Key Ethical Issues in Prenatal Genetics

An Overview

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KEYWORDS

• Ethical issues • Clinical translation • Genetic tests • Informed consent
• Patient decision making

KEY POINTS

- The clinical integration of new prenatal genetic technologies raises important medical and ethical considerations for patients, families, healthcare providers and systems, and society.
- It is critical that effective strategies are put in place to ensure that patients and families make informed decisions about the use of new prenatal genetic tests.
- Despite advances in genetics and obstetrics, inherent challenges to the use of reproductive genetic technologies in utero persist.

INTRODUCTION

The clinical integration of prenatal genetic technologies raises important medical and ethical considerations for patients, families, health care providers, health care systems, and society. Prenatal genetic technologies can have a significant positive impact on health care decisions, health care quality, safety, and access. At the same time, these tests are associated with important ethical issues, such as informed consent, information disclosure, and actionability, and larger societal implications regarding illness and disability. This article outlines some of the lead issues associated with prenatal genetic screens and diagnostic tests. The goal of this overview is not to produce a comprehensive inventory of the ethical issues associated with prenatal genetic testing but to touch on some of the major points to consider when integrating new genetic science and technology into prenatal care.

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CHALLENGES INHERENT WITH GENETIC TESTING IN UTERO

The advent of genetic technologies has made possible new medical achievements in the diagnosis and treatment of disease. Although there are promising efforts under way to achieve personalized genomic medicine, there are important ethical questions that must be addressed if such efforts are to maximize benefits to patients.[1–4] Any such challenges are amplified in the context of prenatal care. In this setting, the information gained from genetic tests may lead to critical health care decisions that can affect the course and outcome of the pregnancy; the decision-making process entails not only understanding the current implications but also forecasting notions of health, well-being, and quality of life months and years in the future and doing so with respect to values and beliefs.[5–8] For some women, this may entail the decision to end a pregnancy if a serious genetic condition is identified. For others, this information might be used with the intention to continue the pregnancy and prepare for the birth of a child with a serious medical condition.[9,10] In addition, such information can influence future reproductive decisions, including deciding if, when, or how to achieve another pregnancy using assisted reproductive technologies (eg, preimplantation genetic diagnosis [PGD] and/or donor gametes) or whether other family-building efforts take precedence (eg, adoption and/or foster care).[11] Thus, it is critical for resources to be in place that allow pregnant patients to engage with prenatal genetic technologies in a way that is informed and meets their needs, goals, and values, both now and as the technology evolves, as a way that makes it possible to gain an unpredicted volume of genetic information about the pregnancy.[12,13] Yet, there are many challenges associated with achieving this benchmark, raising concerns about the ethical implications that arise when women use or decline such tests in absence of meaningful pretest and post-test decision making.[14]

One of the challenges that must be considered pertains to the difficulty of correlating genotype with phenotype. Because of the nature of pregnancy and the fact that key clinical information cannot be obtained until after birth, there is an inherent lack of prognostic uncertainty that comes with the use of genetic tests in the prenatal care context. In the case of newborn or adult testing, information gained from genetic testing is combined with an individual's phenotypic information to help determine a prognosis. Yet, in the context of prenatal medicine, genetic tests must be interpreted with only limited phenotypic information.[12,15] Although advances in fetal imaging do provide a better picture of fetal anatomy, including more precise approaches to ultrasound and the use of other imaging modalities, such as MRI, critical clinical information related to outcome and prognosis is frequently required to understand test results in the context of the newborn's morphology.

Another challenge is the scientific and technical limitations associated with genetic testing itself, specifically limitations in the ability to interpret test results. Tests using next-generation sequencing technology can provide detailed information about genomic variants; however, although some identifiable variants are well characterized, others may be associated with a variant of uncertain significance or a rare genetic condition in which the disease progression in not well known.[15–17] Even with the newest advances, such as cell-free DNA (cfDNA) technology, there is still the potential for uncertainty in the process of assessing fetal risk as a woman may receive a false-positive, false-negative, or inconclusive result. This can cause a chain of difficult and potentially troubling decisions women who undergo utilize this new screen.[18–20] Limitations may also be encountered in settings where genetic testing is performed to investigate a finding of multiple fetal anomalies. In such cases, the approach to genetic testing may be based on a health care provider's suspicion of the different