17th World Congress in Fetal Medicine

Clinical policies in action: expanded carrier testing results

Terhaar C, Hill-Harfe K, Allen R, Settler C, Bombard A
Progenity, Inc., Ann Arbor, MI, United States

Objective

Prior to the 2016 European Society of Human Genetics (ESHG) carrier testing guideline publication and the 2017 American College of Obstetricians and Gynecologists (ACOG) Committee Opinion update, carrier testing recommendations included population-based testing for cystic fibrosis in some countries along with ethnicity-based testing for Ashkenazi Jewish disorders, hemoglobinopathies, and thalassemia. With these professional guidelines from ESHG and ACOG, pan-ethnic and expanded carrier testing (ECT) are now considered reasonable strategies. Recently, Estonia has announced a state-sponsored, pan-ethnic genetic testing service. Most other European countries do not yet formally advocate such services or offer pan-ethnic testing as an option during either pre-conception or prenatal care. We investigated and quantified the identification of additional carriers when screening for historically ethnic-specific disorders using a pan-ethnic, ECT-based approach. Updated information since our prior notification is presented herein.

Methods

A retrospective review was performed on results from an ECT panel including the following disorders traditionally offered based on a patient's ethnicity: cystic fibrosis, hemoglobinopathies, and the Ashkenazi Jewish disorders (Bloom syndrome, Canavan disease, congenital amegakaryocytic thrombocytopenia, dihydrolipamide dehydrogenase deficiency, familial dysautonomia, familial hyperinsulinism, Fanconi anemia type C, Gaucher disease, glycogen storage disease type IA, Joubert syndrome 2, maple syrup urine disease types IA and IB, mucolipidosis type IV, nemaline myopathy 2, Niemann-Pick disease type A/B, Tay-Sachs disease, Usher syndrome type IF and III, and Walker-Warburg syndrome). An analysis of positive results was performed, sub-divided by patient self-reported ethnicity.

Results

Overall, 47% of carriers identified for disorders historically considered ethnic-specific did not self-identify with the at-risk ethnicity. Of the 1, 758 identified carriers of Ashkenazi Jewish disorders (19 total disorders), 80% (1, 417/1, 758) of patients did not self-identify as Ashkenazi Jewish. Approximately 44% (2, 472/5, 567) of identified carriers of alpha-thalassemia self-reported an ethnicity other than Asian or African American. Without ECT, these patients would not have been identified as carriers. Additionally, 29% (229/787) of identified carriers of sickle cell disease reported an ethnicity other than African-American. Lastly, of the 3, 822 cystic fibrosis carriers detected, 1, 500 (39%) did not identify as Caucasian or Ashkenazi Jewish.

Conclusion

ECT identifies additional carriers that do not self-report the ethnicity historically considered to be most at-risk. While professional colleges, societies and specific countries may seem hesitant to recommend ECT to the general population, studies have illustrated that both patients and providers are interested in this option, but may be reluctant to pursue screening in the absence of demonstrable benefits. This study highlights that many additional carriers can be identified when ECT is utilized in the general population. By broadening screening protocols and implementing pan-ethnic testing in routine medical practice, more carriers of these serious disorders will be identified. Carrier identification allows for essential counseling including reproductive options and family planning discussions. References: Henneman, Borry, Peterlin, et al. Responsible implementation of expanded carrier screening. European Journal of Human Genetics, 2016 Edwards, et al. Expanded carrier screening in reproductive medicine-points to consider. Obstet Gynecol. 2015 Mar;125(3): 653–62. American College of Obstetrics and Gynecology Committee Opinion No. 691: Carrier screening for genetic conditions. Obstet Gynecol. 2017;129e41-55. American College of Obstetrics and Gynecologists Committee Opinion No. 690: Carrier screening in the age of genomic medicine. Obstet Gynecol. 2017;129: e35-40. https: //futurism.

com/genetic-testing-estonia/ https: //www. newscientist. com/article/2165318-estonia-to-give-genetic-testing-and-advice-to-100000-residents/.