Supplementary Table 1 Comparison of common methods for measuring body fat

Method	Advantages	Disadvantages
Nuclear Magnetic Resonance Imaging (MRI)	1. Non-invasive 2. High spatial resolution 3. Can distinguish between subcutaneous and visceral fat 4. Can measure other body tissues such as muscle and organs	1. Expensive 2. Time-consuming 3. Limited availability 4. Cannot be used in patients with metal implants or claustrophobia
Computed Tomography (CT)	1. Non-invasive 2. High spatial resolution 3. Can distinguish between subcutaneous and visceral fat 4. Can measure other body tissues such as bone and organs 5. Fast scanning time	1. Expensive 2. Radiation exposure 3. Cannot be used in patients with metal implants or claustrophobia 4. Cannot be used in patients with renal impairment
Dual-Energy X-ray Absorptiometry (DEXA)	1. Non-invasive 2. Low radiation exposure 3. Can measure bone mineral density and lean mass 4. Can distinguish between subcutaneous and visceral fat in the abdominal region	1. Limited spatial resolution 2. Limited availability 3. Cannot measure visceral fat outside the abdominal region
Bioelectrical Impedance Analysis (BIA)	1. Non-invasive 2. Low cost 3. Can be used in outpatient settings 4. Can measure body composition (fat mass and lean mass 5. Can track changes over time	1. Limited accuracy 2. Affected by hydration status 3. Cannot distinguish between subcutaneous and visceral fat

Supplementary Table 2: AUCs of VFA, BFP, BMI and their combination for diagnosing hyperuricemia

Variables	AUC	95%CI low	95%CI up	Best threshold	Specificity	Sensitivity
BFP (%)	0.5515	0.5424	0.5607	30.8500	0.3653	0.7468
VFA (cm^2)	0.5782	0.5689	0.5874	77.3500	0.4468	0.6889
BMI (kg/m^2)	0.6883	0.6797	0.6969	24.5500	0.5577	0.7148
Model 1	0.8052	0.7984	0.8120	-1.3249	0.6074	0.8731
Model 2	0.7495	0.7419	0.7570	-1.5425	0.5507	0.8323
Model 3	0.8053	0.7985	0.8121	-1.3360	0.6024	0.8776
Model 4	0.7951	0.7883	0.8018	-1.2320	0.5973	0.8751

Model 1: (Age+gender+BMI+BFP+VFA): logit(hyperuricemia)=-6.00014 +0.05207*BFP -0.00397*VFA +0.12259*BMI +2.66719*SEX -0.02771*AGE. Model 2(BFP+BMI+VFA): logit(hyperuricemia)= -4.68798 -0.15314*BFP +0.01298*VFA +0.25787*BMI. Model 3(BFP+BMI+Sex+Age): logit(hyperuricemia)= -5.56092 +0.03729*BFP +0.10761*BMI +2.63569*SEX -0.02747*AGE. Model 4(BMI+BFP+Sex): logit(hyperuricemia)= -6.91626 +0.02620*BFP +0.12173*BMI +2.59018*SEX. AUC, area under curve; VFA: Visceral fat area; BFP: body fat percentage; BMI: body mass index.

Supplementary Table 3: Hyperuricemia in normal-weight and lean populations (BMI<25 kg/m^2) with higher VFA and BFP

Hyperuricemia	No	Yes	*P*-value
Female (n)	5658	172	
VFA (cm^2)	73.20 (59.80-92.30)	88.15 (72.25-105.93)	<0.001
BFP (%)	29.70 (26.10-33.00)	32.35 (29.28-34.90)	<0.001
Male (n)	3443	1299	
VFA (cm^2)	62.40 (50.70-74.05)	67.40 (55.70-78.20)	<0.001
BFP (%)	21.40 (18.20-24.30)	22.80 (19.70-25.50)	<0.001

VFA: Visceral fat area; BFP: body fat percentage.

Supplementary Table 4: AUCs of VFA, BFP, BMI and their combination for diagnosing hyperuricemia in normal-weight and lean populations

Variables	AUC	95%CI low	95%CI up	Best threshold	Specificity	Sensitivity
BFP (%)	0.6343	0.6204	0.6482	27.3500	0.4458	0.7967
VFA (cm^2)	0.4887	0.4737	0.5038	66.1500	0.4510	0.5758
BMI (kg/m^2)	0.6401	0.6257	0.6546	22.9500	0.5882	0.6281
Model 1	0.8031	0.7923	0.8140	-1.6037	0.6712	0.8355

Model 1: (Age+gender+BMI+BFP+VFA): logit(hyperuricemia)= -6.56135 +0.04708*BFP +0.00246*VFA +0.11388*BMI +2.88429*SEX -0.02269*AGE. ROC, receiver operating characteristic; AUC, area under curve; VFA: Visceral fat area; BFP: body fat percentage; BMI: body mass index.

Supplementary Table 5 AUCs of VFA, BFP, BMI and their combination for diagnosing hyperuricemia with lower cut-off value

Variables	AUC	95%CI low	95%CI up	Best threshold	Specificity	Sensitivity
BFP (%)	0.5257	0.5173	0.5341	28.6500	0.4906	0.5691
VFA (cm^2)	0.5849	0.5767	0.5932	75.1500	0.4683	0.6687
BMI (kg/m^2)	0.6792	0.6715	0.6869	24.5500	0.6559	0.6055
Model 1	0.7588	0.7519	0.7656	0.6638	0.7372	0.6680

Model 1: (Age+Sex+BMI+BFP): logit(hyperuricemia)= -3.55374 +0.04016*BFP +0.11282*BMI +1.78541*SEX -0.01624*AGE; VFA: Visceral fat area; BFP: body fat percentage; BMI: body mass index.

Supplementary Table 6 Hyperuricemia in normal-weight and lean populations (BMI<25 kg/m2) with higher VFA and BFP with lower cut-off value

Hyperuricemia	No	Yes	*P*-value
Female (n)	3877	1953	
VFA (cm^2)	71.10 (15.60-202.80)	78.70 (5.00-185.10)	<0.001
BFP (%)	29.10 (9.90-47.50)	30.80 (3.00-50.90)	<0.001
Male (n)	1413	3329	
VFA (cm^2)	60.70 (7.00-116.60)	65.30 (5.00-143.30)	<0.001
BFP (%)	20.80 (3.00-33.70)	22.20 (3.00-36.50)	<0.001

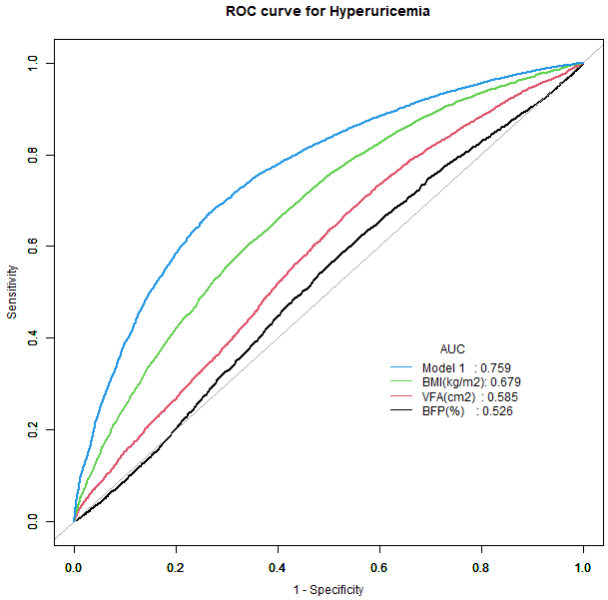
VFA: Visceral fat area; BFP: body fat percentage.

Supplementary Table 7 AUCs of VFA, BFP, BMI and their combination for diagnosing hyperuricemia with lower cut-off value in normal-weight and lean populations

Variables	AUC	95%CI low	95%CI up	Best threshold	Specificity	Sensitivity
BFP (%)	0.5809	0.5701	0.5918	26.8500	0.5147	0.6310
VFA (cm^2)	0.5095	0.4985	0.5205	63.5500	0.4136	0.6229
BMI (kg/m^2)	0.6199	0.6093	0.6306	22.2500	0.5183	0.6660
Model 1	0.7268	0.7172	0.7363	0.1676	0.7552	0.6126

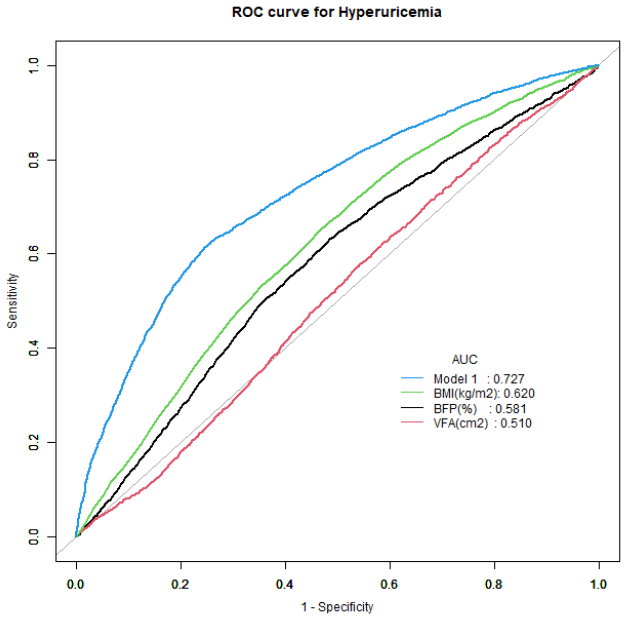
Model 1: (Age+Sex+BMI+BFP+VFA): logit(hyperuricemia)= -3.95982 +0.05135*BFP -0.00202*VFA +0.11849*BMI +1.87699*SEX -0.01456*AGE. ROC, receiver operating characteristic; AUC, area under curve; VFA: Visceral fat area; BFP: body fat percentage; BMI: body mass index.

Supplementary Figure 1: ROC curves of hyperuricemia with lower cutoff value for BMI, VFA, BFP, and the combined model.



Model 1: (Age+Sex+BMI+BFP): logit(hyperuricemia)= -3.55374 +0.04016*BFP +0.11282*BMI +1.78541*SEX -0.01624*AGE; VFA: Visceral fat area; BFP: body fat percentage; BMI: body mass index. **Abbreviation:** ROC, receiver operating characteristic; AUC, area under curve; VFA: Visceral fat area; BFP: body fat percentage; BMI: body mass index.

Supplementary Figure 2: ROC curves of hyperuricemia with lower cutoff value in normal and lean populations for BMI, VFA, BFP BMI, VFA, BFP, and the combined model



Model 1: (Age+Sex+BMI+BFP+VFA): logit(hyperuricemia)= -3.95982 +0.05135*BFP -0.00202*VFA +0.11849*BMI +1.87699*SEX -0.01456*AGE. ROC, receiver operating characteristic; AUC, area under curve; VFA: Visceral fat area; BFP: body fat percentage; BMI: body mass index.

Abbreviation: ROC, receiver operating characteristic; AUC, area under curve; VFA: Visceral fat area; BFP: body fat percentage; BMI: body mass index.