

Follow-up Guidelines for Bone and Soft Tissue Sarcomas in Adults

1. Follow-up Guidelines for Soft Tissue Tumours

Stage of disease	Staging	Disease monitoring
1. Localised extremity post-surgery ± radiotherapy		
<i>Benign tumours/atypical lipomatous tumours</i>	MRI primary tumour	
Year 1		- post-operative visit in first 6 weeks - supported discharge
<i>Low grade</i>	MRI primary tumour CT chest	
Year 1		- post-operative visit in first 6 weeks - 3 month clinical examination (to check function, if necessary) - 6 monthly clinical examination, CXR
Year 2		- 6 monthly clinical examination, CXR
Years 3+		- annual clinical examination, CXR
Discharge at 10 years after surgery		
<i>Intermediate and high grade</i>	MRI primary tumour PET/CT	
Year 1		- post-operative visit in first 6 weeks - 3 monthly clinical examination, CXR - baseline MRI 3 months after completing treatment - PET/CT 6 months after initial staging PET/CT - image prosthesis at 6 months and 1 year

Year 2		<ul style="list-style-type: none"> - 3 monthly clinical examination, CXR - PET/CT 18 months after initial staging PET/CT - image prosthesis annually
Years 3 – 4		<ul style="list-style-type: none"> - 6 monthly clinical examination, CXR - image prosthesis annually
Years 5 – 10		<ul style="list-style-type: none"> - annual clinical examination, CXR - image prosthesis annually
	<p>Discharge at 10 years after surgery unless:</p> <ul style="list-style-type: none"> - Patient has had treatment related toxicity that requires long term follow-up - Patient has a prosthesis <i>in situ</i> (follow-up evaluation by orthopaedic team) - Teenage and young adult patients (<25 years at diagnosis) - will require long term follow-up in a late effects service - Clinical trial patients on active follow-up 	
2. Abdominal/retroperitoneal/gynaecological sarcomas post-surgery (excluding GIST)	PET CT	<i>Comment:</i> Because of the uncertainty about the timing and benefits of intervention for recurrent disease, surgical or otherwise, in this group of sarcomas follow up can take two forms: radiologically directed follow-up, or clinically directed follow-up. The choice of follow-up protocol is a clinical decision between clinician and patient, taking into account biological factors of the particular histological sub-type.
<i>Radiologically directed follow-up</i>		
<i>Low grade</i>		
Year 1		<ul style="list-style-type: none"> - post-operative visit in first 6 weeks - 3 - 6 monthly clinical examination - baseline CT chest/abdo/pelvis post surgery, then at 6 and 12 months
Year 2		<ul style="list-style-type: none"> - 6 monthly clinical examination - CT scan chest/abdo/pelvis at 18 and 24 months
Year 3+		<ul style="list-style-type: none"> - annual clinical examination - annual CT chest/abdo/pelvis to 10 years

Intermediate and high grade	PET/CT and MRI abdomen	
Year 1-2		- post-operative visit in first 6 weeks - 3 monthly clinical examination, CXR - baseline PET/CT 3 months post surgery, then 6 monthly
Years 3 – 4		- 6 monthly clinical examination and CXR - annual PET/CT
Years 5 – 10		- annual clinical examination and CXR - annual PET/CT year 5, then stop
Discharge at 10 years after surgery		
	Clinically directed follow-up Follow up intervals as above, with evaluation for new abdominal symptoms and clinical examination. Scanning (CT chest/abdo/pelvis or PET/CT) is instituted for clinical suspicion of recurrence. Chest surveillance is performed at each visit by CXR.	
3. Head and neck sarcomas	MRI primary site and PET/CT	
Year 1		- post-operative visit in first 6 weeks - 3 monthly clinical examination and CXR - post-treatment MRI of primary site at 3 months after completing treatment - surveillance MRI of primary site at 9 months
Year 2		- 3 monthly clinical examination and CXR - surveillance MRI of primary site at 15 and 21 months

Years 3 – 4		- 6 monthly clinical examination and CXR - surveillance MRI of primary site at 27 months - thereafter annual MRI of primary site
Years 5 – 10		- annual clinical examination and CXR
Discharge at 10 years after surgery		
4. Breast sarcomas	MRI Breast Plus PET/CT for borderline and malignant phyllodes, angiosarcoma, radiationinduced breast sarcoma, other breast soft tissue sarcoma	
Benign phyllodes		Discharge with self-managed follow up
Borderline phyllodes		Breast conserving surgery - breast imaging with 6 monthly USS, annual mammogram for 3 years, then discharge (can be done by breast surgeons) Mastectomy – discharge with self-managed follow-up
Malignant phyllodes, angiosarcoma, radiationinduced breast sarcoma, other breast soft tissue sarcoma		Follow up with chest imaging as high grade extremity/trunk soft tissue sarcoma. Breast conserving surgery - breast imaging with 6 monthly USS, annual mammogram for 3 years, then clinical examination
Discharge at 10 years after surgery		
5. Chest wall and intra-thoracic sarcoma	MRI primary tumour and CT chest or PET/CT	

Year 1		3 monthly clinical examination and CXR - 6 monthly PET/CT/MRI if primary site not adequately assessed by CXR/clinically
Year 2		3 monthly clinical examination and CXR - 6 monthly PET/CT/MRI if primary site not adequately assessed by CXR/clinically
Year 3-5		- 6 monthly clinical examination and CXR - annual PET/CT/MRI if primary site not adequately assessed by CXR/clinically
Year 5-10		annual clinical examination and CXR or - annual PET/CT/MRI if primary site not adequately assessed by CXR/clinically
	Discharge at 10 years after surgery unless histiotypes associated with late recurrence or metastases, when longer follow-up should be considered: Low grade fibromyxoid sarcoma; sclerosing epithelioid fibrosarcoma; synovial sarcoma; extraskeletal myxoid chondrosarcoma; mesenchymal chondrosarcoma	
6. Dermal Sarcoma	MRI primary site (or CT if MRI contraindicated) CT or chest x-ray Cutaneous angiosarcoma: PET/CT	
High grade pleomorphic dermal sarcoma, grade 1 cutaneous leiomyosarcoma		3 monthly clinical review to 2 years, 6 monthly to 5 years, annual to 10 years - CXR 6 monthly for 2 years, annual to 10 years
Grade 2 /3 leiomyosarcoma, MPNST, cutaneous angiosarcoma		As for high grade limb/trunk soft tissue sarcoma
4. Breast Sarcoma		

5. Post pulmonary metastasectomy		
Year 1		<ul style="list-style-type: none"> - post-operative visit in first 6 weeks - 3 monthly clinical examination, CXR - baseline PET/CT scan and CXR post surgery (within 3 months) - thereafter 6 monthly CT scans or PET/CT at clinician's discretion
Year 2		<ul style="list-style-type: none"> - 3 monthly clinical examination, CXR - CT scans or PET/CT at clinician's discretion at 18 and 24 months
Years 3 – 5		<ul style="list-style-type: none"> - 6 monthly clinical examination and CXR - continue CT scans or PET/CT at clinician's discretion if felt to be at high risk or recurrence
Years 6 – 10		<ul style="list-style-type: none"> - annual clinical examination and CXR
Discharge at 10y post surgery		

2. Follow-up guidelines for benign bone tumours (aneurysmal bone cyst, giant cell tumour), well-differentiated cartilagenous tumours (grade 1 - 3 chondrosarcoma), periosteal and parosteal osteosarcoma, chordoma

Stage of disease	Staging Investigations	Disease/late toxicity monitoring
1. Aneurysmal bone cyst, giant cell tumour		
Primary presentation	Baseline CT chest or PET/CT for patients presenting with pathological fracture, plain x-ray and MRI/CT primary site	
Year 1		- post-operative visit in first 6 weeks - 3 - 6 monthly clinical examination, plain films of primary site, CXR for patients presenting with pathological fracture
Years 2 - 3		- 6 monthly clinical examination, plain films of primary site, CXR for patients presenting with pathological fracture
Discharge 3 years after surgery		
After local recurrence	MRI/CT primary site, CT thorax or PET/CT	
Year 1		- post-operative visit in first 6 weeks - 3 - 6 monthly clinical examination, plain films of primary site, CXR
Years 2 - 5		- 6 monthly clinical examination, plain films of primary site, CXR
Discharge 5 years after surgery		
2. Grade 1 chondrosarcoma		
Localised post primary treatment – curettage +/- cementation	Plain x-ray and MRI primary site (chest imaging and bone scan not required)	

Year 1		- post-operative visit in first 6 weeks - 3 - 6 monthly clinical examination, plain films of primary site
Years 2 - 5		- 6 monthly clinical examination, plain films of primary site
Discharge at 5 years from surgery		
<i>Localised post primary treatment – on observation only</i>		
Years 1 - 2		- interval MRI scans at 6 months and 18 months. If no change, and patient does not want curettage, discharge.
3. Grade 2 – 3 chondrosarcoma, periosteal and parosteal osteosarcoma	Plain x-ray and MRI of primary site, CT chest or PET/CT	
<i>Localised post-resection</i>		
Years 1 - 2		- post-operative visit in first 6 weeks - 3 monthly clinical examination, plain films of primary site, CXR
Years 3 – 5		- 6 monthly clinical examination, plain films of primary site, CXR
Years 6 - 10		- annual clinical examination, plain films of primary site, CXR
Discharge at 10 years from surgery		
4. Chordoma	MRI of primary site (for sacral tumours, include whole pelvis), PET/CT	
<i>Localised post-resection +/- radiotherapy</i>		
Years 1 - 2		- post-operative visit in first 6 weeks - 3-6 monthly clinical examination, CXR - MRI of primary site at 6 months, 1 year, 2 years

Years 3 – 5		- 6 monthly clinical examination, CXR - MRI of primary site annually
Years 6 - 10		- annual clinical examination, CXR
Discharge at 10 years from surgery		- MRI of primary site annually

3. Follow-up Guidelines for high grade osteosarcoma/spindle cell sarcoma of bone/dedifferentiated chondrosarcoma

Stage of disease		Disease/late toxicity monitoring
1. Localised post primary treatment	Plain x-rays and MRI primary site; CT chest; or PET scan	
Year 1		- post-operative visit in first 6 weeks (if primary surgery) - 2 monthly clinical examination, plain films of primary site - - PET CT at the end of chemotherapy and then - CT chest 4 monthly, CXR 4 monthly ie alternatively each visit - annual blood biochemistry (U&E, LFT, Ca, PO4, Mg, HCO3)2 - end of year 1 - gonadal function (males: testosterone, LH, FSH; females: oestradiol, LH, FSH) - echo (if treated with anthracycline) and GFR within 3 months of completing chemotherapy
Years 2 - 3	-	- 3 monthly clinical examination and plain films of primary site - CT chest 6 monthly, CXR 6 monthly ie alternatively each visit - annual blood biochemistry (U&E, LFT, Ca, PO4, Mg, HCO3) - end of year 2 - MUGA or ECHO

Year 4		<ul style="list-style-type: none"> - 6 monthly clinical examination and CT chest, plain films of primary site1 - annual blood biochemistry (U&E, LFT, Ca, PO4, Mg, HCO3) - end of year 4 - MUGA or ECHO2
Year 5		<ul style="list-style-type: none"> - 6 monthly clinical examination and CT chest, plain films of primary site1 - annual blood biochemistry (U&E, LFT, Ca, PO4, Mg, HCO3)
Years 6 - 10		<ul style="list-style-type: none"> - annual clinical examination and CT chest, plain films of primary site1 - annual blood biochemistry (U&E, LFT, Ca, PO4, Mg, HCO3) - end of year 6 - MUGA or ECHO2
	<p>Discharge at 10 years after surgery, unless:</p> <ul style="list-style-type: none"> - Patient has had radiotherapy with toxicity that requires long term follow-up - Patient has a prosthesis <i>in situ</i> (follow-up evaluation by orthopaedic team) - Teenage and young adult patients (<25 years at diagnosis) - will require long term follow-up in a late effects service - Clinical trial patients on active follow-up 	
2. Post pulmonary metastatectomy		
Year 1		<ul style="list-style-type: none"> - post-operative visit in first 6 weeks - 3 monthly clinical examination, CT chest, plain films of primary site - baseline CT scan post surgery, thereafter 6 monthly
Year 2		<ul style="list-style-type: none"> - 3 monthly clinical examination, CXT chest, plain films of primary site - 6 monthly CT scan
Years 3 – 4		<ul style="list-style-type: none"> - 6 monthly clinical examination, CT chest, plain films of primary site
Years 5 – 10		<ul style="list-style-type: none"> - annual clinical examination, CT chest, plain films of primary site
Discharge at 10 years after surgery		

3. Relapsed metastatic disease		
Year 1+		<ul style="list-style-type: none"> - 2 - 3 monthly clinical examination and CXR - imaging of disease sites as clinically appropriate

4. Follow-up Guidelines for undifferentiated small round cell sarcomas of bone and soft tissue (Ewing's sarcoma/round cell sarcoma with EWSR1-non-ETS fusions/CIC-rearranged sarcoma/sarcoma with BCOR genetic alterations/desmoplastic small round cell tumour/rhabdomyosarcoma/mesenchymal chondrosarcoma)

Stage of disease		Disease/late toxicity monitoring
1. Localised post primary treatment	Plain x-rays and MRI of primary site and PET scan	
Year 1		<ul style="list-style-type: none"> - 2 monthly clinical examination, CXR, plain films of primary bony site - soft tissue tumours – baseline end of treatment MRI/CT primary site, thereafter at clinician's discretion - radiotherapy as definitive local treatment - baseline end of treatment MRI/CT of primary site, then at 6 and 12 months - end of year 1 - gonadal function (males: testosterone, LH, FSH; females: oestradiol, LH, FSH); renal function (Cr, Na, K, Ca, PO₄, HCO₃, tubular phosphate resorption) -echo (if anthracycline treatment) and GFR at the end of year 1
Years 2 - 3		<ul style="list-style-type: none"> - 3 monthly clinical examination, CXR, plain films of bony primary site - MRI of soft tissue primary site at clinician's discretion - radiotherapy as definitive local treatment - MRI/CT of primary site at 18 and 24 months - MUGA/ECHO 2 years post diagnosis(if anthracycline treatment) - Annual renal function (Cr, Na, K, Ca, PO₄, HCO₃, tubular phosphate resorption)

Year 4		<ul style="list-style-type: none"> - 6 monthly clinical examination, CXR, plain films of primary site - MRI of soft tissue primary site at clinician's discretion - MUGA/ECHO 4 years post diagnosis (if anthracycline treatment) - Annual renal function (Cr, Na, K, Ca, PO4, HCO3, tubular phosphate resorption)
Year 5		<ul style="list-style-type: none"> - 6 monthly clinical examination, CXR, plain films of primary site - Annual renal function (Cr, Na, K, Ca, PO4, HCO3, tubular phosphate resorption) - echo at end of year 5
Years 6 - 10		<ul style="list-style-type: none"> - annual clinical examination, CXR, plain films of primary site - MUGA/ECHO 6 years post diagnosis (if anthracycline treatment) - Annual renal function (Cr, Na, K, Ca, PO4, HCO3, tubular phosphate resorption)
	<p>Discharge at 10 years after surgery, unless:</p> <ul style="list-style-type: none"> - Patient has had radiotherapy with toxicity that requires long term follow-up - Patient has a prosthesis <i>in situ</i> (follow-up evaluation by orthopaedic team) - Teenage and young adult patients (<25 years at diagnosis) - will require long term follow-up in a late effects service - Clinical trial patients on active follow-up 	
2. Relapsed metastatic disease		
Year 1+		<ul style="list-style-type: none"> - 2 - 3 monthly clinical examination and CXR - imaging of disease sites as clinically appropriate