Minimum Recommendations for Monitoring Patients With Gaucher Disease Type 1

The following recommendations for monitoring were developed by experts in the clinical management of Gaucher disease who have served as advisors for the International Collaborative Gaucher Group (ICGG) Gaucher Registry. Those recommendations were published in 2004. The Gaucher Registry is sponsored by Sanofi. Physicians should determine their patient's assessments and the actual frequency of necessary evaluations according to each patient's situation, including individualized therapeutic goals and routine follow-up.

Initial Assessment[1,2]

Blood Tests		
Primary Tests	Additional Tests as Indicated[5]	
Hemoglobin	AST and/or ALT	Albumin
Platelet count	Alkaline phosphatase	Total protein
Biochemical markers[3]	Calcium	Serum immunoelectrophoresis
• Chitotriosidase	Phosphorus	Iron
• ACE	PT	Iron-binding capacity
• TRAP	PTT	Ferritin
Genetic testing (DNA)	WBC	Vitamin B_{12}
Antibody sample[4]	Total and direct bilirubin	
Visceral[6]		
Spleen volume (volumetric MRI or CT) Liver volume (volumetric MRI or CT)		
Skeletal		
MRI (coronal; T_1- and T_2-weighted) of entire femora X-ray: AP view of entire femora[7] and lateral view of spine DEXA: lumbar spine and femoral neck Bone age (for patients aged ≤14 years)[5]		
Pulmonary[8]		
ECG, chest X-ray, and Doppler echocardiogram (right ventricular systolic pressure) for patients aged >18 years		
Quality of Life		
Patient-reported functional health and well-being (SF-36 Health Survey)		

1. A complete patient and family history, preferably including a pedigree, should be conducted.
2. A comprehensive physical examination should be performed at least annually.
3. One or more of these biochemical markers should be consistently monitored at least every 12 months and in conjunction with other clinical assessments of disease activity and response to treatment. Of the 3 recommended markers, chitotriosidase, when available as a validated procedure from an experienced laboratory, may be the most sensitive indicator of changing disease activity and is therefore preferred.
4. A baseline sample should be drawn and tested. A subsequent sample is suggested to be drawn at 6 months after starting enzyme therapy but is optional. Additional samples will be tested only if clinically indicated, such as for a suspected immune-mediated adverse event, prior to a switch to home therapy, or for suspected loss of effectiveness of treatment.
5. These should be followed appropriately if abnormal based on each patient's age and clinical status.
6. Obtain contiguous transaxial, 10 mm-thick sections for sum of region of interest.
7. Optimally from hips to below knees.
8. Pulmonary assessments are recommended every 12 to 24 months for patients with borderline- or above-normal pulmonary pressures at baseline.
9. Anatomical sites not included here should be evaluated if symptoms develop in such locations.
10. AP view of the entire femora (optimally from hips to below knees), and lateral view of the spine.
11. Optional in absence of new symptoms or evidence of disease progression.

Ongoing Monitoring[2]

	Patients Not on Therapy		Patients on Therapy			
			Not Achieved Therapeutic Goals		Achieved Therapeutic Goals	At Time of Dose Change or Significant Clinical Complication
	Every 12 Mo	Every 12-24 Mo	Every 3 Mo	Every 12 Mo	Every 12-24 Mo	
Comprehensive physical examination	X			X	X (Annual)	
SF-36 Health Survey	X			X	X (Annual)	X
Blood Tests						
Hemoglobin	X		X		X	X
Platelet count	X		X		X	X
Biochemical markers[3] • Chitotriosidase • ACE • TRAP	X		X		X	X
Additional blood tests	To be followed if abnormal based on each patient's age and clinical status					
Visceral[6]						
Spleen volume (volumetric MRI or CT)		X		X	X	X
Liver volume (volumetric MRI or CT)		X		X	X	X
Skeletal[9]						
MRI (coronal; T_1- and T_2-weighted) of entire femora[10]		X		X	X	X
X-ray[10,11]		X		X	X	X
DEXA		X		X	X	X
Pulmonary	Recommended every 12 to 24 months for patients with borderline- or above-normal pulmonary pressures at baseline					

ACE, angiotensin-converting enzyme; ALT, alanine aminotransferase; AP, anteroposterior; AST, aspartate aminotransferase; CT, computed tomography; DEXA, dual-energy X-ray absorptiometry; ECG, electrocardiogram; MRI, magnetic resonance imaging; PT, prothrombin time; PTT, partial thromboplastin time; TRAP, tartrate-resistant acid phosphatase; WBC, white blood cell.

Therapeutic Goals for Patients With Gaucher Disease Type 1

An international panel of physicians with extensive clinical experience in treating patients with Gaucher disease reached a consensus on evidence-based therapeutic goals published in 2004.

Bone Disease

Patients	Goals	Time Frame
Pediatric patients	■ Increase cortical and trabecular BMD ■ Attain normal or ideal peak skeletal mass	Year 2
Adult patients	■ Increase trabecular BMD	Years 3 to 5
All patients	■ Prevent or eliminate bone pain ■ Prevent bone crises ■ Prevent osteonecrosis and subchondral joint collapse ■ Improve BMD	Years 1 to 2

Anemia

Patients	Goals	Time Frame
Women and children	■ Hb ≥11.0 g/dL	Years 1 to 2
Men	■ Hb ≥12.0 g/dL	Years 1 to 2
All patients	■ Eliminate blood transfusion dependency ■ Reduce fatigue, dyspnea, angina ■ Maintain improved Hb levels	

› Other therapeutic goals for Gaucher disease type 1 include growth, pulmonary involvement, and functional health and well-being.

Thrombocytopenia

Patients	Goals	Time Frame
Splenectomized patients	■ Normalization of platelet counts	Year 1
Intact spleen All patients with intact spleen	■ Avoid splenectomy ■ Maintain improved platelet counts	
Moderate thrombocytopenia*	■ Increase by 1.5- to 2-fold ■ Approach low-normal platelet counts	Year 1 Year 2
Severe thrombocytopenia†	■ Increase by 1.5-fold ■ Continue to increase slightly, but normalization not expected	Year 1
All patients	■ Sufficient platelets to reduce bleeding	Year 1

Hepatomegaly

Goals
■ Reduce and maintain liver volume to 1.0 to 1.5 times normal ■ Reduce liver volume by 20% to 30% within Years 1 to 2 and by 30% to 40% by Years 3 to 5

Splenomegaly

Goals
■ Reduce and maintain spleen volume to <2 to 8 times normal ■ Reduce spleen volume by 30% to 50% within Year 1 and by 50% to 60% by Years 2 to 5 ■ Alleviate symptoms due to splenomegaly: abdominal distension, early satiety, new splenic infarction ■ Eliminate hypersplenism

Hb, hemoglobin; BMD, bone mineral density.
*>60,000 to <120,000/mm^3; †<60,000/mm^3.

References

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