Journal of Plastic, Reconstructive & Aesthetic Surgery (2010) 63, 598–602

JPRAS
An International Journal of Surgical Reconstruction
www.JPRASurg.com

22q11 chromosome abnormalities and the cleft service☆

N. Nugent*, A. McGillivary, M.J. Earley

Department of Plastic Surgery, Children's University Hospital, Temple Street, Dublin 1, Ireland

Received 14 November 2008; accepted 7 January 2009

KEYWORDS
22q11 deletion syndrome;
Velocardiofacial syndrome;
DiGeorge syndrome;
Cleft palate;
Submucous cleft;
Velophayngeal insuffiency

Summary Deletion of chromosome 22q11 gives rise to a spectrum of anomalies, including cleft palate. These are grouped together as the DiGeorge or velocardiofacial syndrome. Patients with this chromosomal abnormality account for a small, but noteworthy proportion of patients attending our cleft service. They frequently have other significant comorbidities consistent with their diagnosis.

Over a ten-year period, 16 patients within our cleft service have been diagnosed, using chromosome analysis, as having deletions at 22q11. All had either a cleft palate and/or velopharyngeal incompetence, for which they underwent repair of the cleft palate or pharyngoplasty. Several have required secondary palate surgery following initial palate surgery. Poor quality of speech was the indication for secondary procedures in the majority of cases. Fourteen of the 16 have other comorbidities, ranging from congenital heart disease to ocular abnormalities. In addition, 15 of the 16 have developmental delays and/or learning difficulties. Other specialties, such as ENT, cardiology, genetics and ophthalmology have been involved in the care of all these patients.

Although comprising only a small proportion of patients attending a cleft team, the diagnosis of this chromosomal abnormality is significant, as these patients may require substantial input of resources and the expertise of several specialties. Early recognition of features of this entity and diagnosis can aid more efficient intervention.

Microscopic deletions of chromosome 22q11 result in a variety of clinical phenotypes, such as DiGeorge syndrome (DGS), velocardiofacial syndrome (VCFS) and conotruncal anomaly face syndrome.[1,2] It occurs in approximately 1 in 4000 live births.[3] Although there is a wide variation in phenotypic expression, the main characteristics, as a result of this deletion, include congenital cardiac defects, characteristic facial dysmorphic features, hypocalcaemia, learning disabilities, developmental delays, recurrent infections secondary to T-cell abnormalities and palatal disorders.[4] Of interest to the cleft service is that there is

☆ Presented at Irish Association of Plastic Surgeons Winter Meeting, November 2007.

* Corresponding author. Tel.: +353 87 6488013.
E-mail address: noranugent@gmail.com (N. Nugent).

1748-6815/$ - see front matter © 2009 British Association of Plastic, Reconstructive and Aesthetic Surgeons. Published by Elsevier Ltd. All rights reserved.
doi:10.1016/j.bjps.2009.01.021

a relatively high prevalence of palatal anomalies, which can include overt cleft palate, submucous cleft palate, velopharyngeal insufficiency (VPI) and in a minority cleft lips. Originally described by Shprintzen in 1978,[5] it is one of the commonest syndromes associated with clefting of the secondary palate.[6] Along with the clinical features of this condition, diagnosis can be confirmed by chromosomal analysis using fluorescence in-situe hybridization (FISH) techniques to identify the deletion of part of chromosome 22q11.[7,8]

The aim of our study was to quantify the number of patients attending our cleft service with a confirmed deletion of chromosome 22q11 on FISH testing, the type of palatal involvement these patients had, the presence and type of other comorbidities/features of the condition and to ascertain the other specialties involved in their care. We could then quantify the resources needed, and aim towards early intervention.

Patients and methods

With the consent of their parents, all patients referred to our centre requiring assessment by the cleft team have their details stored prospectively in a computer database. The information thus amassed includes personal details, type of cleft, dates of cleft operations and type of operation, associated syndromes diagnosed or suspected and associated comorbidities. Using this database, we were able to identify all patients over a 10-year period (1997—2007) suspected of having a diagnosis of DiGeorge or velocardiofacial syndrome. Those with a 22q11 deletion confirmed by chromosomal analysis (FISH) were included in our study. Patients with phenotypic features of 22q11 deletion but a normal FISH test were excluded.

For each patient, the age at diagnosis (of 22q11 deletion), type of palatal involvement, type of palatal repair and surgical outcome, speech outcome based on their last assessment by our speech and language therapists, other features of 22q11 deletion syndrome present and other specialties involved in their care were recorded.

Results

Sixteen patients with a deletion of chromosome 22q11 confirmed on FISH testing were identified in the 10-year period studied. The mean age at diagnosis was 8.2 years, with a range from neonatal diagnosis to 19 years. Nine patients of the sixteen had been referred to us with symptoms of velopharyngeal insufficiency, five patients had been referred with cleft palates and two with submucous clefting of their palate (See Figure 1). The breakdown of palate operations within the group was as follows; pharyngoplasty (Orticochoea) — six, repair of cleft palate — seven, intravelar veloplasty — one and no surgery in two cases. Six patients required further palatopharyngeal surgery. The indication for a second surgical procedure was cleft-type speech in all cases with nasal regurgitation in one case. Secondary surgery consisted of a pharyngoplasty in the case of those who had primary cleft palate repairs and revision of their pharyngoplasty in those whose primary operation had been a pharyngoplasty.

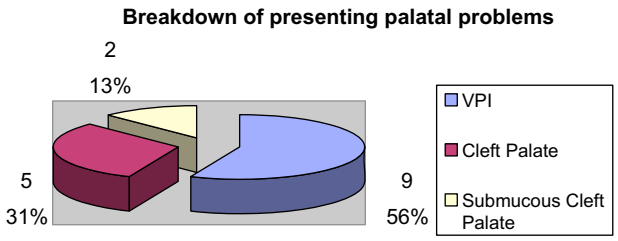

Figure 1 Breakdown of presenting palatal problems.

Eleven patients of the sixteen had persistent mild or moderate problems with nasal resonance (hyponasality in two cases and hypernasality in the remainder) based on their last formal speech assessment, while one had severe problems with nasal resonance. Three had mild or moderate nasal emissions, and four had mild to moderate nasal turbulence. Five patients had mild to moderate articulation errors evident in their speech and one had severe articulation errors. One patient had a facial grimace during speech.

All patients exhibited dysmorphic facial features characteristic of their syndrome (See Figure 2). Nine patients had failure to thrive and/or feeding difficulties as infants. Eleven patients had histories of recurrent infections, and two had been diagnosed with hypocalcaemia. Five had

Figure 2 Patient diagnosed with 22q11 deletion syndrome exhibiting some of the facial features of the syndrome.