

Outcomes of intrauterine transfusion for the treatment of Hemolytic Disease of the Fetus and Newborn

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Background

There are no approved therapeutics for the treatment of Hemolytic Disease of the Fetus and Newborn (HDFN), and pregnancies affected by severe HDFN may necessitate repeated intrauterine transfusions (IUTs).

IUTs are invasive, technically complex surgical procedures performed by specialists that may be associated with an increased rate of fetal mortality and premature birth.

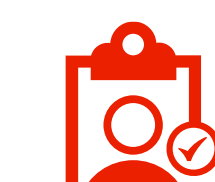
Most evidence on sequelae from this procedure comes from European single center studies and does not evaluate longer-term infant outcomes.

Objective To evaluate outcomes of IUT for the treatment of severe HDFN in antenatal, perinatal, and infancy periods in the United States

Methods



Population: Pregnancies ending in a livebirth or stillbirth among individuals aged 18 – 49 with commercial health insurance.



Database and time period: Optum’s de-identified Clinformatics® Data Mart Database (“Optum Clinformatics®”) from 2000 – 2024.



Cohort definition: Diagnosis code for alloimmunization and procedure code for IUT during pregnancy.



Outcomes: Complications occurring after IUT were assessed in all pregnancies. Perinatal and infant outcomes were evaluated in liveborn infants with records algorithmically linked to maternal records by shared family ID. Infant outcomes were evaluated from day 31 to 365 after birth.

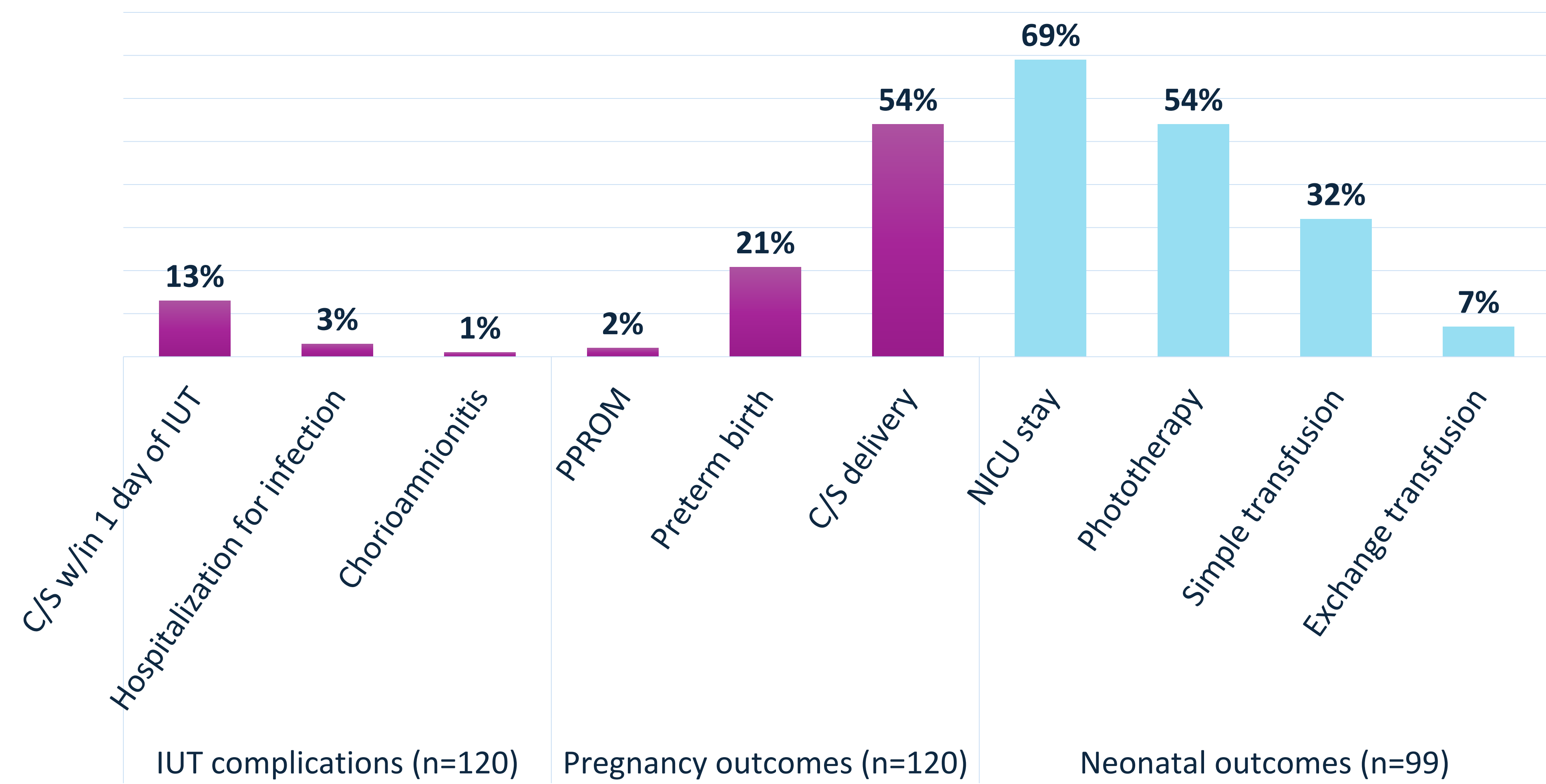
Key Takeaways

- ✓ Intrauterine transfusion for the treatment of HDFN carries a small but clinically meaningful risk of antenatal complications.
- ✓ Despite this intervention, a high proportion of neonates still require continued treatment for HDFN after birth.
- ✓ A higher rate of premature delivery than in the general pregnant population is a potential additional source of neonatal morbidity.
- ✓ Some sequelae of HDFN persist into infancy, however rates of childhood infections were not elevated.

Results

- The cohort consisted of 120 pregnancies with an IUT in 116 individuals, most of which (98.3%) ended in live birth.
- Ninety-nine pregnancies were linkable to infant records, and 39 of these infants had continuous insurance enrollment for at least one year.
- On average, each pregnancy underwent 2.9 IUTs (SD = 1.8) and gestational age at first IUT was 28 weeks (SD = 6).
- Maternal complications related to infection from IUTs were uncommon, however in 13% of cases, the infant was delivered by Cesarean Section within 1 day of an IUT (**Figure 1**).
- Preterm premature rupture of membrane, preterm birth, and Cesarean section delivery were elevated compared to the general pregnant population (1.1%, 7.7%, 32.8%, respectively, in the general population)
- More than two in three infants required NICU admission, and more than half required treatment by phototherapy or transfusion for HDFN in the first 30 days of life.

Figure 1: Antenatal and perinatal outcomes after IUT



C/S = Cesarean section; PPROM = Preterm Premature Rupture of Membranes; NICU = Neonatal Intensive Care Unit

- Four characteristics were evaluated in infants from the IUT cohort and compared by Standardized Mean Difference to infants from the general pregnant population (**Table 1**)
- Two characteristics describing HDFN sequelae – 1) persistence of anemia and HDFN diagnoses and 2) cardiac disorders including cardiopathy and septal defects potentially in conjunction with hydrops – were more common in infants with antenatal IUT.
- Two characteristics describing general pediatric health – infection and non-infectious respiratory diagnoses – were balanced in both cohorts.

Table 1: Infant characteristics, day 31 – 365 after birth

Characteristic	Infants from IUT cohort (N=39)	Infants from general pregnant population (N=770,378)	
HDFN diagnoses and symptoms	69.2%^	7.2%^	^ Imbalanced proportion, defined as an absolute Standardized Mean Difference >0.10
Cardiac disorder	12.8%^	3.3%^	
Infection diagnosis	74.4%	78.2%	
Respiratory diagnosis	61.5%	63.7%	