Higher Specialist Diploma

Cellular Pathology

Examination - February 2021

Essay Paper

120 minutes

Attempt 2 out of 5 questions

Instructions to candidates

1. Record your candidate number and HSD discipline on the front sheet of the answer booklet.

2. Record your candidate number, the question number and the page number in the spaces provided on the answer sheets.

3. Begin each new answer on a new page.

4. Each question is worth 100 marks.
1. Critically appraise the methods employed to determine end point of decalcification in a femoral head specimen.

2. Critically review the application of competency testing within a cellular pathology laboratory - How much is enough?

3. Critically review the value of turnaround times (TAT's) with regard to the 2 Week Wait (2WW) cancer pathway.

4. Critically appraise the scope and range of immunocytochemistry based predictive tests performed within a cellular pathology department.

5. Critically discuss the value of health and safety meetings within a modern-day cellular pathology laboratory service.
Higher Specialist Diploma

Cellular Pathology

Examination - February 2021

Case Studies

120 minutes

Attempt all case studies

Instructions to candidates

1. Record your candidate number and HSD discipline on the front sheet of the answer booklet.

2. Record your candidate number and the page number in the spaces provided on the answer sheets.

3. Begin each new answer on a new page.

4. Each case study is worth 100 marks.
SEEN CASE STUDY

1. A 67 year old man, with a family history of prostate cancer, presented at his local GP with a bladder flow obstruction. His GP ruled out prostate infection and then requested a PSA test. This showed a slightly raised PSA level of 5ug/ml and he was referred to the local hospital for further investigation.

A trans rectal biopsy (6 cores) was negative. The case was reviewed at the local MDT. An MRI scan was then requested. The scan showed a possible lesion in the anterior prostate. He had a trans perineal biopsy (24 cores) plus biopsies from the anterior 'target' lesion.

a. Explain the histological grossing, embedding and microtomy of such specimen samples. (15 marks)

b. The samples blocks were difficult to section due to focal dense tissue. Evaluate what can be done to deal with this problem. What sections should be taken from the blocks? (15 marks)

One core only, from the target region, contained a 1mm focus of glands showing architectural atypia (infiltrative appearance), but lacked significant cytological atypia of malignancy (H&E images). This was therefore regarded as suspicious and further investigation with immunohistochemistry was needed.

Figure 1: Normal Prostate
c. Figure 1 shows the appearance of normal prostate Figure 2 shows atypia. Compare and contrast the key features seen in the photomicrographs. (10 marks)

d. What are the key antibodies you would employ in the evaluation of the prostate tissue samples? Justify your answer. (20 marks)

e. Explain how the use of some of the markers stated above can help distinguish between benign and malignant changes. (15 marks)

The case was diagnosed as prostatic adenocarcinoma.

f. Discuss the grading classification of prostate tumours. Outline the reason for defining the architectural features within this grading system. (15 marks)

g. Discuss the molecular assays that can be performed in cases of suspected prostate carcinoma. (10 marks)
A 62 year old Caucasian woman reported to her GP with a firm hard lump in her left breast. On closer examination multiple other smaller lumps were palpable and in close proximity to the first larger lump. In addition swelling in her left arm pit was apparent and the lady complained of joint and bone pain in the left arm. The GP referred the lady for a mammogram and requested a fine needle biopsy (FNA) of the breast lumps detected.

The mammogram Breast Imaging Report and Data system (BI-RADS) graded the breast lumps as category 5 (from a scale of 1 to 6, with a score of 6 being severe). This result indicated a likelihood of cancer (95%) and strongly recommending a FNA and lumpectomy. The patient then had a subsequent mastectomy of the left breast.

a. Describe the procedure for FNA analysis. (10 marks)

The FNA confirmed a high-grade breast carcinoma.

b. Critically describe the procedures for grossing a cancerous mastectomy. (15 marks)

There were five tumour nodules found within the left breast following grossing. These all revealed invasive breast disease.

c. Critically assess the investigative diagnostic immunocytochemical tests that would be helpful for diagnosis. (15 marks)

The patient was then elected for a sentinel lymph node biopsy (SLNB) assessment.

d. Discuss and evaluate what a sentinel lymph node is, and the general approach adopted to assess SLNB for breast cancer in a routine cellular pathology laboratory (your answer should include details on sectioning and routine staining and immunocytochemical assessments). (15 marks)

e. Critically assess the One Step Nucleic Acid (ONSA) molecular based technique that can sometimes be used in the assessment of SLNB for breast cancer cases. (15 marks)

f. Critically discuss predictive markers that can be employed to evaluate this case. What are the significant indicators of such assays? (15 marks)

g. Critically assesses the methodology of the strategies of the common targeted therapy regimens employed within the field of breast carcinoma. (15 marks)
3. A 26 year old man returned home from a gap year in India having worked in a charity camp for the homeless in poor district outside Calcutta. The man reported to his GP complaining of a loss of sensation in his right hand with evidence of some skin ulcers but with no associated pain and hypo-pigmented skin macules. Prior to this event the man had been in good health and had no underlying medical condition.

a. Describe the personal protective equipment that might be appropriate for the GP to wear based on the information provided in this case study. Highlight the most likely risks. (15 marks)

As part of the initial investigations the GP requested a full blood count. Following review, the GP referred the patient to the specialist regional infectious clinic for further investigations. The clinic performed some skin swaps of the ulcerated areas for microbiological investigations and macules and requested some skin smears of the ulcerated areas. In addition, a 4mm punch biopsy for histological investigations was performed on the ulcerated lesion.

b. Explain the process of preparing a smear for cytological investigation. (10 marks)

The punch biopsy revealed a histological appearance of a chronic granulomatous reaction.

c. Explain with the reasons the fluid the punch biopsy should be placed in to obtain the maximum investigation value? (10 marks)

d. Provide a detailed explanation of the histological features of a chronic granulomatous reaction. (10 marks)

There is evidence inflammation around nerve fibres within the punch biopsy. An infectious aetiology is expected. Special stains were requested for both fungal and bacterial investigation.

e. Suggest the stains that would have been requested. Explain what they would demonstrate if the results were positive and what the infectious organism would look like. (20 marks)

The gentleman now reports with a dry cough as well as skin lesions. Staining for atypical mycobacterium is positive in both the smear and punch biopsy.
f. Explain the rationale behind the staining investigations that could be used to distinguish between the diseases processes that can be caused by atypical mycobacterial infections. (15 marks)

The cause of gentleman’s cough was investigated with CT scan and revealed no findings.

g. Given the above information suggest the most likely diagnosis of this man’s disease, its probable progression and how this could be managed. (20 marks)