FERTILITY PRESERVATION IN AN ADOLESCENT BOY: INDUCING PUBERTY AND SPERMATOGENESIS PRIOR TOBONE MARROW TRANSPLANTATION

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Background

Bone Marrow Transplantation (BMTX) involves use of pre-conditioning regimens that compromise fertility. Many regimes have devastating effects on the spermatogonial stem cell pool → lack of functional gametes → sterility

The common situation is of BMTx as an urgent or semi-urgent procedure, as a primary modality of cancer care for high risk leukaemia, after failed chemotherapy or relapse of leukaemia or in the setting of immune deficiency syndromes.

Less commonly it is possible to plan BMTx within a larger time frame, for conditions such as thalassemia major, or bone marrow dysplasias.

Fertility preservation options

In adult men or late peri- and post pubertal adolescent males , cryopreservation of ejaculated or surgically retrieved sperm can preserve fertility options prior to gonadotoxic treatments.

This option is not available for prepubertal boys because there is no spermatogenesis until puberty.

Foetal/postnatal gonocyte differentiation to spermatogonia occurs. Sertoli cells mature during childhood, germ cells proliferate then seminiferous tubule outgrowth in adolescence.

Problems of iron overload

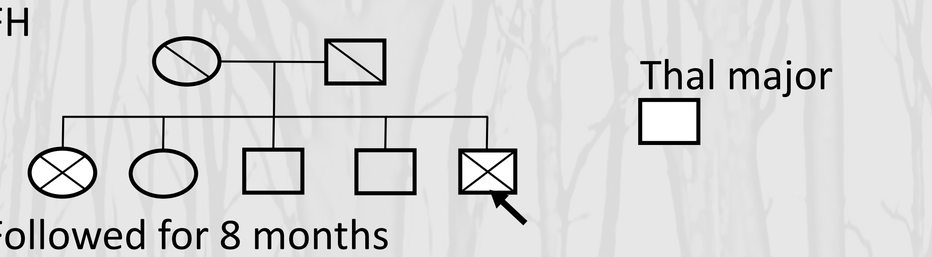
Delayed puberty and hypogonadism are common in children with beta thalassemia major, due to chronic disease and transfusion requirements, → iron overload in the pituitary gland & less commonly in testes

Patient and methods

We describe the use of hCG and FSH in a 13 year old boy with beta thalassemia major

Aims: **to induce puberty and spermatogenesis, over a short time span, prior to bone marrow transplant planned for 6-9 months from first endocrine consultation.**

Male aged 12.2 years at first endocrine consultation
Regular blood transfusions 3 weekly from age 2.5 yrs
Sub optimal chelation for years (Ferritin 5450mcg/l (NR<370)
FH

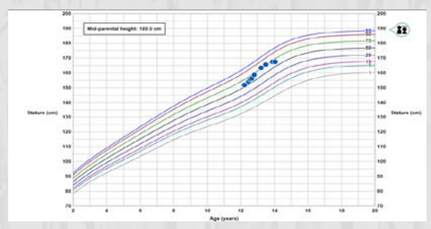


Followed for 8 months
Remained prepubertal with 2ml testes bilaterally
Bone age 13
BMTx planned for 6 months
Parental consent obtained for pubertal induction :

Rx: Human chorionic gonadotropin (hCG) 500units s/c twice per week
↑ to 1000units x2 / week after 3 months
Pubertal progress mildly accelerated

- When serum testosterone 11.9nmol/l, Follicle stimulating hormone (FSH) 150 IU x3/week added, for induction of spermatogenesis
- increased after 3 months to 300units thrice weekly.

Outcome over 9 months :
height 167.5cm,
Adult virilization,
20ml testes bilaterally



Testosterone 17.6 (NR 12-24)nmol/L
Inhibin B 135ng/L(NR 50-350)

Evidence for fertility

Semen collection performed 9 months after start of FSH

0.5-1.8million/ml. on 3 samples
Cryopreservation of 11 straws

Four months after semen collection he underwent bone marrow transplantation, preceded by Busulphan conditioning.

Conclusions

This report provides the first evidence of feasibility of inducing puberty and spermatogenesis adequate for future fertility, in a young prepubertal adolescent male, prior to bone marrow transplant.

Fertility preservation in this case is assured

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This option should be considered in future, for other adolescent males, prior to gonadotoxic treatments

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