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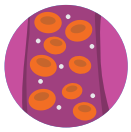
Why is identifying 22q11.2 deletion syndrome (DiGeorge syndrome/VCFS/22q) important?

22q11.2 deletion syndrome (22q11.2ds) is common, with a similar incidence to cystic fibrosis. It has been estimated to be present in around 1 in 2000 people in the general population,[1] although this is likely to be an underestimate as recent studies have shown incidence rates as high as 1 in 992[2] in the prenatal population. 22q11.2ds is associated with a wide range of birth defects, as well as mild-to-moderate intellectual disabilities.

There are many differences that individuals with 22q11.2ds may experience; early intervention can be important for improving outcomes.



Hypocalcemia. A low calcium level, or hypocalcemia, is common with 22q11.2ds, especially in newborns. Low calcium levels may lead to seizures but 22q11.2ds may not be recognized as the underlying cause. A correct diagnosis can prompt evaluation for other associated abnormalities, in addition to treatment and monitoring for hypocalcemia. **Newborns with 22q11.2ds should be monitored for hypocalcemia and if hypocalcemia is identified it should be treated promptly.** Hypocalemia may persist into adulthood.[3]

Immune deficiency. Around 75% of individuals with 22q11.2ds also have reduced immune function.[4] **Because of the chance of immune deficiency, affected individuals should be evaluated prior to receiving live virus vaccines, and monitored for signs or symptoms of infection.**

Palatal abnormalities. Almost 75% of individuals with 22q11.2ds will have a palatal difference that may involve structure, function, or both.[5] These differences can result in feeding and/or speech challenges. **Most of the time, these differences are treatable.** Importantly, some common interventions including tonsillectomy should be avoided if possible in patients with 22q11.2ds; additional evidence that confirming this diagnosis can change medical care.[5]

Feeding difficulties. Newborns with 22q11.2ds often have feeding difficulties, even in the absence of cleft palate or cardiac abnormalities.[6] The underlying feeding problem may be caused by pharyngoesophageal dysmotility and can result in reflux.[6] **Most of these problems are treatable.**

Congenital cardiac defects. About 75% of individuals with 22q11.2ds have congenital heart defects; finding a heart defect may lead to testing for 22q11.2ds.[7] **If an individual is diagnosed with 22q11.2ds, they should be referred to a cardiologist.**

There are other medical problems which can be associated with 22q11.2ds. Intestinal malrotation and Hirschsprung disease have been reported.[7] Other birth defects that have been associated with 22q11.2ds include: renal anomalies, hearing loss, ENT complications, autoimmune diseases, growth delay and skeletal anomalies.[7]

Not all people with 22q11.2ds have all the conditions listed. Recognizing these differences earlier in life however, may improve outcomes. Recommended treatments may include surgery, medication, occupational therapy, physical therapy and special education.

For more information about 22q11.2ds, please visit www.22q.org.

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What is 22q11.2 deletion syndrome?

22q11.2ds has previously been called by many other names such as DiGeorge syndrome, Velo-Cardio-Facial syndrome (VCFS), or 22q. It is caused by a missing piece of chromosome number 22. This genetic change can result in differences that affect many parts of the body. Many children with this disorder have heart defects, immune system problems, and characteristic, though often subtle, facial feature differences.[7] Most have mild-to-moderate learning differences and delayed speech and language development.[7] Some children will have low calcium levels, kidney problems, feeding problems, seizures, or other health problems. About one in five children with 22q11.2ds will be diagnosed with autistic spectrum disorder. There is an increased likelihood of psychiatric disorders such as anxiety and attention deficit disorder, and approximately one in four young adults are diagnosed with schizophrenia.[7]

There is an increased chance of infant death in babies with severe heart or immune system problems. Individuals with 22q11.2ds who survive childhood may have a shorter lifespan and may have a higher chance of sudden death.[8]

What is the cause of 22q11.2ds?

The majority of individuals with 22q11.2ds have a 3 Mb deletion (which typically includes about 90 different genes) on one of the copies of chromosome 22.[7]

The 22q11.2 deletion occurs by chance in most cases. However, up to 10% of children with 22q11.2ds inherit it from a parent who also has the condition (but may be asymptomatic).[4,7] Testing of both parents can help determine the chance of this condition happening again in another pregnancy.

How should I address a high probability Panorama test result for 22q11.2ds?

The Panorama test is a screen, not a diagnostic test. Any high probability result should be confirmed with amniocentesis or chorionic villus sampling (CVS) that includes a chromosome microarray (CMA) which specifically looks for the missing piece of chromosome 22 that causes 22q11.2ds. If your patient elects not to have amniocentesis or CVS, CMA should be performed at birth, and the baby evaluated for potential complications associated with 22q11.2ds while awaiting results of the CMA.

Where can I send my patients for additional information?

You can send your patients to:
https://www.natera.com/panorama-test

You can also contact Natera directly to ask our staff of genetic counselors any questions you or your patients may have at niptgc@natera.com

References

1. Shprinzen RJ. Velo-cardio-facial syndrome. In: Cassidy SB, Allanson J, eds. Management of genetic syndromes. 2nd ed. New York: Wiley, 2004. P. 615-32.
2. Grati FR, et al. Prevalence of recurrent pathogenic microdeletions and microduplications in over 9,500 pregnancies. Prenat Diagn. 2015 May 11. doi: 10.1002/pd.4613.
3. Bassett AS et al. Clinical Features of 78 Adults With 22q11 Deletion Syndrome. Am J Med Genet A. 2005 November 01; 138(4): 307–313.
4. McDonald-McGinn DM et al. 22q11.2 Deletion Syndrome. GeneReviews Adam MP, Ardinger HH, Pagon RA, et al., editors. Seattle (WA): University of Washington, Seattle; 1993-2018.
5. Dyce et al., Arch Otolaryngol Head Neck Surg. 2002 Dec;128(12):1408-12.
6. Eicher PS et al. Dysphagia in children with a 22q11.2 deletion: Unusual pattern found on modified barium swallow J Pediatr. 2000;137:158-64.
7. McDonald-McGinn DM, et al. 22q11.2 Deletion Syndrome. Nat Rev Dis Primers. ; 1: 15071. doi:10.1038/nrdp.2015.71.
8. Bassett et al., Premature death in adults with 22q11.2 deletion syndrome. J Med Genet. 2009 May; 46(5): 324–330.

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