Case Study: An 8-Year-Old Female with Turner Syndrome Presents with Abdominal Pain and Bloody Stools

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Abstract

Turner syndrome (TS), a female-only condition, is one of the most common chromosomal abnormalities worldwide. The most common presenting clinical features of TS are short stature and gonadal dysgenesis. TS is frequently associated with autoimmune conditions including thyroid disease, diabetes mellitus, Celiac disease, and inflammatory bowel disease (IBD). Several studies suggest an increased incidence of IBD in patients with TS. Here we present a case of TS who was diagnosed with Crohn's disease at the age of 9 years. The patient was on growth hormone treatment for growth retardation. She developed bloody diarrhea and iron deficiency anemia, which subsequently led to the diagnosis of Crohn's disease. Systematic evaluation of patients with TS, recognition of the association with IBD, and early intervention may improve quality of life, prevent future complications, and may lengthen life expectancy in these patients.

Introduction

Turner syndrome is a clinical syndrome that arises in females due to the complete or partial absence of the X chromosome. 45XO is a classical karyotype of TS. A TS patient may also present with a mosaic pattern with some of the cells having the classical karyotype and others having an absent or abnormal X chromosome. The risk of autoimmunity in TS is well recognized and the risk is approximately twice as high as in the general female population.[1] Inflammatory bowel disease (IBD) comprises two chronic conditions Crohn's disease (CD) and Ulcerative colitis (UC). The association between IBD and TS has been well established. Colitis in patients with TS is seen to have a more progressive course than in patients with colitis alone.[2] Here we report a case of TS, who developed Crohn's disease.

Case Presentation

An 8-year-old female born via normal vaginal delivery at full-term gestation had uncomplicated prenatal and postnatal courses. She was referred to an endocrinology clinic at the age of 8 years for evaluation of short stature, obesity, and prediabetes. Her height was 47 in, weight was 76 lbs., BMI was 24.2 and HBA1c was 5.9%. At the endocrinology clinic, the patient was suspected to have growth failure due to TS. Prediabetes was detected. No thyroid dysfunction or celiac disease was detected. Cytogenetic analysis revealed a mosaic pattern of 46X,del(X)(p11.2)[12]/45,X[8]. The patient started growth therapy at the age of 8 years. She subsequently developed bloody stool and vomiting and was evaluated in the GI clinic post ER

visit. She was recognized to have iron deficiency anemia. Based on all her physical and clinical findings IBD was suspected and a colonoscopy and biopsy were done.

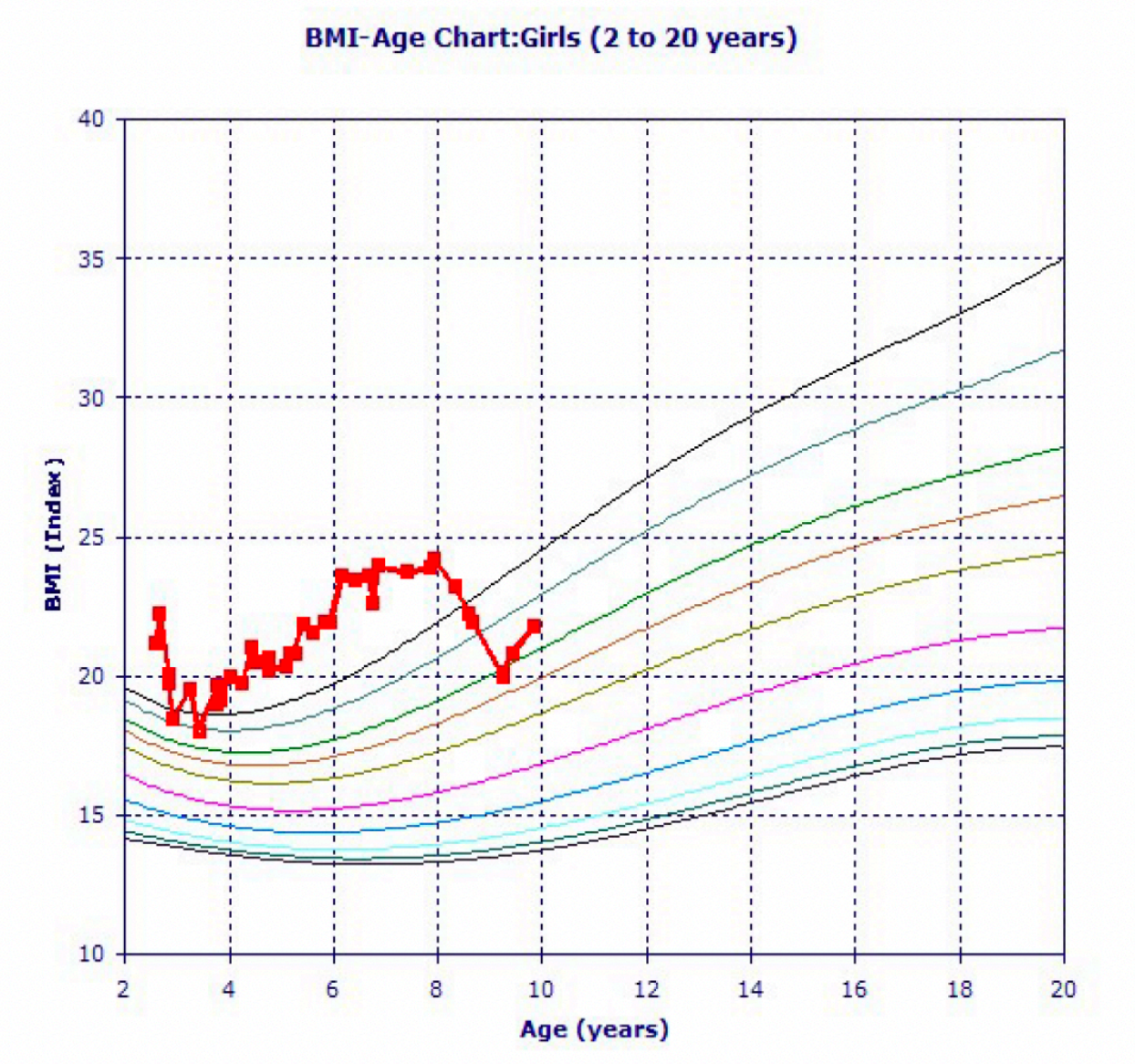
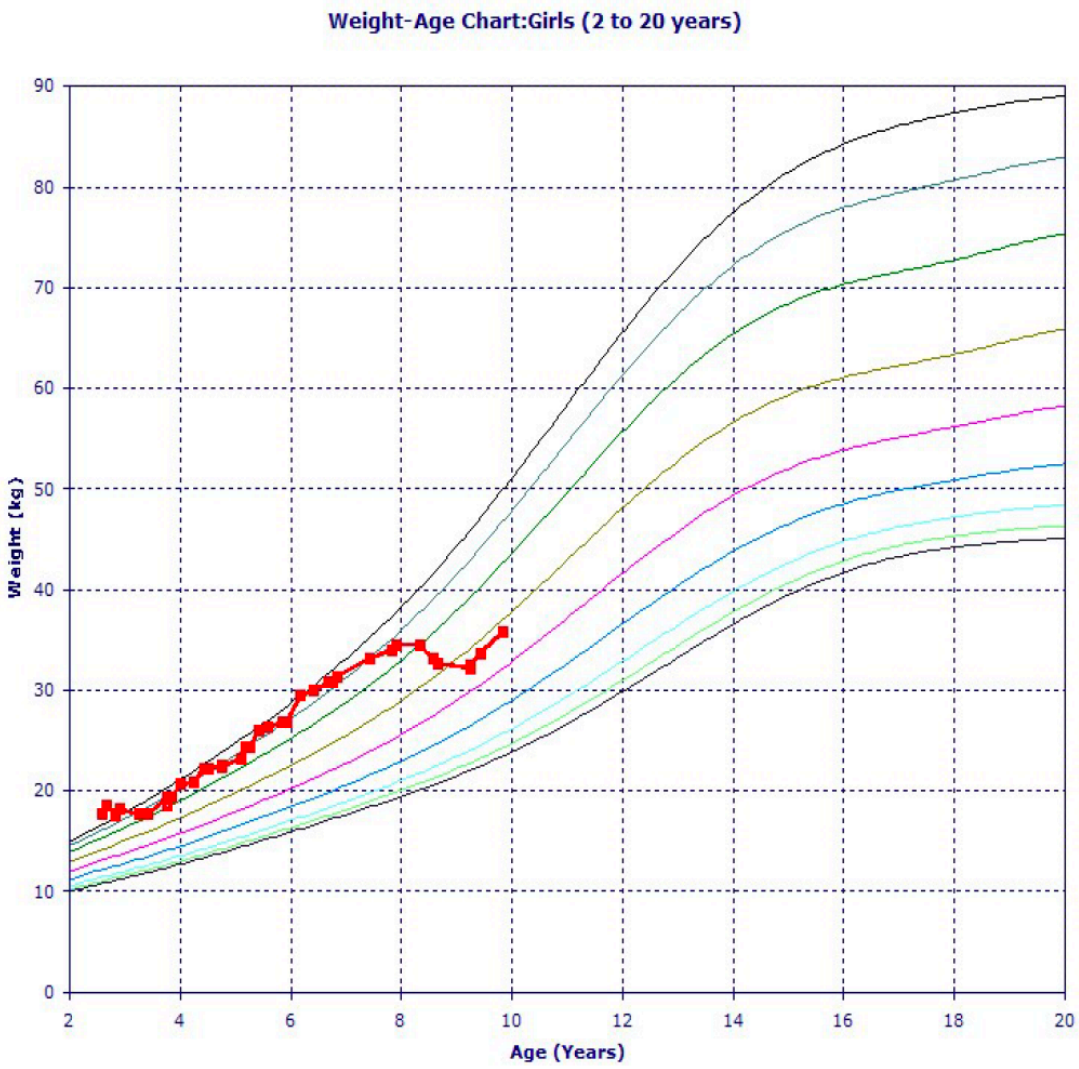


Figure 1: Our patient's BMI-Age Chart

Figure 2: Our patient's Stature-Age Chart

Figure 3: Our patient's Weight-Age Chart



History of Present Illness: An 8-year-old female with recurrent bloody stools and a history of anemia presents to ER for possible appendicitis. Imaging did not show any inflammation of the appendix consistent with appendicitis, and the patient is referred to outpatient GI to undergo evaluation for possible inflammatory bowel disease (IBD).

Social History: Only child, lives with both parents, no one smokes at home.

Allergies: NKDA

Past Medical History: Turner syndrome

Past Surgical History: None

Medications: growth hormone

Family History: No known family history

Physical Exam

Vitals: Temp: 97.1 F, Height: 47 in, Weight: 76 lbs., BMI: 24.2, BP: 110/75, SpO2: 100%

Review of Symptoms:

Constitutional: short stature

Skin: negative

Breast: negative

Eyes: negative

ENMT: negative

Respiratory: negative

Gastrointestinal: bloody stool

Genitourinary: vulvar vitiligo

Musculoskeletal: negative

Hematologic/Lymphatic: anemia

Psychiatric: negative

Initial Evaluation

Laboratory Studies

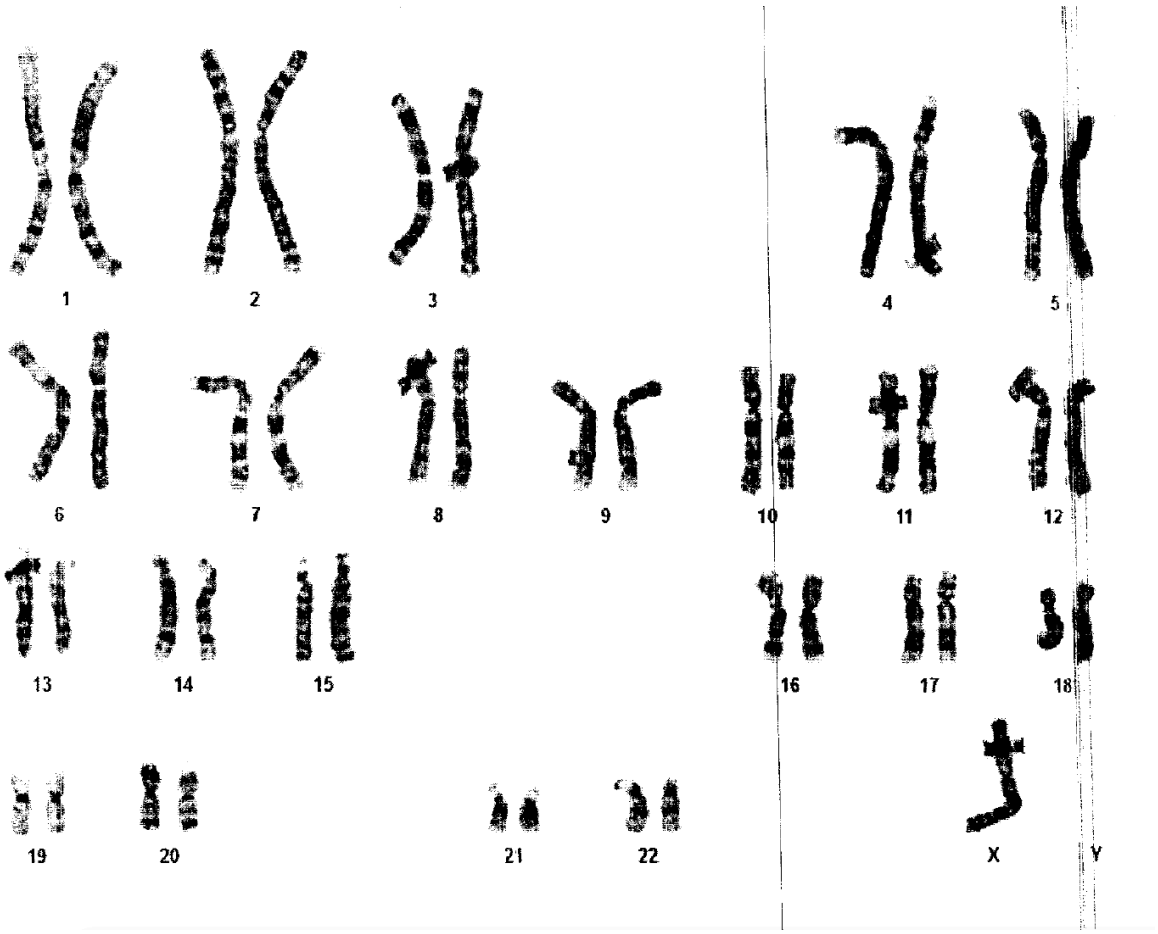
Cytogenetic analysis revealed sex chromosome mosaicism. Eight of 20 metaphases had a 45,X karyotype. The remaining cells had a normal X chromosome and a second X chromosome with a deletion of most of its short arm. IGF-1 115, IGFBP-3 3.35, Hemoglobin A1c 5.8, T4 1.81, TSH 4.560, cortisol 21, Celiac disease panel negative

MRI of abdomen and pelvis shows: liver normal, spleen normal, pancreas normal, gallbladder/biliary tree normal, adrenals normal, kidney normal, lymphadenopathy/retroperitoneum no adenopathy, bowel: stomach normal, proximal small bowel normal, terminal ileum normal, colon/rectum: allowing for the degree of distention, there

is mild circumferential wall thickening of the transverse colon, descending colon, sigmoid colon, and rectum with associated transmural hyperenhancement.

Colonoscopy revealed erythematous, friable (inflamed and ulcerated mucosa in the descending colon at the splenic flexure and in the distal transverse colon).

Biopsy revealed active inflammation involving the duodenal bulb, stomach, and colon. The inflammation is most pronounced from the distal transverse to the sigmoid colon where it is characterized by multifocal acute cryptitis, neutrophilic infiltration of the surface epithelium, and increased neutrophils throughout the lamina propria. Features of chronicity including increased to full thickness lamina propria, lymphoplasmacytosis and glandular architectural distortion are also noted within this region. A single non-caseating epithelioid granuloma is identified within the cecum. The histological features are compatible with inflammatory bowel disease, favor of Crohn's disease, provided other etiologies including infection and drug-induced



injury/inflammation have been excluded. Based on these findings, a diagnosis of Crohn's disease was made.

Figure 4: Cytogenetic result of our patient, taken from blood sample

Differential Diagnosis

Crohn's Disease

Infection

Drug induced injury

Diagnosis

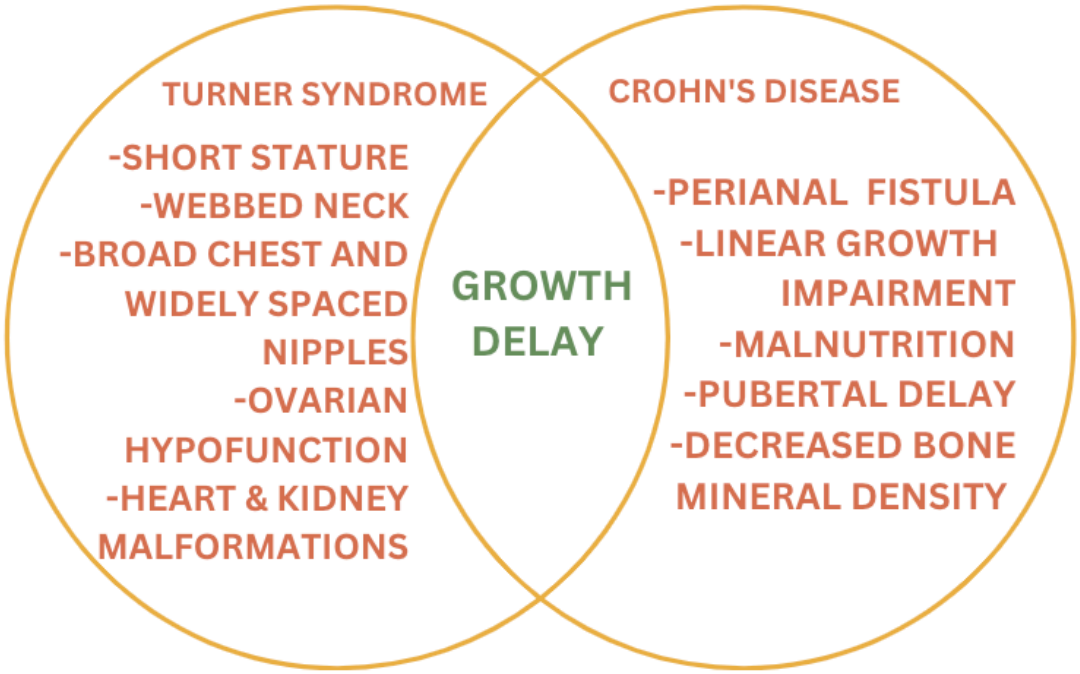
Based on the gastric MRI and biopsies, a diagnosis of Crohn's disease was made. Drug induced injury ruled out because patient was only ever on growth hormone and the occasional over the counter Tylenol and Motrin.

Management

After the initial diagnosis of Turner syndrome was made, the patient was sent for cardiac evaluation. It was notable for the slight prolongation of the corrected QT interval on her EKG. Her cardiac evaluation was otherwise normal, and there was no evidence of coarctation of the aorta or congenital heart disease. Recommendations include avoiding medication that prolongs QT interval (i.e., macrolide antibiotics, Benadryl), and reassessment in 2 months.

Patient was also seen in hematology and ruled out for celiac disease.

As our patient's BMI was on the higher side, and her A1c was increased, it was advised that she control her diet. Hence after age 8, after diet, exercise, and lifestyle modifications, her BMI and weight-age curves were coming down.


TURNER SYNDROME
-SHORT STATURE
-WEBBED NECK
-BROAD CHEST AND WIDELY SPACED NIPPLES
-OVARIAN HYPOFUNCTION
-HEART & KIDNEY MALFORMATIONS
GROWTH DELAY
CROHN'S DISEASE
-PERIANAL FISTULA
-LINEAR GROWTH IMPAIRMENT
-MALNUTRITION
-PUBERTAL DELAY
-DECREASED BONE MINERAL DENSITY

Discussion

Figure 5: similarities of Turner with Crohn's disease

It is important to start early treatment and intervention as soon as the diagnosis of Turner syndrome is made. Many genetic syndromes share relevant features with Crohn's, such as poor growth or short stature, and these similar symptoms can delay the diagnosis of IBD[6]. There is also a recent increase in diagnosing CD in patients with Turner syndrome and Down syndrome[6]. It is also important to realize that a patient can be more susceptible to developing drug toxicities, infections and surgical complications due to the presence of other comorbidities in genetic conditions. As in our patient, it was recommended to avoid medication that prolongs QT interval. Because our patient has mild CD, she does not need any medication at the moment but will require close follow up to make sure the disease does not progress. Based on moderate to severe CD, medical therapy includes medication, ileocolic resection, and dietary therapy.

Reference	Karyotype	Age at presentation with growth failure (years) Turner	Age at diagnosis of Turner's syndrome (years)	Age at onset of bowel symptoms (years)	Means of diagnosis of Crohn's disease
8	45XO/46XiXq	11	17	16	Sigmoidoscopy, barium enema
8	45XO/46XiXq	15	41	21	Barium enema
8	45XO	16	16	17	Laparotomy appearance, ileal histology
8	45XO/46XiXq	14	16	16	Post-mortem gross appearance, histology
8	46XiXq/47XiXqiXq/45XO	8	8	9	Laparotomy appearance, appendix histology
8	46XiXq	14	14	15	Colonoscopy, biopsy
8	45XO/46XX	15	15	15	Hemicolectomy gross specimen, ileal histology
9	45X/46XiXq	15	15	21	Rectal biopsy
10	45X/47XXX	11	16	16	Colonoscopy, biopsy
Our Case	46X,del(X)(p11.2)[12]/45,X[8]	8	8	8	Colonoscopy, biopsy

Figure 6: Summary of documented cases of concomitant Turner syndrome and Crohn's disease

Human Ethics

Maternal consent was received on behalf of the patient for this paper. Written informed consent was obtained from the mother of the individual for the publication of any potentially identifiable images or data included in this article.

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