



FRANZCR Examination

Phase 2 Radiation Oncology

Pathology

July 2018

Time Allowed: 3 Hours

INSTRUCTIONS

ALL QUESTIONS are to be attempted.

There are a total of SIX (6) questions.

All questions are of equal value.

The marks allocated to each sub-part of the questions are indicated in brackets.

Hand **all** papers to the invigilator.

No papers are allowed to be taken from the examination room.

THIS INCLUDES THE QUESTION PAPERS.

Question 1

- a.** List common posterior fossa tumours in children. **(1)**
- b.** What are the microscopic features of classic ependymoma? **(2)**
- c.** Regarding ependymoma of the spine. Outline: **(2.5)**
- i** Epidemiology
 - ii** Clinical Presentation
 - iii** Histologic subtypes and their common locations
- d.** Briefly discuss the prognostic factors in ependymoma? **(2)**
- e.** Regarding pilocytic astrocytoma: **(2.5)**
- i** What are the macroscopic and microscopic features?
 - ii** What signalling pathway is mutated?

Question 2

- a. A 40 year old woman underwent colonoscopy for investigation of anaemia. It showed numerous polyps as well as a malignant looking mass in the descending colon.
- i List the polyposis syndromes that are associated with increased risk of colon cancer. (1)

For Familial Polyposis Coli (classic form), what are the: (3)

- ii Inheritance pattern and molecular abnormality.
- iii Clinical features.
- iv Extracolonic manifestations (list at least 4 conditions; 2 of which have malignant potential).

This patient underwent a left hemi-colectomy. The pathology report concluded it was a node negative adenocarcinoma NOS (AJCC/TNM Stage II).

- b. List the adverse clinicopathologic features of the tumour that would guide the use of adjuvant chemotherapy for this patient? (3)
- c. Two years later, the patient developed multiple liver lesions. A percutaneous biopsy was performed. (3)
- i Describe the microscopic appearance and immunohistochemical profile that would confirm a metastatic colon adenocarcinoma.
- ii What molecular mutations would you request and what are their clinical significances?

Question 3

- a.** A 45 year old male patient having presented with throat discomfort is found to have a swelling at the right base of tongue. Biopsy shows the presence of poorly differentiated malignant cells. **(2)**
- i** List the possible differential diagnosis (primary tumours) in this setting.
 - ii** How may immunohistochemistry (IHC) assist in identifying the potential primary tumour?
- b.** Briefly describe the key molecular steps by which HPV 16 leads to tumour oncogenesis. **(2)**
- c.** In regards to HPV +ve and HPV –ve mucosal head and neck cancers, compare and contrast the following, using a table: **(5)**
- Epidemiological and risk factors
 - Clinical features
 - Biological behaviour
 - Microscopic features
- d.** List the key factors which stratify for prognosis following chemo radiation therapy in oropharyngeal SCC. **(1)**

Question 4

- a.** A 19 year old presents with a rubbery left neck lump. Fine Needle Aspiration Biopsy shows lymphoid material. **(2)**
- i** What are the likely differential diagnoses?
 - ii** How do you classify Hodgkin Lymphoma?
- b.** Describe the epidemiology and aetio-pathogenesis of Hodgkin's Lymphoma. **(3)**
- c.** How do Nodular sclerosis Hodgkin Lymphoma and Mixed cellularity Hodgkin Lymphoma differ in their clinical presentation, prognosis and histopathological findings? **(3)**
- d.** What are the prognostic factors for early and advanced stage Hodgkin Lymphoma? **(2)**

Question 5

- a.** Using a table, outline the common microbial/viral and parasitic organisms that can cause carcinogenesis. Provide examples of cancers caused by them. **(2)**
- b.** Describe how *Helicobacter Pylori* causes gastric malignancies. **(3)**
- c.** Describe the mechanism by which chemicals cause carcinogenesis. **(3)**
- d.** For malignant Mesothelioma: **(2)**
- i** What is the main risk factor and briefly how does that cause carcinogenesis?
 - ii** Name a few other risk factors.

Question 6

- a.**
- i** Define a prognostic factor and a predictive factor. **(1)**
 - ii** Describe the criteria used to determine if a factor is prognostic. **(1)**
- b.** Describe the patient and tumour prognostic factors in a patient newly diagnosed with breast cancer without distant metastases. **(4)**
- c.** Describe the basal like subtype of breast cancer. **(2)**
- d.** Describe the 21 gene recurrence score or (Oncotype Dx) and its clinical significance. **(2)**



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Clinical Oncology

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Question 1

A 30 year old man undergoes an orchidectomy. Histology demonstrates pure seminoma.

- a.** What factors would you take into consideration when deciding on a management plan for this patient? **(2)**

The patient has disease limited to the testis without lymphovascular invasion and no distant disease (Stage 1 Seminoma).

- b.** Outline the management options available, providing evidence where applicable. **(6)**

Include the advantages and disadvantages of each potential management approach.

- c.** **(2)**
- i** How would you counsel the patient regarding outcomes with and without treatment for Stage 1 Seminoma?
 - ii** Outline a suitable follow-up schedule for a patient who has had adjuvant treatment for Stage 1 Seminoma.

Question 2

You have been asked to provide an opinion about the value of setting up a population screening program for lung cancer.

- a.** What advice would you give? Provide relevant evidence for population screening for lung cancer. **(2)**
- b.** A 79 year old man has an incidental finding of a 18mm nodule in the right middle lobe. He has a 60 pack year smoking history and known ischaemic heart disease and peripheral vascular disease.
- i** What are the differential diagnoses for this nodule? **(1)**
- ii** What investigations can be used to establish a diagnosis? **(2)**
What are the benefits and limitations of each investigation?
- c.** With regard to Stereotactic Ablative Body Radiation Therapy (SABR) for lung cancer:
- i** What are the general principles of SABR for lung tumours? **(2)**
- ii** What are the indications and limitations of SABR for lung cancer treatment? **(1)**
- d.** Discuss the relationship between cigarette smoking and lung cancer and its management. **(2)**

Question 3

- a.** Define the terms: **(3)**
- i** Quality Of Life (QOL)
 - ii** Health Related Quality of Life (HRQOL)
 - iii** Quality Adjusted Life Years (QALY)
- b.** Discuss the uses of HRQOL measurement in oncological practice. **(3)**
- c.** **(4)**
- i** What are the ideal features of a tool which measures HRQOL?
 - ii** You are designing a clinical trial for patients with brain tumours which has a HRQOL endpoint. When choosing an appropriate instrument to assess HRQOL in this trial, what domains should the instrument assess?

Question 4

- a.** Cancer cachexia can occur in patients with advanced cancer.
- i** What is cancer cachexia? **(1)**
 - ii** What are the clinical consequences of cancer cachexia? **(1)**
- b.** Patients with advanced gastric cancer often present with cachexia.
- i** Outline the possible causes of cachexia in this setting. **(1)**
 - ii** Discuss the pharmacological and non-pharmacological management options of cachexia in this setting. **(3)**
- c.** A 60 year old patient presents with anaemia secondary to bleeding from an advanced gastric cancer.
- i** Outline your initial management of this patient. **(1)**
 - ii** What are the options for local palliation of gastric cancer bleeding? **(3)**
Include in your answer the advantages and disadvantages of each option.

Question 5

A 60 year old man is experiencing significant distress due to erectile dysfunction. He was treated for prostate cancer one year ago.

- a.** Outline the possible causes for erectile dysfunction in this patient. **(2)**

- b.** How would you further counsel him and what management options would you discuss with him? **(3)**

- c.** Outline the role of androgen deprivation in non-metastatic prostate cancer. **(5)**
Provide evidence where appropriate.

Question 6

- a.** In general, what challenges are there in treating obese patients with cancer? **(6)**
- b.** In a patient who has completed curative intent therapy for cancer, what would you advise them with regard to their ongoing: **(4)**
- i** Diet
 - ii** Body weight
 - iii** Physical activity

Justify your answer.



FRANZCR Examination

Phase 2 Radiation Oncology

Radiation Therapy 1

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Question 1

A 45 year old woman presents with a 6cm invasive ductal carcinoma of the left breast with multiple biopsy proven ipsilateral axillary lymph nodes. There are no distant metastases.

- a. What is the rationale for neoadjuvant chemotherapy in this setting? **(2)**

The tumour is ER negative, PR negative, and HER2 positive. She is treated with Adriamycin/Cyclophosphamide followed by Paclitaxel and Trastuzumab. She has an excellent clinical response.

She has a wide local excision and sentinel lymph node biopsy. Histology shows a 15mm primary tumour with clear margins. One of three sentinel lymph nodes shows isolated tumour cells.

- b. She is referred for adjuvant radiation therapy. Describe a suitable radiation therapy technique and dose fractionation schedule. **(3)**

- c. In general, what are the advantages and disadvantages of prone breast treatment? **(2)**

- d. In general, what are the indications and what is the evidence for a tumour bed boost in adjuvant breast radiation therapy? **(3)**

What are the risks and benefits of a boost?

Question 2

A 23 year old male with Acute Myeloid Leukaemia (AML) is referred for Total Body Irradiation (TBI).

- a. Discuss the rationale for the use of TBI in AML. **(2)**
- b. A decision is made to administer TBI using an opposed lateral technique. **(5)**
Describe this radiation technique and include an appropriate dose fractionation schedule for this technique.
- c. What physical and pharmacological measures should be employed when a patient attends for TBI treatment in the radiation facility? **(1)**
- d. A number of regimens have been developed in which TBI is replaced with additional chemotherapy agents. **(2)**
What are the advantages and disadvantages of this approach?

Question 3

A 50 year old man presents with a slowly enlarging 5cm right parotid mass.

Biopsy confirms mucoepidermoid carcinoma.

- a.** What information from clinical examination and investigations do you need to formulate a treatment plan? **(2)**

Investigations reveal a 5cm tumour with a single 2 cm right Level 2 lymph node (cT3N1M0) high-grade mucoepidermoid carcinoma.

- b.** What is your treatment recommendation? **(2)**
Justify your answer.

The histopathological report reveals a 55mm high grade mucoepidermoid carcinoma, with microscopic positive margins on the surface of the facial nerve (R1), and 3 of 9 Level 2 lymph nodes involved (pT3pN2b). No extracapsular extension. No perineural invasion or lymphovascular invasion.

- c.** Describe a suitable radiation therapy technique and dose fractionation schedule for this patient. **(4)**
- d.** This patient's dental health is very poor. **(2)**
- i** What are the potential consequences of this post radiation therapy treatment?
 - ii** What can be done to minimise these potential consequences?

Question 4

A fit 62 year old woman is found to have a 4cm right lower lobe mass and a 10cm mediastinal mass. Biopsy confirms small cell lung cancer. She has limited stage disease.

- a.** What are the options for radiation therapy dose fractionation schedules in the curative intent management of this patient? **(4)**

Discuss the advantages and disadvantages of each option.

- b.** Describe your preferred radiation therapy technique and dose fractionation schedule. **(2)**

Your answer should include chemotherapy details.

The patient is planned for 3D conformal radiation therapy to be given with the first cycle of chemotherapy but the lung DVH constraints cannot be met.

- c.** What are the options for managing this situation? **(2)**

Justify your answer.

- d.** What is the likelihood of this patient developing Grade 3 or 4 oesophagitis? **(2)**

How would you manage this?

Question 5

A 60 year old man presents with an enlarging anterior neck mass. CT scan demonstrates a left thyroid mass with bilateral levels II-IV lymphadenopathy. Fine needle biopsy shows medullary thyroid carcinoma.

- a.** What further investigations would you recommend in order to formulate a treatment plan? **(2)**

Justify your recommendations.

The patient undergoes total thyroidectomy and bilateral levels II-VI neck dissection. Histology shows medullary thyroid cancer with macroscopic positive resection margins at the thyroid bed. Two level 3 lymph nodes are positive on the left.

- b.** A decision is made to treat with adjuvant radiation therapy. **(4)**

Describe a suitable radiation therapy technique and dose fractionation schedule.

- c.** Outline a suitable follow-up schedule for this patient. **(2)**

- d.** Describe the role of radioactive iodine in the management of thyroid cancer. **(2)**



FRANZCR Examination

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Radiation Therapy 2

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Question 1

A 58 year old man presents after local excision of a 3cm Merkel cell carcinoma from the upper lateral right arm (over the deltoid).

There is a positive radial margin of 0.2mm and there is prominent lymphovascular space invasion.

- a. What further information do you require to determine a management plan for this patient? **(3)**

There is no other evidence of disease.

- b. What management options are available for this patient? What would you recommend? **(4)**

Justify your answer.

- c. Describe a suitable radiation therapy technique and dose fractionation schedule for this patient. **(3)**

Question 2

- a.** **(3)**
- i** What are the current and investigational radiation treatment options available for definitive treatment of intermediate and high risk prostate cancer?
 - ii** What is the evidence for radiation dose escalation for intermediate and high risk patients?

A patient is found to have an isolated local intraprostatic relapse following external beam radiation therapy for localised prostate cancer.

- b.** Discuss the factors that you would take into account when considering a patient for **local salvage treatment**. **(4)**
- c.** What are the salvage treatment options for isolated local relapse following definitive external beam radiation therapy for localised prostate cancer? **(3)**
- Outline the potential toxicities associated with each option.

Question 3

A 25 year old male presents with headache and nausea. Brain CT demonstrates a mass in the fourth ventricle with extension into the brainstem.

- a. What would you look for in the clinical examination and what investigations would you order to assist you in formulating a treatment plan? **(2)**

The patient undergoes resection of the tumour. Histology shows ependymoma.

- b. What further information do you require to make a decision regarding adjuvant radiation therapy? **(2)**

Postoperative assessments show residual disease at the tumour bed as the only site of disease. Postoperative radiation therapy is recommended.

- c. Described a suitable radiation therapy technique and dose fractionation schedule. **(4)**
- d. What are the potential late toxicities of this treatment? **(2)**

Question 4

A 65 year old man undergoes excision of a 1.5cm skin lesion from the right infraorbital cheek. Histopathology demonstrates a poorly differentiated squamous cell carcinoma (SCC) with extensive perineural invasion.

- a.** How would you further assess this patient? **(3)**

He has a 2cm scar 3cm below the lateral infraorbital rim with no signs of local recurrence. There is reduced sensation in the infraorbital region only. There is no lymphadenopathy.

Histology shows a 1cm x 1cm x 6.5mm thick poorly differentiated SCC. Peripheral margins are well clear, deep margin is 0.3mm. There is extensive perineural spread involving nerves up to 0.2mm in diameter.

There is no other sign of disease.

- b.** A decision is made to proceed with adjuvant radiation therapy. Describe a suitable radiation therapy technique and dose fractionation schedule. **(4)**

Your answer should include a detailed description and justification for your choice of your target volumes.

- d.** The patient develops osteoradionecrosis of the mandible.
- i** What factors increase the risk of this complication? **(2)**
 - ii** How would you manage osteoradionecrosis? **(1)**

Question 5

A fit 64 year old man presents with symptoms of reflux and dysphagia.

Investigations reveal an adenocarcinoma of the oesophagus 32-36cm from the incisors. Endoscopic ultrasound shows invasion into the adventitia (T3). Staging investigations show no other disease.

- a.** What treatment would you recommend for this patient? **(1)**

Justify your answer.

The decision is made to treat with neoadjuvant chemo-radiation therapy.

The primary lesion is not visible on CT scan or PET/CT.

- b.** Describe a suitable radiation therapy technique and dose fractionation schedule. **(3)**

- c.** What are the options to ensure adequate caloric intake during the patient's treatment? **(2)**

The patient completes neoadjuvant chemo-radiation therapy and has a total oesophagectomy. One year later the patient presents with dysphagia secondary to an anastomotic recurrence.

- d.** What management options should be considered? **(4)**

What factors would you consider when assessing the different management options?