



FRANZCR Examination

Phase 2 Radiation Oncology

Pathology

July 2019

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 subpart is 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 70 year old man presents with a palpable cervical lymph node.

- a.** List the differential diagnoses. **(1)**

- b.** Regarding follicular lymphoma, describe the: **(2)**
 - i.** microscopic features.

 - ii.** immunohistochemical profile.

- c.** How is follicular lymphoma graded? **(2)**

- d.** Describe a prognostic scoring system used in follicular lymphoma? **(2)**

- e.** The majority of follicular lymphomas have a t(14;18) translocation. **(1)**

Describe 2 laboratory methods that can be used to assess whether the translocation is present.

- f.** What is the natural history of low-grade follicular lymphoma? **(2)**

Question 2

- a.** Regarding adenocarcinoma and squamous cell carcinoma of the oesophagus:
- i.** Compare and contrast the epidemiology and risk factors. **(4)**
 - ii.** List the microscopic and immunohistochemical features. **(2)**
- b.** After neoadjuvant chemoradiotherapy:
- i.** Describe the microscopic changes in the tumour and adjacent tissues. **(2)**
 - ii.** List the pathological prognostic factors in an oesophagectomy specimen. **(2)**

Question 3

A 42 year old male with known cirrhosis presents with right upper quadrant pain. US and CT abdomen show a solitary lesion in the right lobe of the liver. Staging scans are otherwise clear.

- a.** What are the likely differential diagnoses? **(1)**
- b.** You suspect it is a hepatocellular carcinoma (HCC). How would you establish the diagnosis? Justify your answer. **(2)**
- c.** In HCC, what are the:
- i.** Epidemiological factors? **(1)**
 - ii.** Risk factors? **(1)**
 - iii.** Macroscopic features? **(2)**
 - iv.** Microscopic features? **(2)**
- d.** Describe the mechanism of viral carcinogenesis in the development of HCC. **(1)**

Question 4

- a.** For neuroblastoma, describe the:
- i.** Epidemiology. (1)
 - ii.** Common primary locations and the sites of metastases. (1)
 - iii.** Clinical presentation. (2)
 - iv.** Microscopic appearance and typical immunostaining profile. (2)
- b.** List the factors used by the Children's Oncology Group or International Neuroblastoma Risk Group to stratify patients into various risk groups. (2)
- c.** How does neuroblastoma differ from Wilms tumour in terms of epidemiology, clinical presentation and sites of metastases? (2)

Question 5

A 62 year old man who, 8 weeks ago completed radical radiation therapy for a Stage 3 lung cancer, attends for post-treatment review. He reports increasing dyspnoea.

- a.** What are the differential diagnoses? **(1)**

- b.** Describe the histopathogenesis of: **(5)**
 - i.** radiation pneumonitis.

 - ii.** radiation fibrosis.

- c.** What is the pathogenesis of cardiac complications following radiation therapy? **(4)**

Question 6

- a.** A 68 year old has a left prostate nodule on DRE and his PSA is 15. **(2)**
What are the different prostate sampling techniques using transrectal and transperineal approaches?
What are their advantages and disadvantages?
- b.** The patient has a radical prostatectomy with nodal dissection. **(2)**
Describe the features on the histology report that confer a poorer prognosis.
- c.** For prostate adenocarcinoma: **(2)**
Describe how the Gleason score and International Society of Urological Pathology (ISUP) grade group systems of grading are derived and how these two systems differ.
- d.** Prostate cancer commonly metastasises. In general, describe the steps in the metastatic cascade (use of a diagram is acceptable). **(2)**
- e.** Briefly describe three immunohistochemical stains used to distinguish benign from malignant prostate tissue. **(2)**



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Question 1

- a. In general, what criteria should an investigative test meet in order for it to be considered as being suitable for use in a screening program? **(2)**
- b. What are the arguments for and against establishing a lung cancer screening program? **(3)**
- c. Discuss the current evidence and recommendations for lung cancer screening. **(2)**
- d. Define stage migration (Will Rogers phenomenon) and how it would influence your interpretation of medical literature. **(3)**

Provide an example to illustrate your answer.

Question 2

- a.** What is meant by the terms: **(2)**
- i.** Oligometastatic disease.
 - ii.** Oligoprogressive disease.
- b.** What factors should be considered in deciding whether a patient could benefit from aggressive treatment of oligometastatic disease? **(2)**
- c.** A fit 53-year-old male presents with oligometastatic liver metastases from colorectal cancer. **(4)**
- Discuss the options for liver directed treatment for this patient.
- Include in your answer, the advantages and disadvantages for each option.
- d.** Discuss the evidence for stereotactic body radiotherapy for metachronous oligometastatic disease. **(2)**

Question 3

- a. Radiation is frequently used in the treatment of Hodgkin's disease.
- i. List the criteria for defining unfavourable risk Hodgkin's disease? **(2)**
 - ii. In treating patients with Hodgkin's disease, what is meant by: **(1.5)**
 - ii.i. Involved field radiation therapy.
 - ii.ii. Involved site radiation therapy.
 - ii.iii. Involved node radiation therapy.

A 23 year old female is diagnosed with unfavourable risk Hodgkin's lymphoma with bulky mediastinal lymph nodes infiltrating the chest wall. She is treated with 4 cycles of ABVD and achieves a complete response. The decision is made to treat with radiation therapy.

- b. Define the nodal volumes you would use and explain how you would determine them. **(2)**
- c. What information would you give the patient about the efficacy of the treatment and the overall risk of second malignancy? **(1.5)**
- d. Radiation induced cardiac toxicities may occur as a consequence of treatment. **(3)**
- i. What are the risk factors for radiation induced heart disease?
 - ii. In general, how would you reduce the treatment and patient related risk factors?
 - iii. What education would you give the patient on risk reduction strategies?

Question 4

- a.** How would you evaluate a patient with a suspected pituitary adenoma?
- i.** In your answer, discuss the salient points you would assess:
 - i.i.** On clinical history. **(1)**
 - i.ii.** On clinical examination. **(2)**
 - ii.** What investigations would you perform? Justify your answer. **(3)**
- b.** What would you tell a patient about the side-effects of pituitary radiation therapy? **(2)**
- c.** Describe the pharmacological management of the three most common functional pituitary tumours. **(2)**

Question 5

- a.** List the common signs and symptoms of depression in cancer patients. **(2)**

- b.** Identify the specific factors that are important to assess in a patient who has suicidal ideation. **(2)**

- c.** List factors that may increase the risk of depression in cancer patients. **(2)**

- d.** During a routine follow up appointment of a patient with prostate cancer, you assess the patient as being depressed. **(4)**
Discuss how you would manage this patient further.

Question 6

A fit 60 year woman presents with severe pain across the lower back radiating down both legs. She has a recurrent, inoperable renal cell metastasis involving the upper half of her sacrum.

- a. Discuss the pharmacological pain management options for this woman. (5)
Include in your answer the rationale, advantages and disadvantages for each class of drug.

She has had two courses of palliative radiation in the past 6 months such that the upper sacral region has been treated to normal tissue tolerance. Her expected prognosis from her disease is less than 12 months.

- b. Discuss the non-pharmacologic management which may be considered for this woman as an alternative to further radiation. (3)

Discuss the advantages and disadvantages of each.

- c. In general, discuss the systemic management of metastatic renal cell cancer. (2)



FRANZCR Examination

Phase 2 Radiation Oncology

Radiation Therapy 1

July 2019

Time Allowed: 2.5 Hours

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Question 1

A 32 year old woman is 28 weeks pregnant. She is found to have a 3cm left breast mass, which on fine needle aspiration biopsy is an infiltrating ductal carcinoma.

a. Describe your initial management of this patient. **(3)**

b. In general, what are the principles of systemic treatment of breast cancer in pregnant women? **(2)**

She has no treatment until she delivers. After delivery, she undergoes a wide local excision and sentinel node biopsy. The lesion is 30 mm, grade 2, ER/PR positive and Her 2 positive with clear margins. One of the three 3 nodes contains a 5mm metastasis.

c. In general, what are the options for the further management of the axilla where one sentinel node is positive? Justify your answer. **(2)**

She undergoes a left level II axillary dissection and is found to have a total of 4 macrometastases from 15 nodes. She is referred for adjuvant radiation therapy.

d. Describe a suitable radiation therapy technique and dose fractionation schedule. Provide justification for your choice of nodal volumes. **(3)**

Question 2

A 60 year old male presents with a 3 week history of jaundice. Examination is otherwise unremarkable. A CT scan demonstrates a 3 cm mass in the head of the pancreas.

- a. What other investigations would you perform? Justify your answer. **(2)**

The tumour is deemed unresectable due to extensive vessel involvement. Staging reveals no other evidence of disease. Histology shows adenocarcinoma.

- b. What are the management options for this patient? Justify your answer. **(4)**

As part of his treatment, the patient will receive radical long course external beam radiation therapy.

- c. Describe a suitable radiation therapy technique and dose fractionation schedule for this patient. Justify your answer. **(4)**

Question 3

A 4 year old boy presents with a palpable abdominal mass. The favoured diagnosis is Wilms' tumour.

- a. List the key imaging investigations required to confirm the diagnosis and facilitate a management plan. **(1.5)**
- b. In general, what are the indications for radiation therapy in paediatric Wilms' tumour? **(3)**

Following neoadjuvant chemotherapy the boy undergoes right nephrectomy and regional lymph node dissection.

The tumour is found to extend beyond the renal capsule, but margins are clear. Two left para-aortic nodes are involved. The histology is unfavourable / high risk. There is no gross residual disease and there is no tumour spillage or peritoneal involvement.

MDT recommendation is for flank irradiation.

- c. Describe your target volumes including the information you would use to delineate them. Describe a suitable dose fractionation schedule. **(4)**
- d. What potential radiation toxicities would you discuss with the parents? **(1.5)**

Question 4

A fit 69 year old man presents with an ulcerated 3.5cm mass on his glans penis. A biopsy confirms poorly differentiated squamous cell carcinoma.

- a.** How would you further assess this patient? Justify your answer. **(1.5)**
- b.** In general, in penile cancer:
- i.** What pathological features increase the risk of nodal involvement? **(1)**
 - ii.** List the options available for pathologic staging of the nodes in high risk patients. **(0.5)**
 - iii.** Discuss the management of the nodal regions. **(3)**
- c.** Staging investigations show the tumour is localised to the penis. The patient declines surgery.
- i.** Describe a suitable radiation therapy technique and dose fractionation schedule using external beam radiation to treat the penis and inguinal/external iliac nodes. **(3)**
 - ii.** What are the potential toxicities of this treatment? **(1)**

Question 5

- a. Outline the different types and associated natural histories of Kaposi's sarcoma? **(2)**
- b. In general, what are the treatment options available for cutaneous HIV-related Kaposi's sarcoma? **(2)**

A 63 year old male presents with extensive symptomatic Kaposi's lesions on his right lower leg extending from just below the knee anteriorly, involving the calf posteriorly as well as both dorsal and plantar surfaces of his foot.

- c. Describe a suitable radiation therapy technique including a dose and fractionation schedule. **(4)**
- d. What probability of treatment response and potential toxicities would you discuss with the patient? **(2)**



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Radiation Therapy 2

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Question 1

A 72 year old man presents with haematuria. Investigations reveal a muscle invasive, T2, urothelial carcinoma of the bladder with no evidence of disease elsewhere.

- a.** In general, what are the factors that should be taken into account when deciding on the optimal treatment modality? **(3)**
- b.** The patient opts for radical chemo radiation therapy. **(4)**
Describe a suitable chemotherapy schedule, radiation therapy technique and dose fractionation schedule.
- c.** For this patient, what are the:
- i.** Patterns of recurrence? **(0.5)**
 - ii.** Likely outcomes in terms of local control, bladder preservation and cure? **(1.5)**
 - iii.** Potential significant late complications and what is their incidence? **(1)**

Question 2

Radiation therapy may be used in benign disease.

- a.** What factors would you consider when considering radiation therapy for the treatment of keloid. **(2)**
- b.** Discuss the role of radiation therapy in the management of keloid scars. **(2)**
Include in your answer a suitable radiation therapy technique and dose fractionation schedule.

A patient with Graves ophthalmopathy who has failed pharmacological therapy is referred for radiation therapy.

- c.** Describe a suitable radiation therapy technique and dose fractionation schedule. **(1.5)**
- d.** What are the potential toxicities of the treatment? **(1.5)**
- e.** **(3)**
- i.** What is heterotopic ossification (HO)?
 - ii.** List the risk factors for HO.
 - iii.** Discuss the role of radiation therapy in the management of HO. Include in your answer a suitable radiation therapy technique and dose fractionation schedule.

Question 3

- a. When considering low grade gliomas, what are the prognostic factors for survival in patients with Grade 2 glioma? **(3)**
- b. A fit and well 72-year-old woman underwent a complete resection of a glioblastoma multiforme (GBM) from her left temporal lobe. She has made an excellent recovery post operatively.
- i. Considering high grade gliomas, what are the treatment options for elderly patients with GBM? **(2)**
- ii. Which treatment strategy would you recommend for this patient? Justify your answer. **(1)**
- c. A decision is made for the patient to receive radiation therapy. **(2.5)**
- Describe a suitable radiation therapy technique and dose fractionation schedule.
- Nine months after completing her radiation therapy, the patient remains well but develops an asymptomatic 1cm recurrence at the lateral aspect of the resection cavity.
- d. Comment on the management options for this patient. **(1.5)**

Question 4

A 50 year old man presents with a submandibular mass. A CT neck scan confirms a 5cm submandibular salivary gland mass with no lymph node enlargement.

Core biopsy confirms an adenoid cystic carcinoma.

- a. What further investigations would you perform? Justify your answer. **(2)**

The patient undergoes a resection of the mass. Histology confirms a 5 cm adenoid cystic carcinoma with positive deep margins. Perineural invasion is seen at the resection margin in nerves up to 0.2mm diameter.

The recommendation from the MDT is for postoperative radiation therapy.

- b. Describe a suitable radiation therapy treatment technique and dose fractionation schedule for this patient's treatment. **(4)**

- c. Under what circumstances would you consider definitive radiation therapy? **(2)**

- d. The patient has very poor dental health. **(2)**

- i. What are the potential consequences of this following radiation therapy treatment?
- ii. What can be done to minimise these potential consequences?

Question 5

A well 44 year old woman presents with a 12 months history of post coital bleeding. Clinical examination confirms an expanded 5cm diameter cervix with an ulcerated lesion arising from the posterior lip. A biopsy confirms squamous cell carcinoma of the cervix.

- a. How would you further assess this patient? Justify your answer. (2)
- b. The patient is found to have a PET avid enlarged right common iliac lymph node measuring 4cm x 3cm.
- i. Discuss the management options for treating the enlarged common iliac lymph node? (1)
 - ii. In this patient, what factors need to be considered when using an extended radiation field? Justify your answers. (2)

This patient is diagnosed with a FIGO Stage 3B Squamous Cell Carcinoma of the cervix (T2bN1M0).

Definitive Chemoradiation is recommended.

- c. For the external beam component, describe: (3)
- i. the target volumes.
 - ii. a dose fractionation schedule.
- d. Describe a suitable brachytherapy technique including timing, dose and fractionation for this patient. (2)