A Child with Clinical and Cytogenetic Features of Male Edward Syndrome and Turner Syndrome with Bilateral Gonadoblastoma in Infancy

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BACKGROUND

- Mosaic Turner Syndrome (TSM) commonly occurs in the form of 45,X/46,XX and 45,X/46,Xiq
- Mosaicism for the presence of a Y chromosome (45,X/ 46,XY) is well documented in TS.
- The presence of a Y chromosome in TS is associated with increased risk of gonadoblastoma (GB).
- To date, there are only 6 reported cases of TSM with a trisomy 18 karyotype, and only 2 of these were phenotypically female with 45,X, 47,XY+18 karyotype.

CASE REPORT

- Dysmorphic features noted at birth: webbed neck, low set ears and broad chest. The child had female external genitalia.
- Blood: G banded karyotype and interphase fluorescence in situ hybridisation (FISH) showed 45,X in 95% and 47,XY + 18 (Edwards Syndrome) in 5% of cells analysed.
- Buccal swab: Interphase FISH showed only 45,X (100% cells).
- Elective gonadectomy performed at 13 months of age.
- Bilateral streak ovaries with early evidence of GB bilaterally (Figure 2), rudimentary uterus and bilateral fallopian tubes with unilateral ectopic adrenal tissue.
- Gonadal tissue touch preparation: Interphase FISH similar to the blood with 45,X in 86% of cells and 47,XY+18 in 14% of cells analysed (Figure 1).

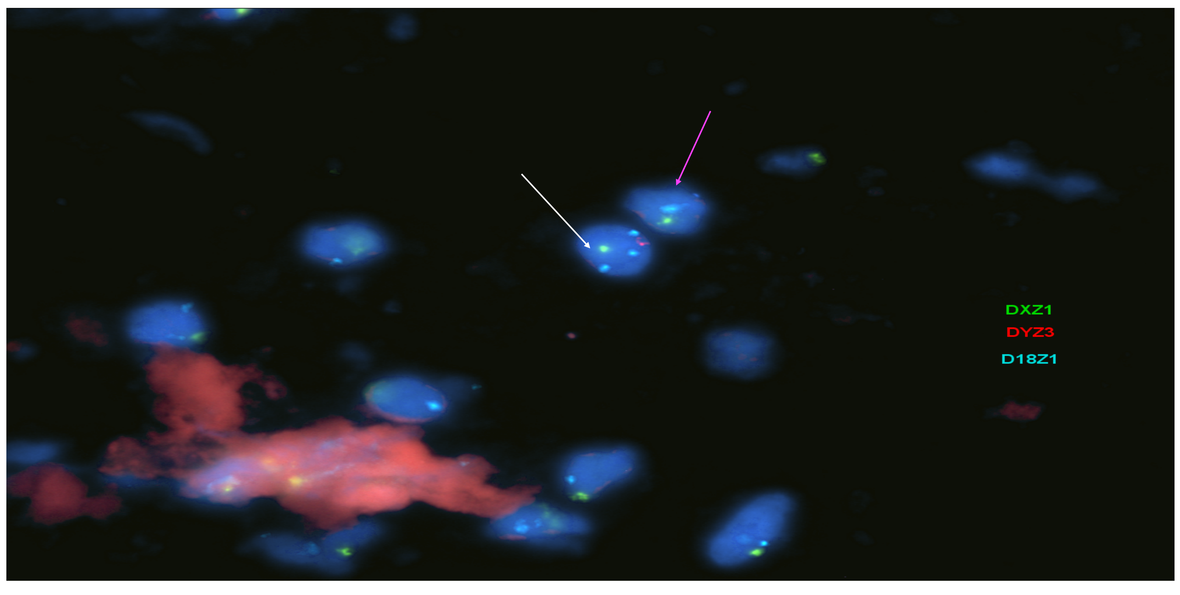

Figure 1: FISH interphase studies on gonadal touch preparation demonstrating mosaicism for TS and for male trisomy 18. The cells in the middle indicated by the white arrow represents 47,XY, +18 i.e. with three chromosome 18 signals (blue spots), one green X chromosome (green spot) and one Y chromosome (red spot). The cell beside it (pink arrow) with two blue spots represents two chromosome 18 signals, and one chromosome X (green spot) (45,X).

CONCLUSIONS

- This case highlights a rare karyotype of TSM and Edwards Syndrome in the same patient.
- Current investigations are ongoing as to the possible causes for this unusual finding.
- This case was also associated with a finding of early evidence bilaterally of gonadoblastoma at a very young age.
- Blood and gonadal karyotypes showed different levels of mosaicism.
- Mosaicism was limited, with the male Edward's karyotype not detected in buccal cells
- To our knowledge this is the only case with the above karyotype with early gonadoblastoma.

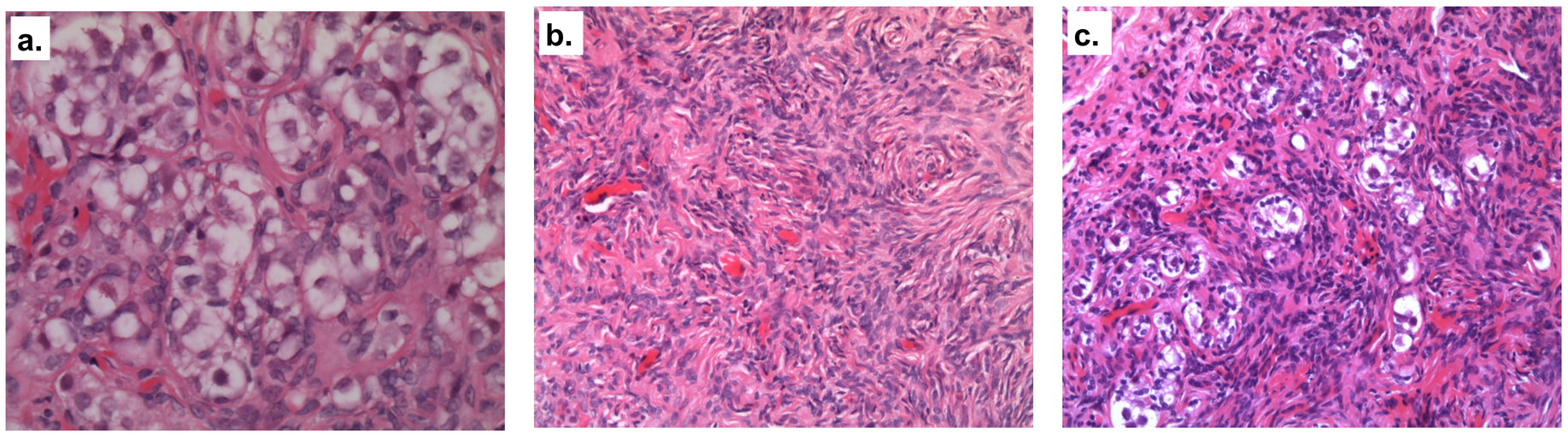

Figure 2: Histopathology specimens. (a) Gonadoblastoma with characteristic mixture of germ cell and sex cord elements. (b) Streak gonad devoid of germ cells (c) Undifferentiated gonadal stroma with chaotic distribution of immature germ cells.

REFERENCES

1. Clinical review: Turner syndrome: updating the paradigm of clinical care. Pinsker, J.E., J Clin Endocrinol Metab, 2012. **97**(6)
2. Occurrence of Gonadoblastoma in Females with Turner Syndrome and Y Chromosome Material: A Population Study. Gravholt et al., JCEM 2000; 85**:**3199–3202
3. Tumour risk in disorders of sex development. Looijenga LHJ et al., Best Practice & Research Clinical Endocrinology & Metabolism, 21 (3):480–495, 2007
4. Gonadoblastoma and Turner syndrome. Brant, W.O., et al., J Urol, 2006. **175**(5): p. 1858-60.
5. A rare abnormal karyotype (45,X/47,XY + 18) associated with increased nuchal translucency thickness. Robertson M, Curren J, Warwick L, Jammu V, Ellwood DA, Dahlstrom JE. Ultrasound Obstet Gynecol. 2006 Feb;27(2):229-31.
6. Gonadoblastoma arising in undifferentiated gonadal tissue within dysgenetic gonads. Cools M, Stoop H, Kersemaekers AM, et al., J Clin Endocrinol Metab. 2006 Jun;91(6):2404-13. Epub 2006 Apr 11