



Noonan syndrome, affecting 1 in 1,000-2,500 live births, occurs **equally in males and females** and shares many phenotypic features with Turner syndrome, though the genetic causes are distinct. About 20% of cases are familial with **autosomal dominant** inheritance. Mutations in the **RAS-MAPK pathway** account for around 70% of cases.

AD
Autosomal dominant

CLINICAL FEATURES

Growth:

- **Short stature**



Facial features:

- **Hypertelorism**
- **Low set and posteriorly rotated ears**
- Epicanthal folds
- Down slanting palpebral fissures
- Retrognathia
- **Low posterior hairline**
- **Short webbed neck**



Neurologic:

- **Subnormal IQ**
- ADHD



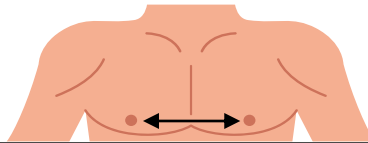
Cardiac:

- **Pulmonary valve stenosis**
- **Hypertrophic cardiomyopathy**
- ASD, VSD



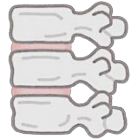
Chest:

- Pectus excavatum or carinatum
- **Widely spaced nipples**



MSK:

- Cubitus valgus
- **Scoliosis**



Lymphatics:

- Lymphatic dysplasia
- **Edema of dorsum of hands and feet**



Endocrine:

- Cryptorchidism
- Small testes
- **Delayed puberty**



Hematologic:

- Coagulation defects
- Acute lymphoblastic leukemia

PRENATAL INDICATORS

- Cystic hygroma
- Hydrops
- Chylothorax
- Edema
- Short femoral length



...In a fetus with a normal karyotype...

DIAGNOSIS

- Identification of **key clinical features**

Genetic testing for mutations in the **RAS-MAPK pathway** (e.g., **PTPN11**)



OTHER INVESTIGATIONS

- **Hormonal evaluation:** **testosterone** and **inhibin-B** levels can provide insights into reproductive function in males.

Imaging: **echocardiogram**

MANAGEMENT

- **Human growth hormone** improves growth velocity in many Noonan syndrome patients, like Turner syndrome.
 - Recommended for patients **below the 3rd percentile for height**.
- Treatment for hypogonadotropic hypogonadism involves **testosterone therapy**, while **gonadotropin therapy** may be considered for testicular development in more complex cases.
- Treatment plans should be **individualized** and monitored closely.



February 2025

Dr. Katharine V. Jensen (Pediatric Resident, University of Alberta) and Dr. Karen Forbes (Professor of Pediatrics, University of Alberta) for www.pedscases.com