulating glucose, creating a state of hyperinsulinism and hypoglycemia within 0.5 to 4 hours, especially in infants of mothers with poorly controlled diabetes (formerly class C diabetes or beyond [class D through R]). Precipitous drops in blood glucose levels can cause serious neurologic damage or death.

IDMs have a characteristic appearance (Box 8-8 and Fig. 8-22).