Abstract: CHARGE syndrome is a rare association of hereditary multisystem disorder presenting with ocular coloboma, cardiac anomalies, choanal atresia, retarded growth and development, genital anomalies and ear anomalies. Here we present a case report of CHARGE syndrome in a 2 days old baby.

Keyword: CHARGE syndrome, Coloboma, CHD7 gene mutation

INTRODUCTION: CHARGE syndrome stands for (1)
C-coloboma of ocular structures
H-heart defects
A-atresia of choana
R-retarded growth & development
G-genital anomalies
E-ear anomalies.

This is a rare syndrome though not all 100% of the cases are associated with all the four major features of the syndrome. Hence we present here the case report of a two days old baby found to have been diagnosed as a case of CHARGE syndrome.

HISTORY: Dr. B. D. Hall (2) first reported the CHARGE association in 1979. Later it was Dr. R. A. Pagon who first coined the term ‘CHARGE’ (3). It was previously referred to as CHARGE association. But it has been now termed as CHARGE syndrome.

CASE REPORT: (2/365) 2 days old female child nursed at neonatal ICU, born by labor naturalis of 2nd degree consanguineous marriage with birth weight of 3 kg was examined during call over for ophthalmological evaluation.

General examination: On examination the baby was found to have cleft lip with cleft palate, bilateral choanal atresia identified initially by the inability to pass nasogastric tube. External ear, genitalia were found to be normal with no external malformations. There was no evidence of umbilical hernia / omphalolele. Ocular examination: On examination, Lids were found to have bilateral full thickness defect of medial 1/3rd of both the upper & lower eyelids of right eye, medial 1/3 rd of lower lid of left eye. Conjunctiva had circumcorneal congestion, and cornea showed exposure keratopathy with epithelial defect involving inferonasal quadrant of both eyes, anterior chamber was normal in depth in both eyes. Iris colour, pattern were normal in both eyes, pupils were round regular reacting to light in both eyes, lens of both eyes were normal.

Fundus examination revealed the presence of bilateral chorioretinal coloboma inferior to the disc sparing the disc.

Investigations: With all the above features, a diagnosis of CHARGE syndrome was made and was investigated further. Choanal atresia was confirmed by endoscopy. Echocardiography was normal. USG abdomen & pelvis showed no evidence of any renal anomalies.

Management: Artificial tear substitute & lid patching with saline gauze advised for exposure keratitis. The child was operated in paediatric surgery as an emergency procedure for choanal atresia with perforation of the membrane. Baby was started on oral feeds and was planned for faciomaxillary & eyelid reconstruction after the general condition is stabilised & fit for general anaesthesia.

DISCUSSION

GENETICS: CHD7 is the only gene detected to be associated with it which is a member of the chromo domain helicase protein
family encoding for chromatin remodelling. Found to be highly associated with definite CHARGE syndrome than with incomplete forms.

**DIAGNOSIS & CLINICAL FEATURES:** Diagnosis is mainly clinical although rarely 100% association of all the features is seen in only a few cases. Based on Blake et al (4) & Amiel et al (5) and Veroles et al(6) clinical ground for diagnosis is as follows: Major characteristics:
1) Ocular coloboma-unilateral/bilateral with or without microphthalmos. coloboma of iris, retina ,choroid,disc .
2) Choanal atresia-unilateral/ bilateral.
3) Cranial nerve dysfunction/anomaly- hypoplasia, anosmia, facial nerve palsy, auditory nerve hypoplasia,9th, 10th cranial nerve dysfunction.
4) Ear anomalies-little/no lobe, middle ear ossicular malformation, Mondoni defect of cochlea, temporal bone abnormalities.

Minor characteristics:
1) Genital hypoplasia-micropenis, cryptorchidism, hypoplastic labia.
2) Developmental delay-delayed milestones, hypotonia.
3) Cardiac anomalies-conotruncal defects (Tetrology of Fallot),aortic arch anomalies, AV canal defects.
4) Growth retardation 5) Orofacial clefts 6) Tracheoesophageal fistula
7) Distinctive facial features-square face with broad prominent forehead prominent nasal bridge & columella, flat midface.

Definite CHARGE syndrome: presence of all 4 major characteristics (or) 3 major and 3 minor characteristics. Probable or possible CHARGE syndrome:1 or 2 major characteristics & variable minor characteristics.

**COLOBOMA:**(10)It is a developmental defect that occurs due to failure of the embryonic fissure to close which usually occurs around 5 to 7 weeks of intrauterine life. It can be complete involving all the structures like iris, ciliary body, zonules, retina & choroid, optic nerve or incomplete involving only few structures. The visual prognosis depends on severity & location of coloboma in relation to mainly optic nerve, macula & maculopapular bundle .

**MANAGEMENT:** Multidisciplinary approach including complete ophthalmological, cardiac, plastic surgical, endocrinological, ENT, audiological, radiological investigations and interventions. Death is mainly due to aspiration /respiratory distress which warrant immediate care.

**Ocular management(1)**
1) Tinted/dark glasses for photophobia.
2) Cycloplegic refraction & best glasses for microphthalmic eyes.
3) Prophylactic photocoagulation for retinal detachment in chorioretinal coloboma.
4) Visual rehabilitation.
5) Exposure keratopathy(8),(9) management includes artificial tear substitutes, tarsorrhaphy, lid patching .Surgical reconstruction includes procedures like lateral cantholysis for small defects or Tenzel semicircular flap or Cutler Beard flaps for moderate to large lid defects.

**OTHER ASSOCIATED FEATURES(1):** DiGeorge syndrome, omphalocele, umbilical hernia, bony sclerosis, hemivertebrae, short webbed neck, shoulder abnormalities, renal anomalies-horseshoe kidney.

**DIFFERENTIAL DIAGNOSIS(11):**

**CONCLUSION:** CHARGE syndrome is a rare genetic syndrome with an incidence of 1 in 10,000 births and it is the first case reported in our hospital in the past 2 years and hence presented this interesting case for discussion.

**REFERENCES:**
7) Lalani SR , Safullah AM et al “spectrum of CHD7 mutation in 110 individuals with CHARGE syndrome and genotype „phenotype correlation” Amj HUM genet 78 (2);303-14.

**FIG.3 fundus picture showing chorioretinal coloboma inferior to disc**