Carcinoma of Breast



Ref.no.: MP2105

ERLER ZIMMER
MEDICAL

Carcinoma of Breast

Clinical History

A 76-year old female presented to the emergency department sudden loss of consciousness. She had signs of a left sided cerebrovascular accident. She was intubated and her stroke was treated. During her admission in ICU she was noted to have a fixed mass in her left breast with palpable lymphadenopathy in her left axilla. She died from a respirator associated pneumonia.



Pathology

The specimen is the patient's left breast mounted to display the cut surface. Immediately beneath and attached to the skin is a large oval tumour mass 11cm in maximum diameter. The tumour is adherent to the underlying muscle. The tumour is not encapsulated and has a variegated cut surface with areas of necrosis, haemorrhage and cyst formation. This is a breast adenocarcinoma, which involved the regional lymph nodes.



Further Information

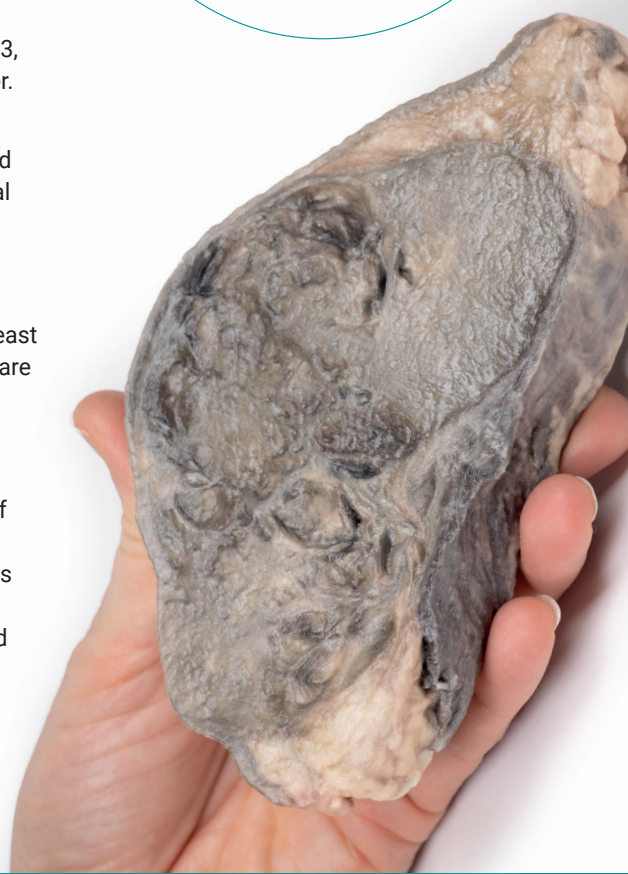
Breast carcinoma is the second most commonly diagnosed cancer in women worldwide. It is rare in women under 30 years of age but the incidence increases significantly after 30 with the peak occurring at 70 to 80 years. Incidence has been decreasing since the introduction of breast cancer screening programmes, which offer mammography to women at risk and public awareness and education in self-examination of the breast. However, breast cancer remains one of the leading causes of cancer-related death in women.

Major risk factors for developing breast carcinoma include being of female gender (men account for 1% of breast cancer diagnosis), exposure to estrogen (early menarche, late menopause, exogenous estrogen), family history of breast cancer, being nulliparous, not breastfeeding, radiation exposure and obesity. Germline mutations in tumour suppressor genes, such as BRCA1, BRCA2, TP53, ATM, CDH1 and CHEK2 are linked with some hereditary cases of breast cancer.

Most breast neoplasms are adenocarcinomas that begin in the duct/lobular system as carcinoma in situ (DCIS). These malignancies are further subdivided according to their expression of estrogen receptors (ER) and Human epidermal growth factor 2 (HER2), which guides treatment. The most frequent sites if distant metastasis occur are bone, liver, lung and brain.

In developed countries with screening programmes most patients present following an abnormal mammogram. Symptomatic patients present with a breast mass which is classically hard, irregular, immovable. Other clinical symptoms are axillary lymphadenopathy, overlying skin changes (erythematous or thickened skin, dimpled skin (peau d'orange) and nipple retraction. Symptoms of distant spread of disease may also cause patient presentations.

Treatment depends on the stage of the disease and the ER and HER2 status of the tumour. Surgical treatments include uni- or bilateral mastectomy or breast conserving lumpectomy. Surgical axillary node clearance is performed in cases with positive nodal disease. Radiotherapy is given to patients with high risk of local recurrence. Patients with HER2 positive cancers are treated with targeted drugs, such as trastuzumab (Herceptin). Patients with ER positive tumors can be treated using anti-estrogen therapy, such as tamoxifen. Systemic chemotherapy is also used to treat some patients with breast cancer.



ERLER ZIMMER

Erler-Zimmer Medical GmbH · Hauptstrasse 27 · 77886 Lauf · Germany
T +49 7841 / 67191-0 · F +49 7841 / 67191-99 · info@erler-zimmer.de
www.erler-zimmer.de · www.3Danatomyseries.com

Follow us!

Endometrial Carcinoma



Ref.no.: MP2106

ERLER ZIMMER
MEDICAL

Endometrial Carcinoma

Clinical History

A 63-year old woman presented with a history of dull lower abdominal pain for 2 months and heavy persistent vaginal bleeding for 1 week. The menopause had occurred 13 years previously. Radical abdominal hysterectomy and bilateral salpingo-oophorectomy were commonly performed for the treatment of endometrial cancer following confirmation of endometrial carcinoma in biopsy.



Pathology

The specimen consists of uterus, fallopian tubes and ovaries. The endometrial cavity and endocervical canal have been opened on the anterior aspect. The endometrial lining is grossly abnormal especially on the right side and a brown polypoid tumour has invaded the myometrium and extends inferiorly into the cervical canal. Histologically this was a well-differentiated adenocarcinoma of the endometrium. The left ovary, which has been sectioned in the coronal plane, is enlarged and has several large follicular cysts/cavities.



Further Information

Endometrial carcinoma is the most common gynecological malignancy in developed countries and the second most common in developing countries after cervical cancer. There are two major types of endometrial carcinoma. Endometroid carcinoma account for almost 80% of endometrial carcinoma. They usually present early and so have a more favourable outcome. These tumours may arise from atypical endometrial hyperplasia. Common genetic abnormalities seen in endometrioid tumours are mutations in the PTEN, PIK3Ca and ARID1A genes. Serous carcinoma are a less common form of endometrial carcinoma. These tumours are associated with mutations in TP53 gene and carry a poorer prognosis. Endometrioid tumours tend to affect women aged 55 to 65 years. Risk factors for developing endometrioid endometrial cancer include obesity, impaired glucose tolerance, infertility, unopposed estrogen therapy (e.g. early menarche, late menopause or exogenous sources). Serous neoplasms affect older women aged 65 to 75 years with other risk factors for development include having a lower BMI and an atrophic uterus. Women with Hereditary Nonpolyposis Colorectal Cancer (Lynch Syndrome) have a significantly higher risk of developing endometrial cancer.



The most common symptom of endometrial cancer is abnormal vaginal bleeding. Most frequently it presents as post-menopausal bleeding, which often allows early presentation. Others may be asymptomatic or an incidental finding of an abnormal endometrium on abdominopelvic imaging. The main radiological sign of endometrial cancer is abnormally thickened endometrium on pelvic ultrasound or CT scan. Diagnosis is made on endometrial biopsy, endometrial curettage or hysterectomy. Treatment depends on the stage of the cancer and includes local radiotherapy, systemic chemotherapy and surgical hysterectomy +/- salpingo-oophorectomy.

ERLER ZIMMER

Erler-Zimmer Medical GmbH · Hauptstrasse 27 · 77886 Lauf · Germany
T +49 7841 / 67191-0 · F +49 7841 / 67191-99 · info@erler-zimmer.de
www.erler-zimmer.de · www.3Danatomyseries.com

Follow us!

Uterine Leiomyoma



Ref.no.: MP2107

ERLER ZIMMER
MEDICAL

Uterine Leiomyoma

Clinical History

A 30-year old female presents with inability to conceive. She also reports a history of intermittent pelvic discomfort, menorrhagia and painful periods. On examination a pelvic mass was palpable. All of her blood tests were within normal ranges. A pelvic ultrasound showed a hypoechoic mass within the myometrium of her uterus. She went for hysteroscopic myomectomy but unfortunately complications meant her surgery was converted to an emergency hysterectomy. She made a full recovery post-op.



Pathology

The specimen includes the cervix, body and fundus of the uterus. The uterus, which is of normal size, has been cut in the sagittal plane. A large ovoid mass approximately 4cm x 2cm protrudes into the uterine cavity and extends as far inferiorly as the opening of the cervix. It originates from the posterior aspect of the uterus. The cervical canal is clearly visible.



Further Information

Uterine leiomyomas , also called fibroids, are the most common pelvic tumours in females. They are present in almost 25% of reproductive females. They are benign tumours arising from smooth muscle and fibroblasts of the myometrium. They usually involve the myometrium of the uterine body. Rarely they can affect the lower uterus or cervix. Leiomyomas can occur as single lesions or multiple and can grow very large. There are rare variants, which can extend and spread distally but are still considered benign: e.g. the benign metastasizing leiomyoma, which commonly spread to the lining; or disseminated peritoneal leiomyomatosis, which appears on the peritoneum covering the uterus

Risk factors for developing fibroid include being of reproductive age, being a black woman and early menarche. Higher parity has been found to be protective. Most leiomyomas have normal karyotypes but there are some which show mutation in the HMG genes. Transformation into malignant leiomyosarcoma is very rare.

Common symptoms of uterine fibroids include abnormal vaginal bleeding, pelvic pain, dyspareunia, dysmenorrhea and symptoms of pelvic structure compression such as urinary symptoms or venous compression symptoms. Leiomyomas can decrease fertility and in pregnant females increase the rate of early pregnancy loss, fetal malpresentation and postpartum hemorrhage. Pelvic ultrasound is usually used to diagnose leiomyomas. CT and MRI scans are rarely used to diagnose.

Leiomyomas can grow but can also regress. Treatment is reserved for persistently or severely symptomatic fibroids. Hormonal treatment may be used to regulate irregular menstrual bleeding symptoms. Surgical treatments include myomectomy (removal of fibroids from myomectomy), hysterectomy, myolysis (thermal ablation of leiomyoma) and uterine artery ablation/embolisation.



ERLER ZIMMER

Erler-Zimmer Medical GmbH · Hauptstrasse 27 · 77886 Lauf · Germany
T +49 7841 / 67191-0 · F +49 7841 / 67191-99 · info@erler-zimmer.de
www.erler-zimmer.de · www.3Danatomyseries.com

Follow us!

Nodular hyperplasia of the Prostate



Ref.no.: MP2108

ERLER ZIMMER
MEDICAL

Nodular hyperplasia of the Prostate

Clinical History

A 63-year old male presented to the emergency departed with acute abdominal pain. He has been unable to pass urine for 5 days. Further questioning revealed a 2-year history of urinary frequency, double void, urinary hesitancy, nocturia and a poor urine stream. Abdominal examination showed a tender distended bladder and an enlarged palpable prostate on digital rectal examination. A bedside bladder scan demonstrated a volume of >1L in the bladder. Blood tests shows a severe acute kidney injury. He is diagnosed with acute renal failure due to acute urinary retention. There were multiple failed attempts at catheterising the patient via the urethra and suprapublically.
A total prostatectomy was performed and he made a good recovery.



Pathology

The specimen is an enlarged prostate gland sliced transversely to display the external and cut surfaces, On the cut surface there are numerous nodules varying in size from 2-10mm in diameter. This is an example of benign nodular hyperplasia (BPH) of the prostate gland.



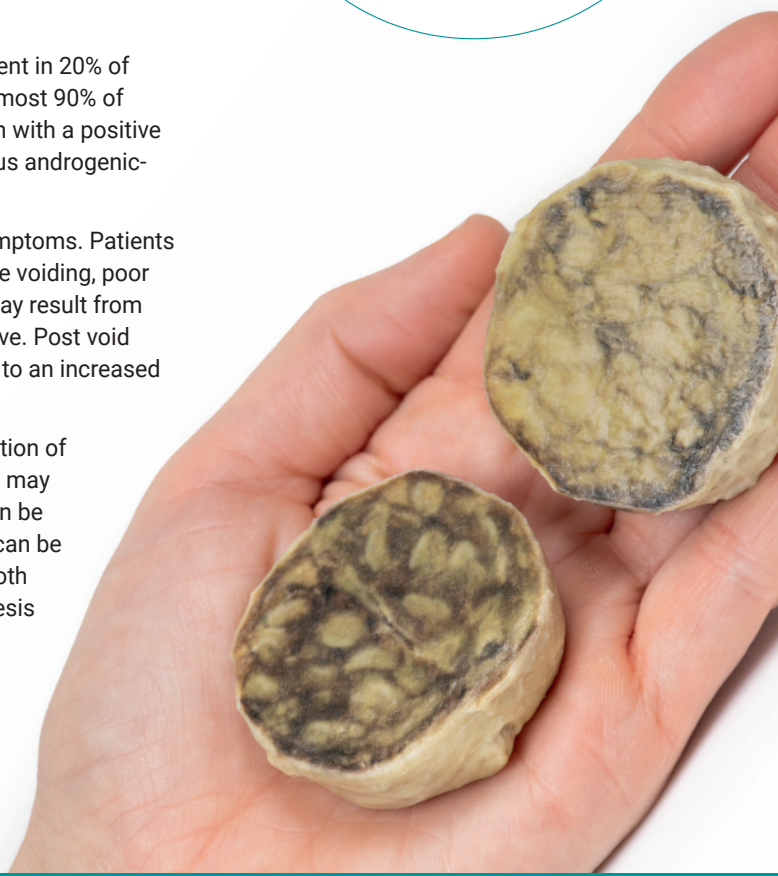
Further Information

Benign prostatic hyperplasia (BPH) or nodular hyperplasia of the prostate is a common disease in older men. BPH is caused by nodular hyperplasia of prostatic stromal and glandular epithelial cells primarily in the periurethral prostate. Hyperplasia is a result of accumulation of senescent cells due to impaired cell death and cell proliferation driven by androgens, mainly dihydrotesterone. Disproportionate enlargement of the median lobe is a common feature of nodular hyperplasia of the prostate. The projecting median lobe may occlude the internal urethral orifice on contraction of the bladder.

Prevalence of BPH increases significantly with age. BPH is present in 20% of males at 40 years of age, 70% of males of 60 year of age and almost 90% of males by the age of 80. There is an increased risk of BPH in men with a positive family history of BPH, in obese males and exposure to exogenous androgenic-anabolic steroids.

Clinical presentation of BPH results from urinary obstructive symptoms. Patients complain of urinary frequency, nocturia, urinary hesitancy, double voiding, poor urinary stream and overflow dribbling. Acute urinary retention may result from complete urinary tract obstruction as in the case discussed above. Post void residual urine results from the obstructing prostate which leads to an increased risk of urinary tract infections.

Diagnosis can be made on clinical history and physical examination of the prostate with a digital rectal exam. Prostate specific antigen may be used to screen for prostate cancer. Ultrasound scan or CT can be used to evaluate the volume of the prostate. Treatment of BPH can be treated medically with Alpha-blockers to relax the prostate smooth muscle tone or 5-alpha-reductase inhibitors, which inhibit synthesis of dihydrotesterone. The main surgical treatment for severe cases of BPH is transurethral resection of the prostate (TURP). Total prostatectomy is no longer used due to risk of disabling complications.



ERLER ZIMMER

Erler-Zimmer Medical GmbH · Hauptstrasse 27 · 77886 Lauf · Germany
T +49 7841 / 67191-0 · F +49 7841 / 67191-99 · info@erler-zimmer.de
www.erler-zimmer.de · www.3Danatomyseries.com

Follow us!

Hydrocoele



Ref.no.: MP2109

ERLER ZIMMER
MEDICAL

Hydrocoele

Clinical History

with a history of diabetes and previous myocardial infarctions. On examination bilateral pleural effusion, peripheral pitting oedema and a swollen scrotum were noted. Transillumination of the swelling transmitted red light. Chest x-ray showed radiological features of congestive cardiac failure. He was commenced on appropriate treatment for heart failure but later died during this admission.



Pathology

The specimen is a testis and its coverings, sliced to display the cut surface. The cavity bounded by the visceral and parietal layers of the tunica vaginalis is distended due to the accumulation of serous fluid. This is an example of a hydrocoele, secondary to generalised oedema due to congestive cardiac failure.



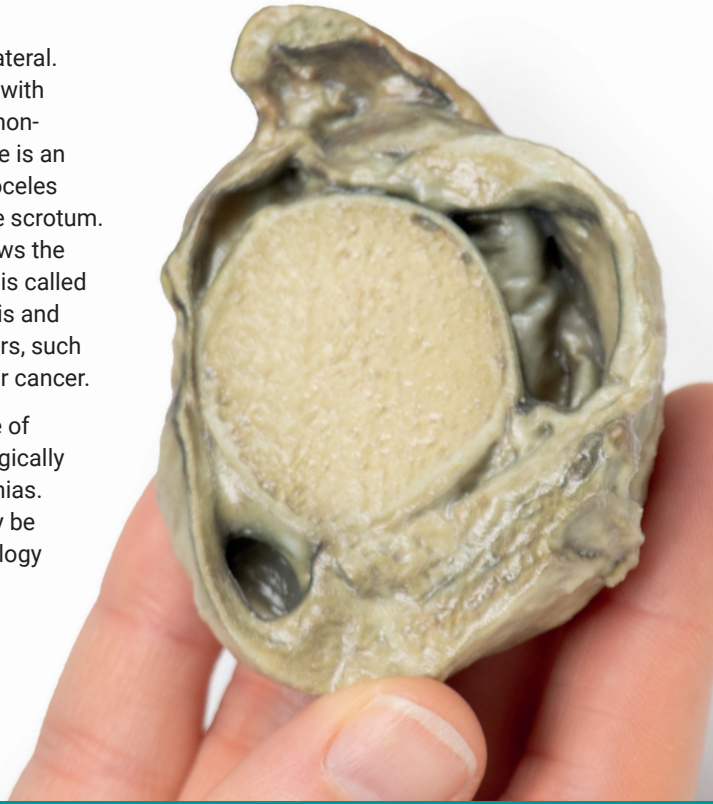
Further Information

A hydrocele is an accumulation of serous fluid between the parietal and visceral layers of the tunica vaginalis around the testes. Hydroceles can be described as communicating with the peritoneal cavity or non-communicating with the peritoneal cavity.

Communicating hydroceles develop as a result of failure of the processus vaginalis to close after the descent of the testes into the scrotum. These may present after birth as a congenital hydrocele or may present later in life due to increase in intra-abdominal pressure, such a cardiac failure in this case. Non-communicating hydroceles are caused by imbalances in fluid secretion and reabsorption e.g. orchitis, epididymitis, testicular tumour, physical trauma (e.g. hernia, testicular torsion) or defective lymphatic drainage (e.g. filariasis, elephantiasis).

Patients present with a scrotal mass. The mass may be uni- or bilateral. Communicating hydroceles may be reducible and increase in size with raised intra-abdominal pressure. Non-communicating are usually non-reducible swellings. The swelling is usually non tender unless there is an underlying infection or torsion causing the hydrocele. Larger hydroceles may be cumbersome and cause erosion and skin infections on the scrotum. Diagnosis can be made on physical examination. Serous fluid allows the passage of light shined through the scrotum when examined: this is called transillumination. Ultrasound may be used to consolidate diagnosis and exclude other testicular pathology. Testicular cancer serum markers, such as alpha fetoprotein and B-HCG, may be taken to exclude testicular cancer.

Many congenital hydroceles resolve spontaneously before the age of 2. If communicating hydroceles persist beyond 2 year they are surgically repaired in order to reduce the risk of developing incarcerated hernias. Surgical repair of communicating hydroceles in older patients may be offered if they are symptomatic. Treatment of the underlying aetiology of reactive hydrocele may cause them to resolve.



ERLER ZIMMER

Erler-Zimmer Medical GmbH · Hauptstrasse 27 · 77886 Lauf · Germany
T +49 7841 / 67191-0 · F +49 7841 / 67191-99 · info@erler-zimmer.de
www.erler-zimmer.de · www.3Danatomyseries.com

Follow us!

Chronic hydrocoele



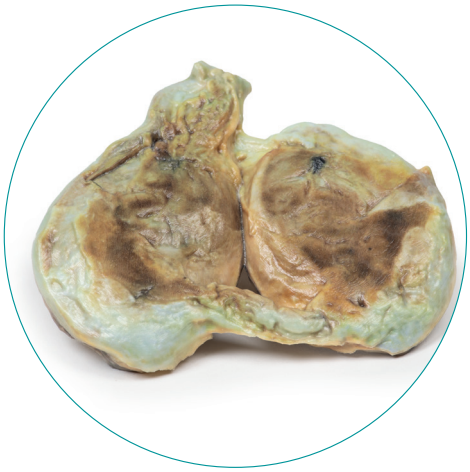
Ref.no.: MP2110

ERLER ZIMMER
MEDICAL

Chronic hydrocoele

Clinical History

An 80-year old male presented with haematemesis. He has a known history of alcoholic liver cirrhosis with oesophageal varices. On examination, he is noted to have multiple spider naevi, large volume abdominal ascites and a scrotal swelling. Transillumination of the swelling transmitted red light. He experienced another large volume haematemesis and died shortly after admission.



Pathology

The specimen consists of a testis, tunica vaginalis and distal end of the spermatic cord. The testis and its surrounding layers have been bisected to display the cut surface. The tunica vaginalis is thickened and the enclosed cavity is distended. The testis is normal. This is an example of a chronic secondary communicated hydrocoele.



Further Information

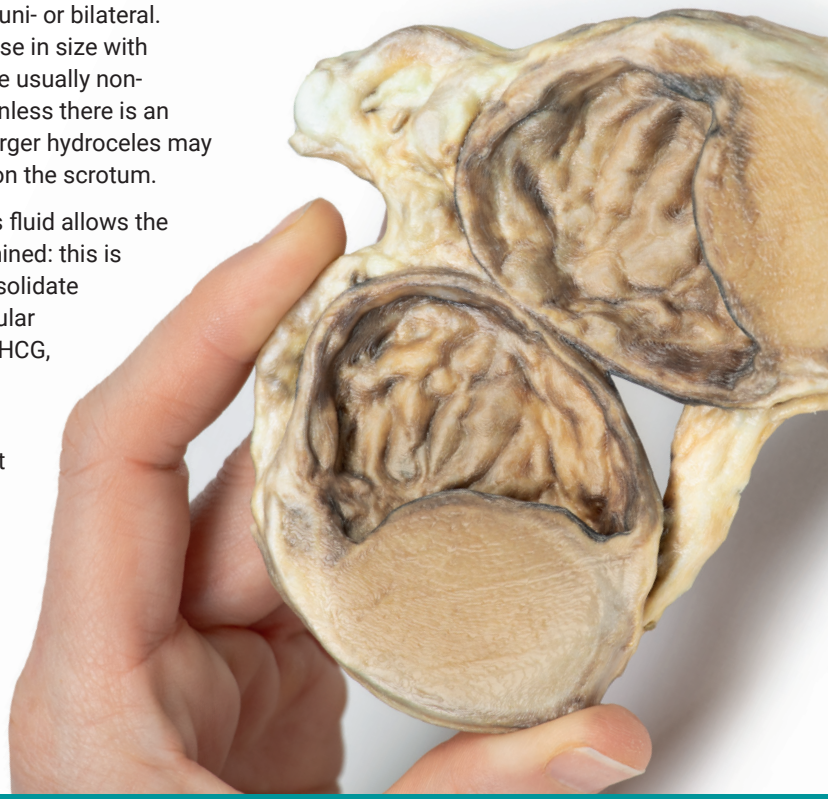
A hydrocele is an accumulation of serous fluid between the parietal and visceral layers of the tunica vaginalis around the testes. Hydroceles can be described as communicating with the peritoneal cavity or non-communicating with the peritoneal cavity.

Communicating hydroceles develop due to failure of the processus vaginalis to close after the descent of the testes into the scrotum. These may present after birth as a congenital hydrocele or may present later in life due to increase in intra-abdominal pressure such a cardiac failure in this case. Non-communicating hydroceles are caused by imbalances in fluid secretion and reabsorption (e.g. orchitis, epididymitis), testicular tumour, physical trauma (e.g. hernia, testicular torsion) or defective lymphatic drainage (e.g. filariasis, elephantiasis).

Patients present with a scrotal mass. The mass may be uni- or bilateral. Communicating hydroceles may be reducible and increase in size with raised intra-abdominal pressure. Non-communicating are usually non-reducible swellings. The swelling is usually non tender unless there is an underlying infection or torsion causing the hydrocele. Larger hydroceles may be cumbersome and cause erosion and skin infections on the scrotum.

Diagnosis can be made on physical examination. Serous fluid allows the passage of light shined through the scrotum when examined: this is called transillumination. Ultrasound may be used to consolidate diagnosis and exclude other testicular pathology. Testicular cancer serum markers, such as alpha fetoprotein and B-HCG, may be taken to exclude testicular cancer.

Many congenital hydroceles resolve spontaneously before the age of 2. If communicating hydroceles persist beyond 2 year they are surgically repaired due to the risk of developing incarcerated hernias. Surgical repair of communicating hydroceles in older patients may be offered if they are symptomatic. Treatment of the underlying aetiology of reactive hydrocele may cause them to resolve.



ERLER ZIMMER

Erler-Zimmer Medical GmbH · Hauptstrasse 27 · 77886 Lauf · Germany
T +49 7841 / 67191-0 · F +49 7841 / 67191-99 · info@erler-zimmer.de
www.erler-zimmer.de · www.3Danatomyseries.com

Follow us!

Tuberculosis



Ref.no.: MP2111

ERLER ZIMMER
MEDICAL

Tuberculosis

Clinical History

A 37-year old female presents with increasing thoracic back pain. She has a history of untreated human immunodeficiency virus (HIV) infection and pulmonary tuberculosis. History revealed ongoing low-grade fevers, chills and weight loss. Examination revealed a cachexic patient with tender thoracic vertebrae at multiple levels. Blood test showed an elevated serum calcium and erythrocyte sedimentation rate. X-ray of her spine showed lytic areas in the thoracic vertebrae. During her hospital admission, she developed urosepsis and died.



Pathology

The specimen is a portion of the patient's thoracic vertebral column that has been sawn longitudinally and mounted to display the cut surface of 7 thoracic vertebrae. In all vertebrae, there are osteolytic areas, varying from 1 to 12 mm in diameter, which contain caseous degenerative material* (mostly now lost) and are surrounded by a thin zone of dense bone. The tuberculous inflammatory process has extended into one of the intervertebral discs, and has also spread outside the vertebral bodies to form collections of caseous material beneath the anterior longitudinal ligament. This is an example of tuberculous mycobacterial osteomyelitis of the vertebral column with paravertebral extension, also known as Pott's Disease.



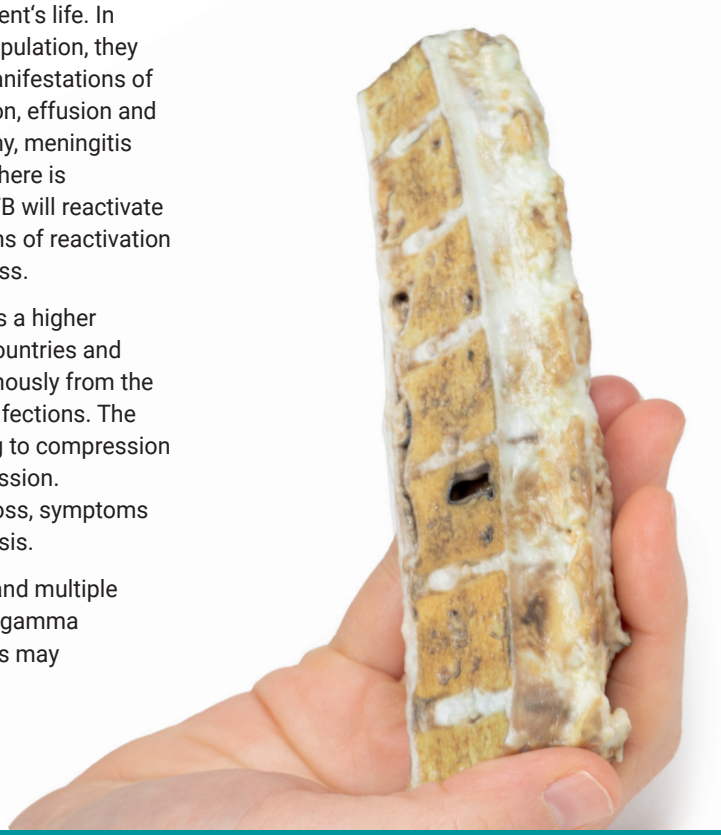
Further Information

Tuberculosis (TB) is a chronic pulmonary and systemic infectious disease caused by Mycobacteria tuberculosis. Transmission most commonly occurs via inhalation of aerosolized droplets of M. tuberculosis. Risk factors for contracting TB include being an inhabitant of a 'developing' country where the disease may be endemic, immunosuppression (e.g. HIV, steroid use, anti-TNF use and diabetes), chronic lung disease (e.g. silicosis), alcoholism, and generalized malnutrition.

After initial pulmonary infection of M. tuberculosis clinical manifestation varies. In 90% of individuals with an intact immune system, they enter an asymptomatic latent infection phase. This latent TB may reactivate at any time in the patient's life. In the other 10% of patients, especially in the immunocompromised population, they develop primary disease, which is immediate active TB infection. Manifestations of primary TB include pulmonary infection symptoms (e.g. consolidation, effusion and hilar adenopathy) and extra pulmonary symptoms - lymphadenopathy, meningitis and disseminated miliary TB. Secondary tuberculosis occurs when there is reactivation of a previous latent TB infection. Around 10% of latent TB will reactivate usually during periods of weakened host immunity. Typical symptoms of reactivation are cough, haemoptysis, low grade fever, night sweats and weight loss.

Osseous infection occurs 1-3% of patients with TB infection. There is a higher incidence of developing bone disease in patients from developing countries and immunocompromised patients. The TB usually spreads haematogenously from the site of active disease. Pott's disease accounts for 40% of TB bone infections. The infection is destructive eroding vertebral discs and vertebrae leading to compression fractures, which may cause symptoms of cord or nerve root compression. Symptoms include pain at the site of disease, fevers, chills, weight loss, symptoms of compression and spinal deformities, such as kyphosis and scoliosis.

TB diagnosis is usually made with a clinical history and chest x-ray and multiple sputum cultures. Mantoux skin tuberculin test and serum interferon gamma release assay may also be used to help screen for infection. Biopsies may be taken of suspected infection site for culture to assist diagnosis.



ERLER ZIMMER

Erler-Zimmer Medical GmbH · Hauptstrasse 27 · 77886 Lauf · Germany
T +49 7841 / 67191-0 · F +49 7841 / 67191-99 · info@erler-zimmer.de
www.erler-zimmer.de · www.3Danatomyseries.com

Follow us!

Chondrosarcoma of femur and ilium



Ref.no.: MP2112

ERLER ZIMMER
MEDICAL

Chondrosarcoma of femur and ilium

Clinical History

A teenage boy presents with groin pain after horse-riding. Examination revealed a large, deep lump. Following biopsy and imaging, the diagnosis of chondrosarcoma was made and a radical surgical resection of his right leg was performed.





Pathology

The specimen consists of the upper end of the femur and its articulation with the pelvis. Within the neck and head of the femur and replacing most of the ilium there is a lobulated pale grey tumour with areas of cavitation, necrosis and haemorrhage. The tumour is extending out beyond bone into the surrounding soft tissues and appears encapsulated. The presence of infiltration, necrosis and haemorrhage are macroscopic features of malignancy.

Further Information

Chondrosarcoma is a primary malignant bone tumour with cartilaginous differentiation. It is a rare cancer that accounts for about 20% of bone tumours. The only available treatment is excisional surgical resection since the current adjuvant treatments are ineffective. The pelvic location creates specific technical difficulties both for exeresis and reconstruction.

The disease usually starts in the bones of the arms, legs or pelvis, but it can be found in any part of the body that contains cartilage. Sometimes chondrosarcoma grows de novo form an otherwise healthy bone; however, sometimes it may arise from a benign bone tumour (an enchondroma or osteochondroma).



There are several subtypes of chondrosarcoma, named based on their microscopic and genetic characteristics. These include: conventional chondrosarcoma; Clear cell chondrosarcoma; Myxoid chondrosarcoma; Mesenchymal chondrosarcoma; Dedifferentiated chondrosarcoma.

ERLER ZIMMER

Erler-Zimmer Medical GmbH · Hauptstrasse 27 · 77886 Lauf · Germany
T +49 7841 / 67191-0 · F +49 7841 / 67191-99 · info@erler-zimmer.de
www.erler-zimmer.de · www.3Danatomyseries.com

Follow us!

Tertiary Syphilis



Ref.no.: MP2113

ERLER ZIMMER
MEDICAL

Tertiary Syphilis

Clinical History

A 66-year old male presents with postprandial epigastric pain. Of note, he is deaf and non-verbal. On examination, he has a tender epigastrium and several nodular tender lesions over his forehead and scalp. Blood tests show a low haemoglobin, impaired hepatic function and are positive for anti-treponemal antibodies. After admission, he has a large gastrointestinal bleed, and dies despite intervention.



Pathology

This specimen is the vault of the patient's skull. On the external surface, there are multiple circumscribed necrotic lesions in the parasagittal area to the left of the mid-line. The lesions are brown in colour and measure up to 3-4 cm in maximum diameter. The lesions have eroded the outer table of the skull and the adjacent periosteum is thickened with a fibrinous inflammation. These lesions are chronic syphilitic lesions or gumma of the skull, which are characteristic of benign tertiary syphilis.

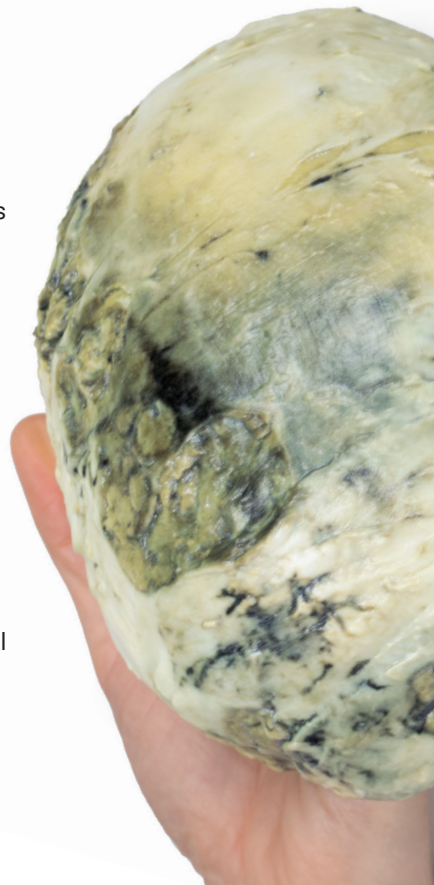


Further Information

Syphilis is a chronic infection caused by the spirochete bacterium Treponema pallidum. Sexually transmitted infection is most common, but it may also be congenitally-acquired by transplacental transmission of the bacteria. Those who have the higher risk of infection, include those of a sexually active age, intravenous drug users, HIV-infected patients and homosexual males. Syphilis infection rates decreased significantly with the introduction of penicillin in 1943, which remains the main treatment today. However, the infection rate has been increasing since the early 2000's.

Syphilis is divided into three stages with distinct clinical and pathological features with characteristic proliferative endarteritis affecting small vessels. Primary syphilis occurs usually 3 weeks after initial infection. This manifests typically as a single, painless and erythematous lesion called a chancre at the site of inoculation.
The syphilis spreads throughout the body from this chancre, which then heals spontaneously after 3 to 6 weeks.

Secondary syphilis occurs weeks to a few months after the primary chancre resolves in 75% of untreated patients. During this stage patients commonly have generalised symptoms, such as malaise, lymphadenopathy and skin rashes. Palmar/plantar rashes are the most frequent site but rashes can also be diffuse. These rashes can be maculopapular, scaly or pustular. Condylomata lata are elevated gray plaques that arise on the moist mucous membranes, such as oral or genital regions. Other less common manifestations include hepatitis, gastrointestinal invasion or ulceration and neurosyphilis - discussed below.



Tertiary syphilis has three main characteristics: cardiovascular syphilis, neurosyphilis and gumma-tous syphilis. These occur after a latent period of 5 years or more in one third of untreated patients.

Cardiovascular syphilis involves an aortitis for which the exact pathophysiology is unclear.
The vasculitis involves the ascending thoracic aorta leading to progressive dilation of the aortic root which can cause aortic valve insufficiency and aneurysms. Clinical manifestation usually happens 15-30 years post initial infection.

Neurosyphilis can be symptomatic or asymptomatic. It occurs in 10% of untreated patients. Early clinical manifestations include headaches, meningitis, hearing loss and ocular involvement, most commonly uveitis, causing vision loss. Late manifestations can occur up to 25 years post initial infection. Main features are meningovascular neurosyphilis, paretic neurosyphilis and tabes dorsalis. Meningovascular involvement involves chronic meningitis and endarteritis which can lead to strokes. Tabes dorsalis is caused from degeneration of the posterior columns within the spinal cord. This causes loss of proprioception, ataxia, loss of pain sensation, and loss of reflexes. Paretic neurosyphilis is caused by invasion and damage of the brain parenchyma, most commonly the frontal lobes. This leads to progressive cognitive impairment and mood disturbance.

Gummatous syphilis is characterised by the formation of nodular lesions most commonly bone, skin and mucosa of the upper airway and mouth called gummas. Gummas can occur anywhere including viscera. The formation of gummas is rare but occurs more frequently in HIV-infected patients. Skeletal involvement causes pain and pathological fractures.

ERLER ZIMMER

Erler-Zimmer Medical GmbH · Hauptstrasse 27 · 77886 Lauf · Germany
T +49 7841 / 67191-0 · F +49 7841 / 67191-99 · info@erler-zimmer.de
www.erler-zimmer.de · www.3Danatomyseries.com

Follow us!

Chondrosarcoma of scapula



Ref.no.: MP2114

ERLER ZIMMER
MEDICAL

Chondrosarcoma of scapula

Clinical History

A 60-year old female presented with a 12-month history of recurrent pain and increasing swelling in her right shoulder. On examination, there was a palpable mass over the superior aspect of her right scapula. There was limitation of abduction and external rotation at the shoulder joint. There was no palpable lymphadenopathy. X-ray of her shoulder showed a mass involving the superior scapula above the spine. The mass was biopsied and the scapula was completely excised.



Pathology

The specimen is the patient's excised right scapula. An irregular lobulated tumour 11 cm in maximum diameter arises from the spine of the scapula and extends to involve the acromion and coracoid process. The tumour is a mottled pale-yellow brown colour with patchy surface haemorrhage. There is some adherent muscle and fibrous tissue. The mass has infiltrated and replaced the normal bone. Histologically the tumour consisted of pleomorphic rounded and spindle-shaped cells with numerous mitotic figures and cartilage formation. This is chondrosarcoma of the scapula.



Further Information

Chondrosarcomas are malignant bone tumours that produce cartilage. These are the third most common primary bone malignancy after myeloma and osteosarcoma. Conventional tumours are the most common subtype of chondrosarcoma; making up 90% of cases. Less frequently diagnosed subtypes include clear cell, dedifferentiated and mesenchymal chondrosarcomas.

Some chondrosarcomas arise from pre-existing benign lesions, such as enchondroma or osteochondroma. Common mutations in chondrosarcomas are point mutations in the IDH1 and IDH2 genes as well as silencing of CDKN2A tumour suppressor gene. Chondrosarcomas that occur in multiple osteochondroma syndrome have mutations in the tumour suppressor EXT genes. Men are twice as likely to develop chondrosarcoma than women. The axial skeleton is more frequently affected than the appendicular skeleton. Around 5% affect the scapula. These are largely slow growing tumours. They usually present with painful and gradually enlarging masses. At the time of diagnosis most are low grade tumours that rarely metastasize. The lungs are the most common site for distant spread. Grade 1 tumours have an almost 90% 5-year survival rate, whereas with grade 3 chondrosarcomas, the 5-year survival rate drops to 43%.

CT scan is the optimal radiological investigation for diagnosis with MRI also frequently used. Biopsies may be taken to assist diagnosis. Treatment depends on the grade and the location of the tumour. Complete surgical resection is the standard treatment. Generally, chondrosarcomas do not respond to chemotherapy or radiotherapy given they are very slow growing tumours.



ERLER ZIMMER

Erler-Zimmer Medical GmbH · Hauptstrasse 27 · 77886 Lauf · Germany
T +49 7841 / 67191-0 · F +49 7841 / 67191-99 · info@erler-zimmer.de
www.erler-zimmer.de · www.3Danatomyseries.com

Follow us!

Osteosarcoma of femur



Ref.no.: MP2115

ERLER ZIMMER
MEDICAL

Osteosarcoma of femur

Clinical History

On examination, there was a palpable tender swelling above the right knee. Blood test showed a raised Alkaline Phosphatase level. A knee x-ray showed periosteal reactive changes in the distal femur suspicious for a bone malignancy. The patient then underwent staging CT and MRI evaluation of the right leg. He underwent adjuvant chemotherapy prior to resection of his right femur. He made a full recovery.



Pathology

The specimen is the patient's excised distal femur. On the cut surface, there is a large pale infiltrating tumour, 10 cm in greatest diameter, extending through the periosteum near the articular surface. This is an osteosarcoma of the femur.

Further Information

Osteosarcomas are a malignant tumour of bones that are characterised by the production of osteoid matrix or immature bone. It is the most common primary malignancy of bone. Most occur in the distal femur with the tibia and humerus being the most frequent sites affected. Men are more commonly affected than women. They occur in a bimodal age distribution, with most occurring in children and adolescents under 20 years of age and the second peak occurring in older adults over 60.



Secondary osteosarcomas are more common in older patients. Secondary osteosarcomas occur in patient's bones with predisposing conditions such as Paget's disease, bone infarcts and previous irradiation. Mutations in tumour suppressors and oncogenes, such as RB, TP53 and INK4a have been shown in osteosarcomas.

Osteosarcomas usually present with painful, enlarging masses. Pathological fractures can also be the first presenting complaint. Constitutional symptoms are usually not present. Alkaline phosphatase and lactate dehydrogenase may be elevated on blood tests. X-rays can show features of bone destruction, a mass or signs of a periosteal reaction, such as a sunburst appearance or triangular shells of reactive bone (Codman's Triangle). MRI of the affected bone is used to evaluate local staging of the tumour while CT of the body is used to evaluate for distant spread. The tumour may be biopsied in some cases.

The lungs are the most common site for distant metastases followed by the bones and brain. Treatment involves neoadjuvant chemotherapy followed by surgery. 5-year survival rate for localised osteosarcoma is 60-70% but this drops to <20% in patients with distant metastases.



ERLER ZIMMER

Erler-Zimmer Medical GmbH · Hauptstrasse 27 · 77886 Lauf · Germany
T +49 7841 / 67191-0 · F +49 7841 / 67191-99 · info@erler-zimmer.de
www.erler-zimmer.de · www.3Danatomyseries.com

Follow us!

Chondrosarcoma



Ref.no.: MP2116

ERLER ZIMMER
MEDICAL

Chondrosarcoma

Clinical History

A 57-year old male attends complaining of recurrent pain in his right thigh. On examination there is no palpable abnormality in the thigh. An x-ray of the limb showed bony absorption associated with expansion and periosteal reaction at the proximal right femur. A CT of the limb showed a mass in the proximal right femur. A biopsy was taken of the lesion. Subsequently he had excision of the right upper femur followed by insertion of a prosthesis.



Pathology

The specimen comprises the head, neck and upper third of the shaft of the right femur, sawn longitudinally to display the cut surface. In the medullary cavity of the upper portion of the shaft is an ovoid tumour that is 6.5 cm in maximum diameter. The tumour is not encapsulated and has a haemorrhagic cut surface with pale hyaline and cystic areas. Histologically, this is a low grade chondrosarcoma.



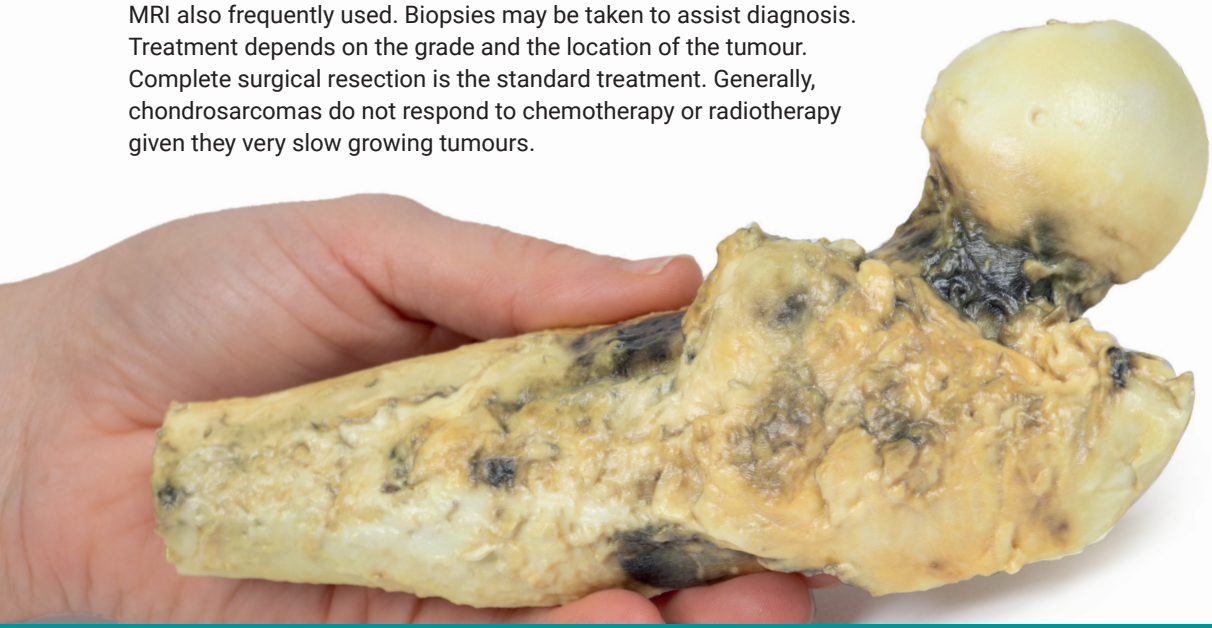
Further Information

Chondrosarcomas are malignant bone tumours that produce cartilage. These are the third most common primary bone malignancy after myeloma and osteosarcoma. Conventional tumours are the most common subtype of chondrosarcoma, making up 90% of cases. Less frequently diagnosed subtypes include clear cell, dedifferentiated and mesenchymal chondrosarcomas.

Some chondrosarcomas arise from pre-existing benign lesions, such as enchondroma or osteochondroma. Common mutations in chondrosarcomas are point mutations in the IDH1 and IDH2 genes as well as silencing of CDKN2A tumour suppressor gene. Chondrosarcomas that occur in multiple osteochondroma syndrome have mutations in the tumour suppressor EXT genes.

Men are twice as likely to develop chondrosarcoma than women. The axial skeleton is more frequently affected than the appendicular skeleton. Around 20% affect the femur. These are largely slow growing tumours. They usually present with painful and gradually enlarging masses. At the time of diagnosis, most are low grade tumours that rarely metastasize. The lungs are the most common site for distant spread. Grade 1 tumours have an almost 90% 5-year survival rate, whereas with grade 3 chondrosarcoma the 5-year survival rate drops to 43%.

CT scan is the optimal radiological investigation for diagnosis with MRI also frequently used. Biopsies may be taken to assist diagnosis. Treatment depends on the grade and the location of the tumour. Complete surgical resection is the standard treatment. Generally, chondrosarcomas do not respond to chemotherapy or radiotherapy given they very slow growing tumours.



ERLER ZIMMER

Erler-Zimmer Medical GmbH · Hauptstrasse 27 · 77886 Lauf · Germany
T +49 7841 / 67191-0 · F +49 7841 / 67191-99 · info@erler-zimmer.de
www.erler-zimmer.de · www.3Danatomyseries.com

Follow us!

Metastatic Malignant Melanoma



Ref.no.: MP2117

ERLER ZIMMER
MEDICAL

Metastatic Malignant Melanoma

Clinical History

A 65-year old male with presents with pain in his left groin. He has a history of skin melanoma on his left foot treated with surgical resection and radiotherapy. On examination, he is cachexic with a hard, enlarged liver and has a discharging sinus in the left groin surrounded by black nodules. He is admitted and dies from a hospital-acquired pneumonia.

Pathology

The specimen is the patient's proximal right femur sawn longitudinally to display the cut surface. The medullary cavity contains many deposits of tumour tissue varying in colour from a pale brown to black. Cancellous bone has been completely destroyed by the larger deposits, which appear dark and measure up to 3 cm in maximum diameter. Elsewhere pale brown tumour infiltrates the marrow cavity diffusely. Cortical bone has been spared, although at the junction of the shaft and neck, medially the cortical bone is discoloured and thickened. These are metastatic deposits from a melanoma of the skin.





Further Information

Melanoma is a malignant skin cancer associated with exposure to UV radiation in sunlight or tanning beds. Other risk factors for developing melanoma include fair complexion, presence of large number of melanocytic naevi, severe sunburn as a child and immunosuppression. It accounts for around 5% of all skin cancer diagnosis but has the highest mortality rate of all skin cancers. Melanomas typically occur in sun exposed areas as a pigmented lesion with irregular borders, variegated colour, an asymmetrical shape and which evolves of time. There are multiple mutations common in melanoma. Loss of cell cycle control gene from mutation in CDKN2A gene. Mutations in pro-growth signalling pathways such as BRAF and PI3K mutations are seen frequently in melanomas, as well as mutations that activate telomerase such as the TERT gene. Recognition that melanoma antigens activate host immune responses has led to promising immunotherapy, which enhances host T-cell identifying of these antigens.

The most common sites for metastasis of malignant melanoma are the lungs, liver, brain and bone as well as regional lymph nodes. Bone metastases are found in 25-50% of metastatic melanoma. The axial skeleton is more frequently affected by metastatic melanoma spread. These metastatic deposits cause pain and even pathological fractures. The probability of metastatic spread depends on the stage of the primary tumour, which is based on tumour depth, mitotic activity and ulceration of the skin as well as node and solid organ involvement.

Diagnosis of melanoma is made with excisional biopsy. Investigation for bone metastasis is done using blood test (raised Alkaline phosphatase, calcium and LDH) and radiological investigations most commonly X-ray and CT but MRI and PET scan may also be used. Treatment depends on the stage or the tumour as well as the immune profile of the melanoma. Treatment usually involves surgical resection, chemotherapy, immunotherapy, radiotherapy or more commonly a combination of treatments.



ERLER ZIMMER

Erler-Zimmer Medical GmbH · Hauptstrasse 27 · 77886 Lauf · Germany
T +49 7841 / 67191-0 · F +49 7841 / 67191-99 · info@erler-zimmer.de
www.erler-zimmer.de · www.3Danatomyseries.com

Follow us!

Osteochondroma





Ref.no.: MP2118

ERLER ZIMMER
MEDICAL

Osteochondroma

Clinical History

A 61-year old male with prostate cancer attends pre-assessment clinic prior to a prostatectomy. Overall, he feels well with no major complaints. On review of symptoms, it is noted he has chronic pain in his right knee, which his GP called osteoarthritis. To exclude boney metastases of the prostate carcinoma, a knee x-ray is ordered, which shows a pedunculated lesion projecting from the medial aspect of the diaphysis of the right femur. His prostatectomy goes ahead but he subsequently dies from a postoperative pulmonary embolism.



Pathology

The specimen is the lower end of the patient's right femur, which has been cut in the coronal plane and mounted to display the external surfaces. A pedunculated bony protuberance 2 cm in length projects from the medial aspect of the femoral shaft 7 cm above the medial condyle. The projection is composed of normal bone with a thin cap of hyaline cartilage at the tip. This is an example of an osteochondroma.



Further Information

An osteochondroma (or an exostosis) is a benign cartilaginous tumour. They are comprised of a cartilaginous capped bony protrusion from the external surface of the bone from which they arise. They are the most common benign bone tumours. Most osteochondromas occur spontaneously but they may also occur as part of multiple hereditary exostosis syndrome or post radiotherapy. They usually develop from or near the growth plate. They most commonly arise from the appendicular skeleton, especially in the lower limb around the knee or the upper limb at the proximal humerus. Men are more commonly affected than women.

Symptoms vary on the site and size of the growth. Many osteochondroma remain asymptomatic. Osteochondroma lead to symptoms from the compression of surrounding neurovascular structures. They may also cause a pain from myositis or a fracture of the bony spur. They usually present in the second decade of life. They can be diagnosed with plain x-ray but MRI is the gold standard to ensure that there is no malignancy present within the growth.



Hereditary exostoses are associated with mutations in the EXT1 and EXT2 genes. Reduced expression of these genes has also been seen in sporadic osteochondromas. Osteochondromas stop forming as fusion of the growth plate occurs. Treatment of excision is only if symptoms are severe. Malignant transformation to chondrosarcoma is rare in sporadic cases but more common in hereditary exostosis (5-20%).

ERLER ZIMMER

Erler-Zimmer Medical GmbH · Hauptstrasse 27 · 77886 Lauf · Germany
T +49 7841 / 67191-0 · F +49 7841 / 67191-99 · info@erler-zimmer.de
www.erler-zimmer.de · www.3Danatomyseries.com

Follow us!

Suppurative arthritis of the knee



Ref.no.: MP2119

ERLER ZIMMER
MEDICAL

Suppurative arthritis of the knee

Clinical History

A man aged 82 years had a history of tuberculosis of the left knee in childhood. He developed a painful swollen knee 10 days prior to admission to hospital. Examination revealed an inflamed knee, painful to move, which improved slightly with antibiotic therapy and rest. X-ray showed a disorganized knee joint and mid-thigh amputation was performed 3 days after admission. Post-operative recovery was satisfactory.



Pathology

The specimen displays the articular surfaces of a femur and tibia. The articular surfaces have been severely eroded. They are brown in colour, very irregular, and there are shaggy adhesions and plaques of yellow necrotic material. No normal articular cartilage is present. Some irregular varying in size bony projections (up to 1 cm in diameter) are present on the femoral condyles. Staphylococcus aureus was cultured from the joint. This is an example of suppurative arthritis in a joint previously damaged by tuberculosis.



Further Information

Suppurative arthritis is typically caused by a bacterial infection in the joint. Diagnosis is made by analysis of synovial fluid including microscopic examination and culture. Suppurative arthritis is also referred to as pyarthrosis, and bacterial or septic arthritis. Tuberculous septic arthritis should be considered in patients who present with acute or chronic monoarthritis, and who have an abnormal chest radiograph or eosinophilia or a previous history of TB.

Pulmonary tuberculosis accounts for around 52% of tubercular infection but musculoskeletal involvement is seen in up to 19% of cases.1 It is more common in children than in adults, probably owing to the greater amount of bone marrow present in immature bone. In adults, TB shows a preponderence to the spine (40%), followed by the hip (25%), and then the knee (8%).While extrapulmonary manifestations of TB are common, accounting for around 15–20% of cases in immunocompetent patients, the first presentation of the disease as a joint infection is rare[1].

Reference: 1. Carrol ED, Clarke JE, Cant AJ. Non-pulmonary tuberculosis. Paediatr Respir Rev. 2001;2:113–9.



ERLER ZIMMER

Erler-Zimmer Medical GmbH · Hauptstrasse 27 · 77886 Lauf · Germany
T +49 7841 / 67191-0 · F +49 7841 / 67191-99 · info@erler-zimmer.de
www.erler-zimmer.de · www.3Danatomyseries.com

Follow us!