Serum tumour markers (Recommended)

Reason/Evidentiary Support

The serum tumour markers, alpha-fetoprotein (AFP), beta subunit of human chorionic gonadotropin (b-hCG), and lactate dehydrogenase (LDH), play an essential role in the management of men with testicular tumours and have been included in the staging system for testicular tumours as an "S" stage.[1] The "S" stage is usually based on the **post**-orchidectomy serum tumour marker values, which reflect the degree of marker production by the patient's metastatic disease and correlate best with prognosis. In advanced disease, the marker levels closest to the start of chemotherapy should be used to determine the final "S" stage and may significantly differ (higher or lower) than pre-orchidectomy markers. In select cases of advanced disease when orchidectomy is deferred until after chemotherapy, the markers used for staging are not obtained post-orchidectomy. It is important to recognize the half-life of b-hCG (1–3 days) and AFP (5–7 days) when assigning the "S" stage to a patient with declining markers post-orchidectomy. Patients with AFP or b-hCG that decline at or more rapidly than the expected half-life following orchidectomy and have no evidence of metastatic disease on imaging should be followed until marker normalization or rise in order to differentiate between Stage IA/B and Stage IS disease. The latter implies metastatic disease is present even when not apparent on imaging.

Since the tumour markers obtained prior to orchidectomy are typically what is available to the pathologist, in most cases, the pathologist is not able to assign the "S" stage and notation of "SX" should be used, similar to when nodal and metastasis stages cannot be assigned. Nevertheless, the pre-orchidectomy marker levels are important and should be provided to the pathologist whenever possible. The occurrence of elevated serum levels of AFP or b-hCG may indicate the need for additional sections of certain specimens if the initial findings do not account for such elevations. For each marker, notation of the level and date it was drawn or the lack of availability should be noted in the pathology report. In addition, for LDH, the upper limit of normal for the assay should be provided when available. Ideally serum makers would be a 'required' data item, however there is often difficulty with obtaining these at the time of reporting. There are also occasional testes removed for trauma which have incidental germ cell tumours.

Anatomic Stage/Prognostic Groups

Group	T	N	M	S
Stage 0	pTis	N0	M0	S0
Stage I	pT1-4	N0	M0	SX
Stage IA	pT1	N0	M0	S0
Stage IB	pT2	N0	M0	S0
	pT3	N0	M0	S0
	pT4	N0	M0	S0
Stage IS	Any pT/TX	N0	M0	S1-3
Stage II	Any pT/TX	N1,N2,N3	M0	SX
Stage IIA	Any pT/TX	N1	M0	S0
	Any pT/TX	N1	M0	S1
Stage IIB	Any pT/TX	N2	M0	S0
	Any pT/TX	N2	M0	S1
Stage IIC	Any pT/TX	N3	M0	S0
	Any pT/TX	N3	M0	S1
Stage III	Any pT/TX	Any N	M1	SX
Stage IIIA	Any pT/TX	Any N	M1a	S0
	Any pT/TX	Any N	M1a	S1
Stage IIIB	Any pT/TX	N1,N2,N3	M0	S2
	Any pT/TX	Any N	M1a	S2
Stage IIIC	Any pT/TX	N1,N2,N3	M0	S3
	Any pT/TX	Any N	M1a	S3
	Any pT/TX	Any N	M1b	Any S

Prognostic Factors

Serum Tumour Markers (S)

SX	Serum marker studies not available or performed		
S0	Serum marker study levels within normal limits		
	LDH	hCG (mIU/mL)	AFP (ng/mL)
S1	<1.5 x #N and	<5,000 and	<1,000
S2	1.5-10 x #N or	5,000-50,000 or	1,000-10,000
S3	>10 x #N or	>50,000 or	>10,000

 # N indicates the upper limit of normal for the LDH assay.

The Serum Tumour Markers (S) category comprises the following:

- AFP – half-life 5 to 7 days
- hCG – half-life 1 to 3 days
- LDH.

References

1 International Union against Cancer (UICC) (2009). *TNM Classification of Malignant Tumours (7th edition)*. Sobin L, Gospodarowicz M and Wittekind C (eds). Wiley-Blackwell, Chichester, UK and Hoboken, New Jersey.