PRINCESS MARGARET CANCER CENTRE
CLINICAL PRACTICE GUIDELINES

GENITOURINARY

TESTIS CANCER

GU Site Group – Testis Cancer

Author: Dr. Charles Catton, Updated January 2016: Dr. Robert Hamilton

1. INTRODUCTION

Testicular cancer is uncommon and accounts for <1% of new cases of cancer. In 2015 it is estimated that 1050 new cases will be diagnosed and >95% of cases are germ cell tumours (Canadian Cancer Statistics 2015). Diagnosis is most frequently made between the ages of 15-35. The average annual change in age-standardized incidence increased by 1.7%/year from 2001-2010. The cause of this increase is not known.

The natural history of testicular cancer is variable, but it is frequently clinically localized at diagnosis. Although the management of testicular cancer has changed substantially in the last 20 years, in those where metastasis has occurred, the disease is frequently curable and thus number of deaths from disease in Canada has been stable at around 40 per year.

2. PREVENTION

There is no known preventative treatment for this disease.

3. SCREENING AND EARLY DETECTION

Routine screening is not recommended and no program for screening exists due to the uncommon nature of the disease. The role of testicular self-examination as a screening tool has been controversial, however some emphasis on raising awareness of the disease amongst young men has been attempted. Many advocacy groups and public awareness campaigns focus attention on the importance of young men performing self-examination, however there is no evidence that performing this type of screening leads to earlier diagnosis of testicular cancers or improves mortality.

4. DIAGNOSIS

Diagnosis of testicular cancer is usually made with a scrotal ultrasound followed by radical inguinal orchiectomy. Occasionally, in case of urgent need to start treatment, orchiectomy may be delayed until after treatment of metastatic disease has been completed. In rare cases, where testicular sparing is desired and feasible, partial orchiectomy may be undertaken. Such a situations include prior removal of the contralateral testicle (for cancer, trauma, undescended testis etc.), bilateral testicular tumours at diagnosis, or isolated, small, peripheral tumours where the diagnosis of germ cell tumour may be uncertain.

At the initial assessment, patients should be assessed in a multidisciplinary environment.

Clinical Evaluation:

- Complete history in all patients
- Co-morbid conditions (previous cancers, heart disease, cerebrovascular disease, diabetes, renal dysfunction)
- Prior treatment of cancer, if any

- Complete physical examination in all patients, including contralateral testis
- Family history of cancer

Oncologic Imaging and Laboratory Evaluations:
Evaluation of extent of disease:

- All patients should undergo a bilateral scrotal ultrasound (if not already done).
- CT of the abdomen and pelvis with (+/- intravenous contrast) to detect metastases.
- CT chest to detect metastases (chest X-ray alone, is acceptable for stage I seminoma patients).
- Patients with high risk/suspicion of brain metastases should undergo brain MRI.

Laboratory Tests:

- Baseline serum tumour markers (AFP, HCG, LDH) for all patients prior to and after orchiectomy
- CBC, electrolytes, calcium, creatinine, liver function studies

Other Investigations:

- In rare circumstances when metastastic lesions are present initially and the diagnosis is uncertain, a CT or ultrasound guided biopsy to confirm malignancy may be performed. Trans-scrotal biopsy should be avoided.

5. PATHOLOGY

All patients should have documentation of the tumor histology and its subtype (See WHO Classification for testicular cancer in Appendix I). On occasion where urgent treatment of metastatic disease is required and orchiectomy is not feasible or will delay care, the clinical presentation and tumour marker levels may be sufficient to proceed with management.

Pathology reports in orchiectomy specimens for testicular cancer should specify histological subtype (and proportion), any additional immunohistochemistry, known pathological prognostic factors, tumor extension, and resection margin status should be provided so that an accurate pathological staging of the tumor can be rendered.

Expert uropathology review for patients whose tumor diagnoses were made at outside institutions is conducted at the request of treating oncologists.

The 2004 WHO classification is the official classification system used for diagnosis, and is provided in Appendix I.

Staging is according to the Joint UICC & AJCC Staging Seventh Edition, 2010. The following is a brief summary of the clinically relevant stages of testicular cancer:

Stage I = disease confined to the testis.
Stage II = disease involves the testis and the retroperitoneal nodes
Stage III = disease involves the testis with distant metastases

There is a risk stratification of germ cell tumours based on patients with distant metastatic disease according to the International Germ Cell Cancer Collaborative Group.
More detailed description of stage and risk classification is provided in Appendix II.

6. MANAGEMENT

6.1 Germ Cell Tumours

Management strategies for newly diagnosed patients with testicular germ cell tumours (GCT) are based on assigned stage/risk classification (See appendix II) and patient factors.

Options include surveillance, surgery (retroperitoneal node dissection and selective resection of metastatic disease), radiotherapy, and chemotherapy.

Patients with elevated AFP levels should be managed as non-seminoma regardless of the pathology in the primary tumour unless an alternative explanation for the elevated level is found.

Investigations and procedures prior to treatment

- All patients undergoing definitive treatment i.e. surgery, radiation, chemotherapy, should be offered the opportunity to sperm bank unless need for urgent treatment does not allow.
- Pulmonary function tests and audiometry may be done as required for patients undergoing combination chemotherapy.

6.1.1 Seminoma

6.1.1.1 Stage I (tumour marker negative)

Surveillance
Surveillance is a management strategy designed to provide selective treatment based upon the tumor behavior determined through a period of observation and only administering treatment in case of relapse of disease. The goal is to minimize the side effects of treatment by avoiding unnecessary therapy without adversely affecting oncologic outcomes. This is the preferred management strategy world-wide. Risk-adapted surveillance is not recommended.

Patients should be motivated, and compliance is optimal if rationale of the strategy and importance of adherence to the assigned follow up schedule is initially established and discussed with the patient. The risk of relapse for all-comers with Stage I Seminoma is estimated at 15%.

Surveillance protocol
Patients are followed with physical examination, blood work and imaging at regular intervals. See full details in Appendix III.

Adjuvant therapy
Risk adapted management (based on risk factors tumour size/rete testis invasion) is not recommended.
Adjuvant therapy is designed to provide a reduction in relapse rates with the use of either single agent carboplatin chemotherapy or retroperitoneal radiotherapy. This will be offered to patients who are deemed unsuitable for a surveillance strategy.

Carboplatin, when used, will be delivered as 1 cycle and AUC 7.
Radiotherapy, when used, will be delivered in a similar manner as stage II disease (see below) except the dose used is 25 Gy in 20 fraction over 4 weeks only. As relapse rates are reduced from 15% to 5% with either carboplatin chemotherapy or retroperitoneal radiothearpy, patients should be informed that follow up is still required after adjuvant therapy.

6.1.1.2 Stage IIA/B

Radiotherapy
Selection factors for radiotherapy include patient preference, extent and location of retroperitoneal lymphadenopathy, no contraindication to radiotherapy e.g. active inflammatory bowel, anticipated excess renal toxicity. Stage IIA/B disease is normally treated with radiotherapy except where the oncologist deems the extent of disease to be more suitable for combination chemotherapy.

Treatment technique for EBRT
Parallel opposed fields with appropriate shielding of organs at risk such as the kidneys to encompass the retroperitoneal nodal chain from the upper para-aortic nodes to the ipsilateral common iliac nodes.

Testicular shielding is used in patient concerned with fertility preservation
25 Gy in 20 fractions over 4 weeks with 10 Gy boost to gross nodal disease prescribed to ICRU point.

Chemotherapy
Selection factors for chemotherapy may include extent of retroperitoneal disease, patient preference and contraindication to radiotherapy. Combination chemotherapy with either 3 cycles of BEP (Bleomycin 30 U days 2,9,16; Etoposide 100mg/m2/d x 5d;Cisplatin 20mg/m2/d x5d) or 4 cycles of EP (Etoposide 100mg/m2/d x 5d; Cisplatin 20mg/m2/d x 5d) is considered standard. BEP is the preferred regimen unless there are contraindications to bleomycin. Supportive measures e.g. use of growth factors such as G-CSF, to avoid dose reductions and/or delays are recommended as needed.
Chemotherapy doses should not be capped for patients with elevated BSA.

6.1.1.3 Stage IIC/III

Good Risk
Combination chemotherapy with either 3 cycles of BEP or 4 cycles of EP (if contraindication to bleomycin) is considered standard.

Intermediate Risk
Combination chemotherapy with either 4 cycles of BEP or 4 cycles of VIP (if contraindication to bleomycin) (Etoposide 75mg/m2/d x 5d; Ifosfamide 1200mg/m2/d; Cisplatin 20mg/m2/d x 5d with GCSF support) is considered standard.

6.1.1.4 Post treatment residual mass

Residual masses after therapy are managed according to size. If <3 cm, observation and intervention only if evidence of progression. If > 3 cm, PET scan and if positive consider repeat PET scan after 6 weeks (because of high rate of false positive), biopsy and/or surgical resection. Referral to tertiary centre is highly recommended due to the complexity of surgery in the post-chemotherapy setting.

6.1.1.4 Recurrent disease

Relapse on surveillance is managed according to extent of disease similar to de-novo stage II-III disease. Patients with low bulk retroperitoneal lymphadenopathy should be considered for radiotherapy. More extensive relapse is managed with chemotherapy (BEP x 3 or EP x 4).

Relapse after initial treatment with radiotherapy is generally managed with combination chemotherapy. Relapse after initial treatment with chemotherapy is generally managed with salvage combination chemotherapy and high dose chemotherapy/autologous stem cell transplant in appropriate patients (section 6.1.2.6).

6.1.2 Non-seminoma and mixed germ cell tumour

6.1.2.1 Stage I (tumour marker negative)

Surveillance
Surveillance is a management strategy designed to provide selective treatment based upon the tumor behavior determined through a period of observation and only administering treatment in case of relapse of disease. The goal is to minimize the side effects of treatment by avoiding unnecessary therapy without adversely affecting oncologic outcomes. This is the preferred management strategy.

Patients should be motivated, and compliance is optimal if rationale of the strategy and importance of adherence to the assigned follow up schedule is initially established and discussed with the patient.

Surveillance protocol
Patients are followed with physical examination, blood work and imaging at regular intervals. See full details in Appendix III.

Adjuvant therapy

Risk adapted management is not recommended. Adjuvant chemotherapy may be considered in patients at high risk of relapse (50%) after orchiectomy (vascular invasion or pure embryonal carcinoma in primary tumour) if unsuitable for surveillance. Combination chemotherapy with 2 cycles of BEP is considered standard if this option is used. This reduces the relapse risk to <3%.

Surgery in the form of nerve sparing retroperitoneal lymph node dissection may be considered in patients not suitable for surveillance or adjuvant chemotherapy. This reduces risk of relapse to <10%.

Patients should be informed that follow up is still required after adjuvant therapy.

6.1.2.2 Stage IS (tumour marker +)

Such patients will be treated in the same manner as good–prognosis patients with metastatic disease (see below).

6.1.2.3 Stage IIA (tumour marker -)

Surgery
When surgery is the chosen option, nerve sparing RPLND is standard and pathological nodal status will dictate any subsequent treatment. For pN0 – surveillance, for pN1 – surveillance (RR < 30%) or adjuvant chemotherapy (BEP/EP x 2), for pN2 – adjuvant chemotherapy (BEP/EP x 2) and for pN3 – chemotherapy as for good prognosis advanced disease (EP x 4 or BEP x 3).

6.1.2.4 Stage IIA (tumour marker +), stage IIB/C, stage III

Good prognosis
Standard combination chemotherapy for good prognosis advanced disease is either BEP x 3 (preferred) or EP x 4 (if contraindication to bleomycin).

Intermediate and Poor Prognosis
Standard combination chemotherapy for intermediate/poor prognosis disease is BEP x 4 or VIP x 4 if there is a contraindication to bleomycin. If bulky retroperitoneal

lymphadenopathy (>5 cm) is present, prophylactic low molecular weight heparin should be given during chemotherapy to reduce the risk of venous thrombosis.
High dose chemotherapy and autologous stem cell transplant as initial treatment for poor prognosis disease is not recommended.

Patients with primary mediastinal non-seminoma germ cell tumors are treated with VIP x 4 to reduce the risk of post-operative pulmonary complications associated with bleomycin.

6.1.2.5 Post treatment residual mass

Any mass >1cm after chemotherapy should be resected for three reasons: a) the residual mass may harbor viable chemo-refractory germ cell tumour; b) the residual mass may harbor teratoma which can grown in a destructive way ("growing teratoma syndrome"); c) the residual mass may harbor teratoma that can or already has undergone malignant transformation.

If fibrosis or teratoma are found at pathological examination, no further chemotherapy is required. If viable tumour is found after resection, treatment options include active surveillance or 2 further cycles of cisplatin-based chemotherapy, which may be considered in the event of extensive viable disease, incomplete resection, or poor risk IGCCCG classification.

6.1.2.6 Recurrent disease

Relapse on surveillance and after primary RPLND is managed according to extent of disease similar to de-novo presentation of stage II-III disease.

Relapse after initial treatment with chemotherapy is generally managed with salvage combination chemotherapy with 4 cycles of TIP (Paclitaxel 250mg/m2 Day 1, Ifosphamide 1500mg/m2 and Cisplatin 25mg/m2 Days 2-5 and prophylactic granulocyte colony stimulating factor (G-CSF)) or 1-2 cycles of TIP followed by high dose chemotherapy with Carboplatin and Etoposide with autologous stem cell transplant in appropriate patients. Patients with late relapse (≥2 years after completion of initial chemotherapy) are usually managed with surgical resection if feasible.

Patients with incurable, platinum refractory disease are treated with palliative chemotherapy with Paclitaxel (100mg/m2) and Gemcitabine (1000mg/m2) days 1, 8, and 15 every 28 days, single agent Gemcitabine (1000mg/m2) days 1, 8, and 15 every 28 days, or oral Etoposide 50mg/m2/ day every 28 days.

6.2 Non-Germ Cell Tumours

Non-germ cell tumours are uncommon and are managed individually according to specific pathology and extent of disease after orchiectomy.

6.3 Oncology Nursing Practice

Refer to general oncology nursing practices

7. SUPPORTIVE CARE

7.1 Patient Education

Patient education is an integral aspect of cancer management in the GU site group. In addition to one-on-one education specific to the patient situation, written educational materials are provided to patients. The specific educational content is provided depending on the patient's diagnosis and management options. In addition, there is a library with resources available to the patient. Patients are encouraged to participate in testicular cancer support groups. These groups provide important peer support and education to recently diagnosed men and their families. The largest such group is Testicular Cancer Canada and their organization can be accessed at www.testicularcancercanada.ca

Once patients have received their treatment (or no treatment in the case of surveillance) and a sufficient period of time has passed such that the risk of subsequent relapse is low, patients receive a Survivorship Care Plan which outlines several aspects of there after cancer care. These aspects include physical and mental health, sequelae of the treatment they received, and oncologic follow-up guidelines specific to their cancer. Resources are provided for any specific issues that may arise after cancer treatment.

7.2 **Psychosocial Care**

Refer to general psychosocial oncology care guidelines

7.3 **Symptom Management**

Men with testis cancer may have a multitude of physical and emotional symptoms related to their disease and treatment. DART and ESAS (Distress Assessment and Response Tool and Edmonton Symptom Assessment System) are the screening tools used to identify the symptoms of most concern to the patient. They add to the clinical assessment of the patient made by the clinician at an individual attendance, but are also recorded serially at each attendance, to observe outcomes of interventions used. Patients answers are reviewed by the nurse and oncologists, symptom management guides are used in response to this screening and patients with significant burden of symptoms can be referred to appropriate services (eg palliative care, social work etc).

Referral for expert management of treatment related complications should be considered if conservative measures fail, particularly in those associated with the late effects of treatment.

7.4 **Clinical Nutrition**

Written materials on nutrition and health and access to a dietician are made available to men with testis cancer. Proper nutrition is especially important to maintain health and limit the effects of metabolic syndrome in men, in particular those treated with combination chemotherapy.

7.5 **Palliative Care**

Refer to general oncology palliative care guidelines

8. **FOLLOW-UP**

Follow-up is individualized according to the specific management undertaken by the patient. Patients have regular follow up with physical examination together with appropriate imaging and blood work. Full details are provided in Appendix III.

APPENDIX I – PATHOLOGICAL CLASSIFICATION OF TESTIS CANCER

2004 WHO Classification for testis cancer:

Germ cell tumours

Precursor lesions

- Intratubular germ cell neoplasia
- Unclassified type (carcinoma in situ)
- Specifed types

Tumours of one histologic type (pure forms)

- Seminoma
  - Variant - Seminoma with syncytiotrophoblastic cells
- Spermatocytic seminoma
  - Variant - spermatocytic seminoma with sarcoma
- Embryonal carcinoma
- Yolk sac tumour
- Trophoblastic tumours
  - Choriocarcinoma
    - Variant - monophasic choriocarcinoma
  - Placental site trophoblastic tumour
  - Cystic trophoblastic tumour
- Teratoma
  - Variant – Dermoid cyst
  - Variant – Epidermoid cyst
  - Variant – Monodermal teratoma (Carcinoid, Primitive neurectodermal tumour (PNET), Nephroblastoma-like tumor, others.
  - Variant - Teratomic with somatic-type malignancy

Tumours of more than one histologic type (mixed forms)

- Embryonal carcinoma and teratoma
- Teratoma and seminoma
- Choriocarcinoma and teratoma.embryonal carcinoma

- Others

Sex cord/Gonadal stromal tumours

- Leydig cell tumour
- Sertoli cell tumour
  - Lipid rich variant
  - Scleriosing variant
  - Large cell calcifying variant
  - Intratubular sertoli cell neoplasia in Peutz-Jeghers syndrome
- Granulosa cell tumour
  - Adult type
  - Juvenile type
- Thecoma Fibroma Group
  - Thecoma
  - Fibroma
- Sex cord/gonadal stromal tunour - incompletely differentiated
- Sex cord/gonadal stromal tumour - mixed types

Mixed Germ Cell and Sex Cord/Gonadal Stromal Tumours

- Gonadoblastoma
- Germ cell-sex cord/gonadal stromal tumour, unclassified

Miscellaneous tumours of the testis

- Carcinoid
- Tumours of ovarian epithelial types
  - Serous tumour of borderline malignancy
  - Serous carcinoma
  - Well differentiated endometroid tumour
  - Mucinous cystadenoma
  - Mucinoous cystadenoma
  - Brenner tumour
- Nephroblastoma
- Paraganglioma

Haemotpoietic tumours

Tumours of collecting ducts and rete

- Adenoma
- Carcinoma

Tumours of the paratesticular structures

- Adenomatoid tumour
- Malignant and Benign Mesothelioma
- Adenocarcinoma of the epididymis
- Papillary cystadenoma of the epididymis
- Melanotic neuroectodermal tumour
- Desmoplastic small round cell tumour

Mesenchymal tumours of the spermatic cord and testicular adnexae

- Lipoma
- Liposarcoma
- Rhabdomyosarcoma
- Aggressive angiomyxoma
- Angiomyofibroblastic-like tumour
- Fibromatosis
- Fibroma
- Soliatary fibrous tumour
- Others

Secondary tumours of the testis

APPENDIX II

TESTICULAR CANCER STAGING (Joint UICC & AJCC Staging Seventh Edition, 2010):

Primary Tumor (T)

pTX	Primary tumor cannot be assessed.
pT0	No evidence of primary tumor (e.g., histologic scar in testis).
pTis	Intratubular germ cell neoplasia (carcinoma *in situ*).
pT1	Tumor limited to the testis and epididymis without vascular/lymphatic invasion; tumor may invade into the tunica albuginea but not the tunica vaginalis.
pT2	Tumor limited to the testis and epididymis with vascular/lymphatic invasion, or tumor extending through the tunica albuginea with involvement of the tunica vaginalis.
pT3	Tumor invades the spermatic cord with or without vascular/lymphatic invasion.
pT4	Tumor invades the scrotum with or without vascular/lymphatic invasion.

Regional Lymph Nodes (N)

Clinical	
NX	Regional lymph nodes cannot be assessed.
N0	No regional lymph node metastasis.
N1	Metastasis with a lymph node mass ≤2 cm in greatest dimension; or multiple lymph nodes, none >2 cm in greatest dimension.
N2	Metastasis with a lymph node mass >2 cm but not >5 cm in greatest dimension; or multiple lymph nodes, any one mass >2 cm but not >5 cm in greatest dimension.
N3	Metastasis with a lymph node mass >5 cm in greatest dimension.
Pathologic (pN)	
pNX	Regional lymph nodes cannot be assessed.
pN0	No regional lymph node metastasis.
pN1	Metastasis with a lymph node mass ≤2 cm in greatest dimension and ≤5 nodes

	positive, none >2 cm in greatest dimension.
pN2	Metastasis with a lymph node mass >2 cm but not >5 cm in greatest dimension; or >5 nodes positive, none >5 cm; or evidence of extranodal extension of tumor.
pN3	Metastasis with a lymph node mass >5 cm in greatest dimension.

Distant Metastasis (M)

M0	No distant metastasis.
M1	Distant metastasis.
M1a	Nonregional nodal or pulmonary metastasis.
M1b	Distant metastasis other than to nonregional lymph nodes and lung.

Serum Tumour Markers (S)

SX	Marker studies not available or not performed.
S0	Marker study levels within normal limits.
S1	LDH <1.5 × N[b] *and* hCG (mIu/ml) <5,000 *and* AFP (ng/ml) <1,000.
S2	LDH 1.5–10 × N *or* hCG (mIu/ml) 5,000–50,000 *or* AFP (ng/ml) 1,000–10,000.
S3	LDH >10 × N *or* hCG (mIu/ml) >50,000 *or* AFP (ng/ml) >10,000.

Stage Groupings

Group	T	N	M	S (Serum Tumor Markers)
0	pTis	N0	M0	S0
I	pT1–4	N0	M0	SX
IA	pT1	N0	M0	S0
IB	pT2	N0	M0	S0
	pT3	N0	M0	S0
	pT4	N0	M0	S0
IS	Any pT/Tx	N0	M0	S1–3
II	Any pT/Tx	N1–3	M0	SX
IIA	Any pT/Tx	N1	M0	S0

Group	T	N	M	S (Serum Tumor Markers)
	Any pT/Tx	N1	M0	S1
IIB	Any pT/Tx	N2	M0	S0
	Any pT/Tx	N2	M0	S1
IIC	Any pT/Tx	N3	M0	S0
	Any pT/Tx	N3	M0	S1
III	Any pT/Tx	Any N	M1	SX
IIIA	Any pT/Tx	Any N	M1a	S0
	Any pT/Tx	Any N	M1a	S1
IIIB	Any pT/Tx	N1–3	M0	S2
	Any pT/Tx	Any N	M1a	S2
IIIC	Any pT/Tx	N1–3	M0	S3
	Any pT/Tx	Any N	M1a	S3
	Any pT/Tx	Any N	M1b	Any S

RISK CLASSIFICATION FOR METASTATIC GERM CELL TUMOURS
(International Germ Cell Cancer Collaborative Group)

IGCCCG Classification	
Seminoma	
Good Risk (90% 5yr OS)	Any primary No non-pulmonary metastases* Normal AFP
Intermediate Risk (80% 5yr OS)	Any primary Non-pulmonary metastases* present Normal AFP
Non-Seminoma	
Good Risk (90% 5yr OS)	Testicular or retroperitoneal primary No non-pulmonary metastases* AFP <1000; BHCG<5000, LDH <1.5xN
Intermediate Risk (80% 5yr OS)	Testicular or retroperitoneal primary No non-pulmonary metastases* AFP 1000-10000; BHCG 5000-50000; LDH 1.5-10xN

High Risk (50% 5yr OS)	Mediastinal primary or Non-pulmonary visceral metastases* or AFP>10000; BHCG >50,000, or LDH >10x N

* non-nodal metastases

APPENDIX III – TESTICULAR CANCER FOLLOWUP PROTOCOLS

SEMINOMA SURVEILLANCE

NON-SEMINOMA SURVEILLANCE

POST CHEMOTHERAPY with CR (no RPLND)

POST PRIMARY RPLND (pN-ve)

POST PRIMARY RPLND (pN+ve)

POST CHEMOTHERAPY – RPLND

POST RADIATION THERAPY

STAGE I SEMINOMA SURVEILLANCE PROTOCOL

Time Post Orchiectomy	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Year 1						**CT A&P***						**CT A&P** **CXR**** serum LH, FSH, free & total testosterone
Year 2						**CT A&P**						**CT A&P** **CXR** serum LH, FSH, free & total testosterone
Year 3						**CT A&P**						**CT A&P** **CXR** serum LH, FSH, free & total testosterone
Year 4												**CT Abdo*** ONLY** serum LH, FSH, free & total testosterone
Year 5												**CT Abdo ONLY** serum LH, FSH, free & total testosterone
Year 7												**CT Abdo ONLY** serum LH, FSH, free & total testosterone
Year 9												**CT Abdo ONLY** **CXR** serum LH, FSH, free & total testosterone

CT A&P* (Abdomen & Pelvis) first 3 years; CXR **(Chest X-Ray); CT Abdo*** (Abdomen) only after 3 years.

All CT scans will be low dose.

Requesting CT studies for testis cancer pts - entering orders in EPR, please include the following in the Comments so that the correct protocol is followed:

- Pts in first 3 yrs of seminoma surveillance: **"Seminoma Surveillance – Early"**
- Pts after 3 yrs of seminoma surveillance: **"Seminoma Surveillance – Late"**

If, for some reason, you require IV contrast (eg pre RPLND) please add this in the Comments.
All other requests related to testis ca will trigger a "TESTIS LOW DOSE" CT protocol which is what we are currently doing (low-dose, no IV, coverage from diaphragm to ischium).

STAGE I NON-SEMINOMA SURVEILLANCE GUIDELINE

Time Post Orchiectomy	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Year 1	**Markers***	**Markers**		**Markers** **CT A&P***** **CT Thorax**		**Markers**		**Markers** **CT A&P** **CT Thorax**		**Markers**		**Markers** **CT A&P** **CT Thorax** Serum LH,FSH, free & total testosterone
Year 2		**Markers**		**Markers**		**Markers**		**Markers**		**Markers**		**Markers** **CT A&P** **CT Thorax** Serum LH,FSH, free & total testosterone
Year 3				**Markers**				**Markers**				**Markers** Serum LH,FSH, free & total testosterone
Year 4						**Markers**						**Markers** Serum LH,FSH, free & total testosterone
Year 5												**Markers** **CT A&P** **CT Thorax** Serum LH,FSH, free & total testosterone
	Transition to primary care after 5 years. No ongoing imaging/labs required. Physical surveillance of remaining testis.											

Markers* (HCG, AFP, LDH); CT A&P*** (CT Scan of Abdomen and Pelvis)

All CT scans will be low dose.

Requesting CT studies for Non-seminoma testis cancer pts - entering orders in EPR, please include the following in the Comments so that the correct protocol is followed:

- **"Non-Seminoma Surveillance"**

If, for some reason, you require IV contrast (eg pre RPLND) please add this in the Comments.
All other requests related to testis ca will trigger a "TESTIS LOW DOSE" CT protocol which is what we are currently doing (low-dose, no IV, coverage from diaphragm to ischium).

SEMINOMA & NON SEMINOMA POST CHEMOTHERAPY with CR SURVEILLANCE (no RPLND) GUIDELINE

Time post chemo-therapy	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Year 1			Markers*			Markers CT A&P** CT Thorax			Markers			Markers Cr**** CT A&P CT Thorax Serum LH,FSH, free & total testosterone
Year 2			Markers			Markers CT A&P CT Thorax			Markers			Markers Cr CT A&P CT Thorax Serum LH,FSH, free & total testosterone
Year 3				Markers				Markers				Markers Cr Serum LH,FSH, free & total testosterone
Year 4						Markers						Markers Cr Serum LH,FSH, free & total testosterone
Year 5												Markers Cr CT A&P CT Thorax Serum LH,FSH, free & total testosterone
Year 6												Markers Serum LH,FSH, free & total testosterone
Year 7												Markers Serum LH,FSH, free & total testosterone
Year 8												Markers Serum LH,FSH, free & total testosterone
Year 9												Markers Serum LH,FSH, free & total testosterone
Year 10												Markers CT A&P CT Thorax Serum LH,FSH, free & total testosterone

Markers* (HCG, AFP, LDH); CT A&P** (CT Scan of Abdomen and Pelvis); Cr*** (Creatinine)
All CT scans will be low dose.
Requesting CT studies for testis cancer pts - entering orders in EPR, please include the following in the Comments so that the correct protocol is followed:
"post chemotherapy"

NON-SEMINOMA POST PRIMARY RETROPERITONEAL LYMPH NODE DISSECTION (RPLND) with pN-ve SURVEILLANCE GUIDELINE

Time post RPLND	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Year 1		**Markers***		**Markers** **CT A&P****		**Markers**		**Markers**		**Markers**		**Markers** **CT Thorax** Serum LH,FSH, free & total testosterone
Year 2		**Markers**		**Markers**		**Markers**		**Markers**		**Markers**		**Markers** **CT Thorax** Serum LH,FSH, free & total testosterone
Year 3				**Markers**				**Markers**				**Markers** Serum LH,FSH, free & total testosterone
Year 4						**Markers**						**Markers** Serum LH,FSH, free & total testosterone
Year 5												**Markers** **CT Thorax** Serum LH,FSH, free & total testosterone
	Transition to Primary Care after 5 years.											

Markers* (HCG, AFP, LDH); CT A&P** (CT Scan of Abdomen and Pelvis)

All CT scans will be low dose.

Requesting CT studies for testis cancer pts - entering orders in EPR, please include the following in the Comments so that the correct protocol is followed:

- "post retroperitoneal lymph node dissection"

NON-SEMINOMA POST PRIMARY RETROPERITONEAL LYMPH NODE DISSECTION (RPLND) with pN+ve SURVEILLANCE GUIDELINE

Time post RPLND	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Year 1		**Markers***		**Markers** **CT A&P**** **CT Thorax**		**Markers**		**Markers** **CT Thorax**		**Markers**		**Markers** **CT Thorax** Serum LH,FSH, free & total testosterone
Year 2		**Markers**		**Markers**		**Markers**		**Markers**		**Markers**		**Markers** **CT Thorax** Serum LH,FSH, free & total testosterone
Year 3				**Markers**				**Markers**				**Markers** Serum LH,FSH, free & total testosterone
Year 4						**Markers**						**Markers** Serum LH,FSH, free & total testosterone
Year 5												**Markers** **CT Thorax** Serum LH,FSH, free & total testosterone
	Transition to Primary Care after 5 years.											

Markers* (HCG, AFP, LDH); CT A&P** (CT Scan of Abdomen and Pelvis)

All CT scans will be low dose

Requesting CT studies for testis cancer pts - entering orders in EPR, please include the following in the Comments so that the correct protocol is followed:

- "post retroperitoneal lymph node dissection"

SEMINOMA & NON SEMINOMA POST CHEMOTHERAPY – RPLND (with Teratoma/Fibrosis/Necrosis) FOLLOW-UP

Time post chemotherapy - RPLND	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Year 1			Markers*			Markers CT A&P** CT Thorax			Markers			Markers Cr*** CT A&P CT Thorax Serum LH,FSH, free & total testosterone
Year 2			Markers			Markers CXR****			Markers			Markers Cr CT A&P CT Thorax Serum LH,FSH, free & total testosterone
Year 3												Markers Cr CXR Serum LH,FSH, free & total testosterone
Year 4												Markers Cr CXR Serum LH,FSH, free & total testosterone
Year 5												Markers Cr CXR Serum LH,FSH, free & total testosterone
Year 6												Markers Serum LH,FSH, free & total testosterone
Year 7												Markers Serum LH,FSH, free & total testosterone
Year 8												Markers Serum LH,FSH, free & total testosterone
Year 9												Markers Serum LH,FSH, free & total testosterone

Year 10												Markers CT A&P CT Thorax Serum LH,FSH, free & total testosterone

Markers* (HCG, AFP, LDH); CT A&P** (CT Scan of Abdomen and Pelvis); Cr*** (Creatinine); CXR**** (Chest X-Ray)

All CT scans will be low dose.

Requesting CT studies for testis cancer pts - entering orders in EPR, please include the following in the Comments so that the correct protocol is followed: "post chemotherapy with retroperitoneal lymph node dissection"

SEMINOMA TREATED WITH RADIATION THERAPY SURVEILLANCE GUIDELINE

Time post radiation therapy	**Month 1**	**Month 2**	**Month 3**	**Month 4**	**Month 5**	**Month 6**	**Month 7**	**Month 8**	**Month 9**	**Month 10**	**Month 11**	**Month 12**
Year 1						**CXR***						**CXR** Serum LH,FSH, free & total testosterone
Year 2						**CXR**						**CXR** Serum LH,FSH, free & total testosterone
Year 3						**CXR**						**CXR** Serum LH,FSH, free & total testosterone
Year 4												**CXR** Serum LH,FSH, free & total testosterone
Year 5												**CXR** Serum LH,FSH, free & total testosterone
Year 7												**CXR** Serum LH,FSH, free & total testosterone
Year 9												**CXR** Serum LH,FSH, free & total testosterone

CXR* (Chest X-Ray)