Cell Pathology

Cell Pathology Session 1 â€“ Epidemiology of common tumours Â·   Outline the basic epidemiology of cancer 1 in 3 Britons will have it diagnosed, 1 in 4 will die from it; the proportion of people who will die from cancer has increased but this is not because cancer survival rates are worse, but because medical advances mean that they will not die of other illnesses Â·   Describe the epidemiology of breast cancer This is commonly a disease of the developed world, with incidence highest in Europe, North America and Australia and lowest in Africa and China; in the UK 38000 women are diagnosed with it each year, making it the most common cancer in the UK overall (men and women); the lifetime risk for a UK woman of developing it is 1/9; the breakdown is around 30000 of cases in >50 women, over 7000 in <50 women, and the rest in men Â·   Describe the epidemiology of lung cancer The Yorkshire Cancer Registry Report of 1996 showed that between 1976 and 1993, both the incidence and mortality of male lung cancer decreased in Yorkshire by 20/100000, and in female lung cancer increased by 20/100000; in the US, after an incidence of 75/100000 in 1990, the male incidence fell to 70/100000 in 1995, yet the female incidence has risen from 10/100000 in 1970 to 35/100000 in 1995; it is now the second most common cancer in the UK overall Â·   Describe the epidemiology of cervical cancer Out of nearly 5 million smear tests that are performed each year, 24000 are diagnosed with a severely abnormal result, and around 3000 are diagnosed with cervical cancer â€“ it is the second most common cancer in women under 35 Â·   Describe the epidemiology of stomach cancer 10500 diagnosed each year in the UK, 6th commonest cancer; more common in men than women; incidence has been falling since the 1930s due to improved diet and food storage Â·   Describe the epidemiology of colorectal cancer Excluding skin cancer, colorectal cancer is the second most common cancer in the UK to affect women (after breast), and the third most common in men (after lung and prostate), with an incidence of over 34000 Â·   Describe the epidemiology of prostate cancer This mostly affects men over 60 years old, and has an incidence of 21000, making it the second most common cancer in men in the UK, excluding skin cancer; the incidence is increasing Â·   List the sites of the four most commonly occurring cancers in children Cancer kills more children than any disease; then incidence is rising, but up to 70% can be cured; the most commonly occurring are leukaemia (malignant tumours of the haemopoietic stem cells), CNS/brain, lymphomas (abnormal proliferation of lymphocytes), carcinomas Â·   Describe the incidence, categories, and epidemiology of Burkittâ€™s lymphoma Burkittâ€™s lymphoma is a form of non-Hodgkinâ€™s lymphoma associated with the Epstein-Barr virus (EBV); it occurs primarily in children in countries where malaria is endemic, particularly in Africa (endemic Burkittâ€™s â€“ affecting as many boys as girls, and affecting the jaw and abdomen); non-endemic Burkittâ€™s lymphoma occurs outside these countries (affects twice as many boys as girls with only a 15% association with EBV, and more commonly affects the ileocaecal region), and there is also a Burkitt-like lymphoma that affects HIV +ve individuals Â·   Give examples of other cancers with have a proposed or proven viral aetiology Cervical cancer â€“ human papillomavirus

Liver cell cancer â€“ hepatits B

Kaposiâ€™s sarcoma â€“ herpes virus 8 Â·   With respect to causation, define sufficient cause and synergism Sufficient cause â€“ a particular occurrence would not take place without it

Synergism â€“ a particular occurrence would not take place without a sufficient cause that could be represented by different factors

Â·   Provide an overview of the epidemiological evidence for cancer causation If a group of cases occurs at a particular time and in confined area, it suggests a viral aetiology; tumours associated with viruses are more common in children and adolescents Session 2 â€“ The importance of autopsy Â·   Define the autopsy Autopsy (necropsy, post-mortem) is a careful examination of a dead hoe; it involves the macroscopic and microscopic inspection the body systems, and is performed by a histopathologist; a hospital autopsy is when you know the cause of death, if you donâ€™t, it should go to the coroner Â·   Define the advantages of autopsy Mainly for the confirmation of diagnosis â€“ to find anatomical and structural findings that correlate with it, and to establish the progression of the disease; it is useful in audit, to monitor the efficacy of treatments, teaching, and research (e.g. discovery of nvCJD) Â·   Outline why consent for hospital autopsy is in decline Diagnostic â€“ pre-mortem techniques are improving (e.g. fine needle aspiration, fibre-optic biopsies)

Logistical â€“ there is an urgency for a diagnosis with biopsies, and so thereâ€™s less time to do them

Economic â€“ in some countries (e.g. USA), the cost of autopsy is added to the medical bill

Consent â€“ recent change in attitude towards the idea of autopsy following random organ harvesting scandals

Training â€“ the people that liaise with the relatives (i.e. the patient relatives officers) arenâ€™t trained to explain why a post mortem is needed â€“ consultants have the best success Â·   List common causes of sudden unexpected natural death Cardiovascular ischaemia, hypertension, aortic valve disease, cardiomyopathies, ruptured aneurysm,

Intracranial CVA (usually only fatal in brainstem), cerebral haemorrhage, infarction, epilepsy

Respiratory asthma, haemoptysis, fulminating pneumonia

Gastrointestinal bleeding, strangulated hernias, peritonitis

Obstetric ectopic pregnancy, amniotic fluid embolism Â·   List features that will differentiate a dead body from a living body Presence of a pulse, breath sounds, reflexes, flaccidity (loss of muscle tone), trucking (when blood clots in the capillaries of the retina), cooling of the body (depends on situation e.g. weight, clothing etc), hypostasis (the blood settles within the blood vessels, causing a discolouration which isnâ€™t present at places where pressure was applied (e.g. belt, if lying on the back the arse and shoulders); the changes also happen in organs, and so can be mistaken for MI, or gut poisoning for example), rigor mortis (after death, the sarcoplasmic reticulum becomes incompetent and releases calcium ions, which causes myosin crossbridges to bind to actin â€“ but because thereâ€™s no ATP production they stay there, fusing the thin and thick filaments into a gel; this starts to occur when the [ATP] < 85%, usually around six hours after death in the small muscles, progressing to the large; it only lasts for 24 hours since proteolytic enzymes digest the crossbridges; cadaveric spasm is an instantaneous type of rigor but it very localised and uncommon (everyone think Carl Weathers in the film Predatorâ€¦)), and later decomposition (resulting after three days from autodigestion (release of proteolytic enzymes from incompetent membranes) and by bacteria and fungi, first from the GI tract but then exogenously; the body then undergoes putrefaction, mummification (usually in dry conditions), or adipocere (commonly in moist conditions or under water) Â·   Give an outline of how you decide if someone died by drowning? If they didnâ€™t they may have died before they hit the water (e.g. MI, PE) or died in the water but not by drowning (e.g. broken neck hitting bottom); you tell by the presence of subpleural petechial haemorrhages and diatoms (random little water plants); if diatoms are present in organs distant from the lungs (e.g. kidney, bone marrow), you know that there must still have been circulation whilst the person was in the water (and therefore they died of drowning) â€“ after death, they will only be seen in the lungs Â·   Contrast the effects of drowning in seawater and freshwater Freshwater has no salt, and so water goes into the bloodstream from the lungs causing an acute ↑ in blood volume, which the body canâ€™t handle \ acute heart failure â€“ there is characteristic haemolysis which releases potassium

Seawater is salty, hypertonic, and so water does not move into the bloodstream from the lungs so freely â€“ there is little ↑ in blood volume, no haemolysis, and so they can survive for up to 30 minutes Â·   List four substances used as self administered poisons and indicate their actions Aspirin stimulates the respiratory centre \ respiratory alkalosis; to compensate, there is renal bicarbonate and potassium excretion \ metabolic acidosis and ↓ pH; energy metabolism is also disrupted leading to ↑ lactate, pyruvate and ketones, which intensifies the acidosis; symptoms include tinnitus, nausea, vomiting, hyperventilation, hyperpyrexia and tachycardia

Paracetemol see P&T Session 1 (page 3) for actions

Carbon Monoxide binds readily with haemoglobin and subsequently prevents oxygen binding, giving symptoms of headache, mental impairment and possible coma

Tricyclic Anti-depressants lead to tachycardia, hypotension, fixed/dilated pupils, convulsions, urinary retention, cardiac arrhythmias, ↓ consciousness Â·   Draw a diagram including the main features of chronic liver disease due to alcohol

No. But they are ascites, splenomegaly, bounding pulse, tachycardia, gynaecomastia (bitch tits), testicular atrophy, spider naevi (>5 on anterior chest wall is indicative), palmar eryhtema, dupuytrenâ€™s contractures, clubbing etc. Session 3 â€“ Forensic medicine Â·   Whoâ€™s this coroner chap then? Usually a trained barrister or doctor, or both, with a team of pathologists and officers, handles any cases when the cause of death is not known Â·   Give examples of cases handled by the coroner Sudden unexpected death, industrial accidents, domestic accidents, drug abuse/poisoning, deaths during or immediate to surgery (i.e. if they die on the table, within the first 24 hours, or without regaining consciousness), in allegations of negligence, industrial diseases (e.g. asbestosis), infant deaths, vehicular accidents, abortions, when the doctor isnâ€™t sure (or hasnâ€™t seen the patient for two weeks), suicides, deaths in prison/mental custody, murder, and people in receipt of war pension Â·   Differentiate the coronerâ€™s autopsy from a hospital autopsy The coronerâ€™s autopsy is purely to establish the cause of death, and if it was by natural causes or not; there is no investigation into other systems to establish the presence of other disease Â·   Outline the structure of a death certificate The standard format is to first list the immediate cause of death (e.g. bronchopneumonia), then the predisposing factors (e.g. bronchial carcinoma) and then any other factors, the possibly contributed to the death without actually leading to it Â·   List four types of wound Abrasion, laceration, incised wound, and bruise/contusion Â·   Briefly describe â€œabrasionâ€• A superficial injury the skin, that may bleed if there is trauma to skin blood vessels; some may show a pattern, which can indicate what was used to cause the injury or in what circumstances it was caused; this is due to epidermis being pulled towards the end of the injury (i.e. to the point where force was removed) Â·   Briefly describe â€œlacerationâ€• This is when the full thickness of the skin is torn by a blunt tear/crushing; its appearance is dependant on the underlying tissue e.g. on a fleshy bit it will look characteristic, but on the scalp, since its bone beneath, it may look incised Â·   Briefly describe â€œincised woundâ€• This is a clean cut (showing little injury around the area) caused by a sharp object; there are different types; for example, a stab wound is one that is deeper than the actual area of penetration; a slash wound in one with a long area of penetration but with little depth â€“ less dangerous than a stab wound but common in attempted suicide Â·   Briefly describe â€œbruise/contusionâ€• There is damage to the vasculature causing blood to move usually into subcutaneous fat (in visible bruising) or muscle (in deep bruising); as in abrasions, the nature of the wound can give indications to the weapon used, the force with which it was applied, and the state of the affected tissue before the incident; to date a bruise, a good

indication is the colour â€“ if it has no colour and appears fresh, it was probably inflicted within the last two days; if there are bruises with different colours in the same area, they were probably inflicted at different times Â·   Describe features that may be present in child abuse A delayed or repeated presentation; lack of correlation between explanation and clinical findings; pattern of bruising (i.e. gripping); skeletal injuries (especially in a non-mobile child); signs of shaking (haemorrhage) Â·   List three main types of intracranial haemorrhages and give their causes These are classified depending on the location of the bleed in relation to the layers of the meninges:

Subarachnoid 80% of these are caused by ruptured intracranial saccular (berry) aneurysms; the aneurysms are very difficult to diagnose while the patient is asymptomatic; intracranial arteries are more susceptible to aneurysms as they have less elastin in their walls with a thinner tunica adventitia, and are found unsupported in the subarachnoid space; research has shown that hypertension, ↑ blood flow and blood vessel disorders as well as genetics, infection and metastasis lead to a higher incidence of berry aneurysm

Subdural can be either acute or chronic; acutely the most common cause is trauma with most patients presenting comatose, and results from one of three occurrences â€“ cortical artery bleed, bleeding due to parenchymal injury, and by a tearing of a draining vein; chronically the mechanism is that of cerebral atrophy in the elderly leading to tension in the cortical arteries and rupturing; however due to the ↑ space bleeding may remain asymptomatic

Epidural occurs in 2% of patients with head injuries and is very serious. Great; the usual cause is that force to the head causes the dura to separate from the skull, causing damage to the blood vessels in there; signs and symptoms include headache, vomiting, seizures, bradycardia and usually skull fracture; the most common cause is trauma but it may result from thrombolysis and anticoagulant therapy

About the Author