DOWNLOAD PDF TURNER SYNDROME MANAGEMENT GUIDELINES

Chapter 1 : Turner Syndrome: Diagnosis and Management - - American Family Physician

Turner Syndrome Management Guidelines Australasian Paediatric Endocrine Group - November by George Werther, with advice from Margaret Zacharin.

The objective of this work is to provide updated guidelines for the evaluation and treatment of girls and women with Turner syndrome TS. The meeting was supported by the National Institute of Child Health and unrestricted educational grants from pharmaceutical companies. The study group used peer-reviewed published information to form its principal recommendations. Expert opinion was used where good evidence was lacking. The study group met for 3 d to discuss key issues. Breakout groups focused on genetic, cardiological, auxological, psychological, gynecological, and general medical concerns and drafted recommendations for presentation to the whole group. Draft reports were available for additional comment on the meeting web site. Synthesis of the section reports and final revisions were reviewed by e-mail and approved by whole-group consensus. We suggest that parents receiving a prenatal diagnosis of TS be advised of the broad phenotypic spectrum and the good quality of life observed in TS in recent years. We recommend that magnetic resonance angiography be used in addition to echocardiography to evaluate the cardiovascular system and suggest that patients with defined cardiovascular defects be cautioned in regard to pregnancy and certain types of exercise. We recommend that puberty should not be delayed to promote statural growth. We suggest a comprehensive educational evaluation in early childhood to identify potential attention-deficit or nonverbal learning disorders. We suggest that caregivers address the prospect of premature ovarian failure in an open and sensitive manner and emphasize the critical importance of estrogen treatment for feminization and for bone health during the adult years. All individuals with TS require continued monitoring of hearing and thyroid function throughout the lifespan. We suggest that adults with TS be monitored for aortic enlargement, hypertension, diabetes, and dyslipidemia. This disorder presents the clinician with a challenging array of genetic, developmental, endocrine, cardiovascular, psychosocial, and reproductive issues. There have been important advances in each of these arenas since publication of the previous recommendations for the care of girls and women with TS 2. Discussions at this conference and the ensuing recommendations have been based upon recent, peer-reviewed scientific publications. The paper is divided into sections addressing 1 diagnostic issues, 2 congenital cardiovascular disease, 3 growth and development, 4 psychological and educational issues, and 5 TS in adulthood. Definition The diagnosis of TS requires the presence of characteristic physical features in phenotypic females 3 , 4 coupled with complete or partial absence of the second sex chromosome, with or without cell line mosaicism 5. Individuals with a 45,X cell population but without clinical features are not considered to have TS. Phenotypic males are also excluded from the diagnosis of TS, regardless of karyotype. Whether to diagnose individuals with sex chromosome structural abnormalities as having TS requires clinical judgment. Abnormalities such as ring X and Xq isochromosomes are common in patients with classic TS features, and many of these patients have phenotypes indistinguishable from that of patients with apparently nonmosaic monosomy X 45,X 5. Patients with small distal short arm deletions Xp- including the SHOX gene frequently have short stature and other TS-associated skeletal anomalies, but most are at low risk of ovarian failure and should generally not be diagnosed with TS if band Xp Individuals with deletions of the long arm distal to Xq24 frequently have primary or secondary amenorrhea without short stature or other TS features 7 ; the diagnosis of premature ovarian failure is more appropriate for them. Prenatal diagnosis Sex chromosome abnormalities are increasingly detected prenatally by chorionic villous sampling or amniocentesis, and genetic counseling before any prenatal diagnostic procedure should always include discussion of the possibility of detecting them. Certain ultrasound findings indicate an increased likelihood of TS. Increased nuchal translucency on ultrasound is frequently seen in TS but may also be observed in autosomal trisomy syndromes. The presence of cystic hygromas make the diagnosis of TS more likely 8. Ultrasound and maternal serum screening are not diagnostic, and to make a prenatal diagnosis of TS, karyotype confirmation is obligatory. The postnatal outcome and constitutional karyotype of individuals with prenatally diagnosed sex chromosome monosomy are uncertain, especially in mosaic cases. Therefore,

chromosomes should be reevaluated postnatally in all cases. The degree of mosaicism detected prenatally is not generally predictive of the severity of the TS phenotype 11 , In general, any of the features of TS may be seen with virtually any of the common chromosome constitutions 5. Nonmosaic 45,X fetuses with pleural effusion or cystic hygroma often spontaneously abort Nevertheless, a 45,X karyotype, even with ultrasound evidence of cystic hygroma, lymphedema, and effusions, is compatible with delivery of a viable newborn. Many pregnancies diagnosed prenatally with TS are currently terminated 14 , Decisions regarding pregnancy termination are difficult; thus, it is critical that the best available information be provided to parents. Although upholding personal choice about reproduction is a widely embraced ethical principle, decisions to terminate a fetus with TS should never be based upon misunderstood or unbalanced information Many studies providing genotype-phenotype correlations are subject to considerable ascertainment bias. Individuals with 45,X mosaicism detected because of an abnormal antecedent ultrasound study are more likely to have clinical TS than those with 45,X mosaicism detected incidentally by screening on the basis of advanced maternal age 11 , 12 , which itself is not associated with an increased incidence of TS Not unexpectedly, prenatally diagnosed children tend to be less affected than those diagnosed postnatally on clinical grounds 11 , Physicians and genetic counselors involved in pre- and postdiagnostic counseling need to be fully informed about the prognosis, complications, and quality of life of individuals affected with TS as well as of recent advances in management. The clinical spectrum of TS is much broader and often less severe than that described in many textbooks. Prenatal counseling should always involve discussion of the variability of features, the likelihood of short stature and ovarian failure, and their management. It should be emphasized that most individuals with TS have intelligence scores in the normal range, although they may have specific types of learning disabilities. Most adults with TS function well and independently. Girls and women in one study indicated that struggling with their infertility was the greatest challenge they faced in adapting to a life with TS Speaking with children and adults with TS and their families is important for prospective parents faced with a decision about pregnancy and can be facilitated by support organizations, e. Postnatal diagnosis All individuals with suspected TS see below should have a karyotype performed. The cytogeneticist should be consulted in this case. Although a peripheral blood karyotype is usually adequate, if there is a strong clinical suspicion of TS, despite a normal blood karyotype, a second tissue, such as skin, may be examined. Testing for Y chromosome material should be performed in any TS patient or fetus with a marker chromosome a sex chromosomal fragment of unknown origin, i. The presence of virilization in a TS patient should prompt a search for a gonadal, adrenal, or midline tumor as well as investigation of the karyotype for Y material. The prevalence and clinical significance of cryptic Y material detected only by FISH or DNA analysis in patients without virilization or a marker chromosome needs additional investigation. False positives may be a problem with highly sensitive PCR-based Y detection methods Gonadoblastomas may transform into malignant germ cell neoplasms; hence, the current recommendation is for laparoscopic, prophylactic gonadectomy It is often assumed that gonads in patients with TS and Y chromosome mosaicism have no reproductive potential, but spontaneous pregnancies in such women have been reported 23 , Thus, preservation of follicles or oocytes may be a future option for some patients undergoing gonadectomy. The gene responsible for gonadoblastoma has not been identified, but mapping data indicate that it is distinct from SRY, the male sex-determining gene 25 , Routine testing for SRY or the presence of Y chromosome material in 45,X individuals without masculinization is not clinically warranted at present. Indications for karyotype The diagnosis of TS should be considered in any female with unexplained growth failure or pubertal delay or any constellation of the following clinical findings: Newborn screening Under-diagnosis and delayed diagnosis of TS remains a problem Importantly, early detection permits identification of cardiovascular system malformations such as bicuspid aortic valve that require treatment to prevent complications. Moreover, early diagnosis facilitates prevention or remediation of growth failure, hearing problems, and learning difficulties. Finally, it may be possible in future years to prevent infertility in some individuals with TS by harvesting eggs or ovarian tissue for cryopreservation from girls while they still have viable follicles PCR-based screening methods to detect sex chromosome aneuploidy are feasible 29 but have not yet been validated on a newborn population sample. If and when molecular screening for TS is offered, positive findings will need karyotype confirmation, an

infrastructure for follow-up and treatment of the patients with sex chromosome abnormalities, and support services to help parents and caregivers deal with the uncertainties inherent in this type of diagnosis. By extrapolation from experience with prenatal diagnosis, it is highly likely that newborn screening will also identify sex chromosome abnormalities of no clinical consequence in some phenotypically normal individuals; this risk must be weighed against the benefit of early detection of TS and other X-chromosome disorders. Frequency and type of congenital defects The most serious, life-threatening consequences of X-chromosome haploinsufficiency involve the cardiovascular system. This is most apparent during fetal development, where major defects in cardiac and aortic development result in a very high mortality for fetuses with a 45,X karyotype 30 , 31 , Fetuses with cardiovascular failure almost always demonstrate obstructed jugular lymphatics with nuchal cystic hygromas. These hygromas resolve as the lymphatics open later in gestation, but residual postnatal webbing of the neck predicts defects such as bicuspid aortic valve BAV and aortic coarctation in surviving individuals with TS 33 , 34 , This association led to the hypothesis that the fetal cystic hygromas caused the cardiovascular defects by compressing outflow tracts This view remains speculative, however, and it seems equally possible that haploinsufficiency for the same X-linked gene s impairs both lymphatic and vascular development. Several recent imaging studies have investigated the prevalence of aortic coarctation and BAV in large groups of girls and women with TS 34 , 36 , 37 , Aortic coarctation and BAV are each almost 4-fold more frequent in patients with webbed necks, e. It is important to note that coarctation may not be detected in infancy and may be first diagnosed in older children or adults, and magnetic resonance imaging MRI studies frequently identify cases missed by echocardiography 39 , 40 , 41 , 42 , The presence of an abnormal aortic valve is usually clinically silent in young patients and detected only as a result of screening The abnormal valve is at risk for infective endocarditis, and over time, it may deteriorate leading to clinically significant aortic stenosis or regurgitation. The BAV is also associated with aortic wall abnormalities, including ascending aortic dilation, aneurysm formation, and aortic dissection 45 , Recent studies suggest a broader spectrum of cardiovascular system abnormalities in TS than previously recognized. Magnetic resonance angiographic screening studies of asymptomatic individuals with TS have identified a high prevalence of vascular anomalies of uncertain clinical significance 39 , 40 , 41 , By itself the elongated transverse arch does not appear to be clinically significant, but there is concern that it may reflect an abnormal aortic wall prone to dilation and perhaps dissection. PAPVC in TS frequently involves the left upper pulmonary vein, which is less common than the typical right-sided presentation in the general population, and makes echocardiographic detection more challenging. Whether this defect is clinically significant depends upon the degree of the left-to-right shunt 47 , 48 , There seems to be a generalized dilation of major vessels in women with TS, including the brachial and carotid arteries as well as the aorta. The distal extent of this dilated vasculopathy is unknown. Estrogen deficiency contributes to greater intima medial thickness and altered arterial wall dynamics but not to the increased caliber of vessels 50 , Electrocardiography Adults with TS have a high prevalence of electrocardiographic conduction and repolarization abnormalities. Right axis deviation, T wave abnormalities, accelerated AV conduction, and QTc prolongation are significantly more common in women with TS than normal, age-matched controls Right axis deviation may be associated with underlying PAPVC, but the other findings appear independent of anatomic defects These data and the recent observations of an unusual resting tachycardia that begins in utero 53 and evidence of impaired sympathovagal tone 54 suggest that there may be an intrinsic defect in autonomic regulation of the cardiovascular system in TS. The clinical significance of these recent observations is unclear, but additional monitoring of electrocardiograms ECGs in TS seems warranted. Risk for aortic dissection A major concern in TS remains the rare but often fatal occurrence of aortic dilation, dissection, or rupture in relatively young individuals. Dissecting aortic aneurysm in TS is usually associated with additional risk factors including BAV or other abnormalities of the aortic valve, coarctation or dilatation of the aorta, and systemic hypertension 45 , 55 , Systemic hypertension is common in TS and therefore may be the most important treatable risk factor for aortic enlargement and dissection 46 , However, a few cases do not clearly document the established risk factors, raising the possibility that the vasculopathy of TS alone may predispose to dissection.

Chapter 2 : [Clinical guideline 'Turner syndrome'].

The Turner Syndrome Society offers education and support for all those touched by TS.

The test involves a blood sample. Occasionally, your doctor also may request a cheek scraping buccal smear or skin sample. The chromosome analysis determines whether or not there is a missing X chromosome or abnormality of one of the X chromosomes. Prenatal diagnosis A diagnosis is sometimes made during fetal development. Certain features on an ultrasound image may raise suspicion that your baby has Turner syndrome or another genetic condition affecting development in the womb. However, doing a karyotype during pregnancy or after delivery is recommended to confirm the diagnosis. One of two procedures can be performed to test prenatally for Turner syndrome: This involves taking a small piece of tissue from the developing placenta. The placenta contains the same genetic material as the baby. The chorionic villus cells can be sent to the genetics laboratory for chromosome studies. In this test, a sample of the amniotic fluid is taken from the uterus. The baby sheds cells into the amniotic fluid. Discuss the benefits and risks of prenatal testing with your doctor. Evaluation and monitoring for medical or mental health issues associated with Turner syndrome throughout life can help to address problems early. The primary treatments for nearly all girls and women with Turner syndrome include hormone therapies: For most girls, growth hormone therapy â€" usually given daily as injections of recombinant human growth hormone â€" is recommended to increase height as much as possible at appropriate times during early childhood until the early teen years. Starting treatment early can improve height and bone growth. In girls with very short stature, the doctor may recommend oxandrolone in addition to the growth hormone. Most girls with Turner syndrome need to start estrogen and related hormone therapy in order to begin puberty. Often, estrogen therapy is started around age 11 or 12 years. Estrogen helps to promote breast development and improve the size volume of the uterus. Estrogen helps with bone mineralization, and when used with growth hormone, may also help with height. Estrogen replacement therapy usually continues throughout life, until the average age of menopause is reached. Regular checkups have shown substantial improvements in the health and quality of life for girls and women with Turner syndrome. A primary care doctor can help to continue coordination of care among a number of specialists throughout life. Health care team Because Turner syndrome can result in various developmental problems and medical complications, several specialists may be involved in screening for specific conditions, making diagnoses, recommending treatments and providing care. Teams may evolve as the needs of girls with Turner syndrome change throughout life. Care team specialists may include some or all of these professionals, and others as needed: Those who can are still likely to experience failure of the ovaries and subsequent infertility very early in adulthood. Some women with Turner syndrome can become pregnant with the donation of an egg or embryo. This requires a specially designed hormone therapy to prepare the uterus for pregnancy. A reproductive endocrinologist can discuss options and help evaluate the chances of success. In most cases, females with Turner syndrome have relatively high-risk pregnancies. Request an Appointment at Mayo Clinic Coping and support The Turner Syndrome Society of the United States and other organizations provide educational materials, resources for families and information about support groups. Groups for parents provide an opportunity to exchange ideas, develop coping strategies and locate resources. Peer groups for girls with Turner syndrome can help reinforce self-esteem and provide a social network of people who understand how to live with Turner syndrome. Preparing for your appointment How you learn your child has Turner syndrome may vary. Turner syndrome may be suspected by prenatal cell-free DNA screening or certain features may be detected on prenatal ultrasound screening. Prenatal diagnostic testing can confirm the diagnosis. If certain conditions â€" such as a webbed neck or other distinct physical features â€" are readily apparent at birth, diagnostic tests will likely begin before your child leaves the hospital. During childhood or teen years. Diagnostic testing can confirm the diagnosis. These visits are an opportunity for the doctor to take height measurements, note delays in expected growth and identify other problems in physical development. The doctor may ask questions such as: How well does your child eat? Has your child begun to show signs of puberty? Is your child experiencing any learning difficulties at school? How does your child do in peer-to-peer

interactions or social situations? Talking to the doctor about Turner syndrome If your family doctor or pediatrician believes that your child shows signs or symptoms of Turner syndrome and suggests diagnostic tests, you may want to ask these questions: What diagnostic tests are needed? When will we know the results of the tests? What specialists will we need to see? How will you screen for disorders or complications that are commonly associated with Turner syndrome? Can you suggest educational materials and local support services regarding Turner syndrome?

Chapter 3 : Turner Syndrome Society of the United States | Guidelines & Checklists

Turner syndrome occurs in one out of every 2, to 3, live female births. The syndrome is characterized by the partial or complete absence of one X chromosome (45,X karyotype).

Chapter 4 : BMJ Best Practice

Turner syndrome is an important cause of short stature in girls and of primary or secondary amenorrhea in adolescents, and is caused by loss of part or all of an X chromosome [1]. This topic will review the management of children and adolescents with this disorder. Treatment varies with the age of.

Chapter 5 : Turner syndrome - Diagnosis and treatment - Mayo Clinic

How To Use: This form is suggested to help assess the teen/emerging young adult's knowledge and skills regarding Turner Syndrome and its management. The tool is intended as an aide to help assess the readiness of older teens/emerging young adults in the transition and to be transferred from pediatric to adult care providers.

Chapter 6 : Turner syndrome and hypertrophic vagina (query bank)

Management guidelines International Clinical practice guidelines for the care of girls and women with Turner syndrome: proceedings from the Cincinnati International Turner Syndrome Meeting [23] Gravholt CH, Andersen NH, Conway GS; International Turner Syndrome Consensus Group.