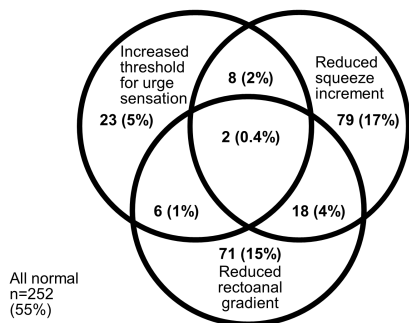**Supplemental Figure 1.** Proportion of all constipated patients (left panel) and constipated patients who also underwent defecography (right panel) who had anorectal manometry abnormalities (ie, reduced rectoanal gradient during evacuation and/or reduced anal squeeze increment and/or reduced rectal sensation). All 3 manometry variables were normal in 55% (left panel) or 49% of patients (right panel).

Supplemental Figure 2. Proportion of constipated patients with a prolonged balloon expulsion time stratified by the number of anorectal manometry abnormal findings. The balloon expulsion time was prolonged in all patients with 4 or more abnormal manometry findings.
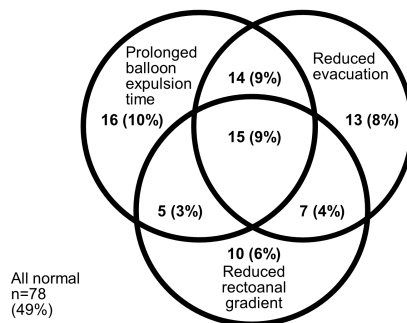
Supplemental Figure 3: Receiver operating characteristic curve to predict a prolonged rectal balloon expulsion time from selected anorectal manometry variables (ie, rectoanal gradient, anal squeeze increment, and rectal volume threshold for urgency) in all participants with complete HR_ARM data.

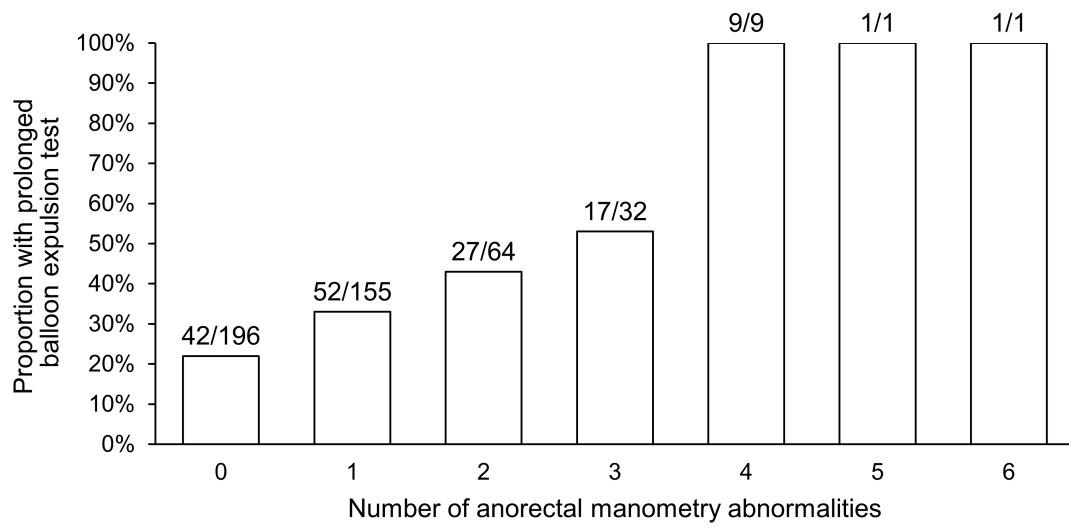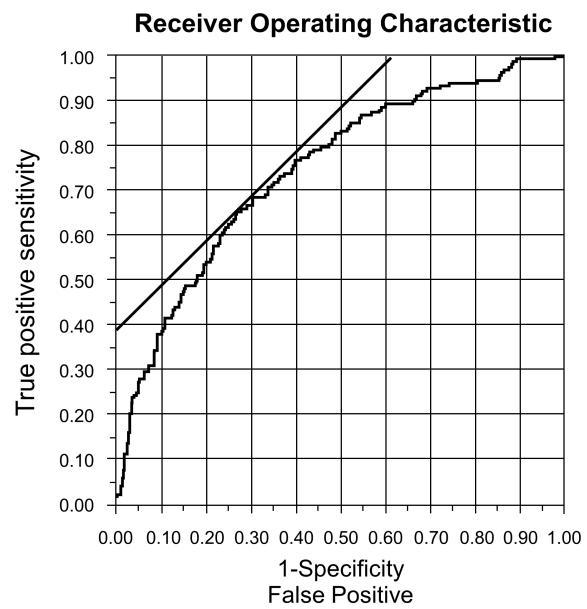**All Constipated Patients with Sensation Data n=459**

Increased threshold for urge sensation

Reduced squeeze increment

8 (2%)

23 (5%)

79 (17%)

2 (0.4%)

6 (1%)

18 (4%)

71 (15%)
Reduced rectoanal gradient

All normal n=252 (55%)

A

All Constipated Patients with Defecography n=158

Prolonged balloon expulsion time

Reduced evacuation

14 (9%)

16 (10%)

13 (8%)

15 (9%)

5 (3%)

7 (4%)

10 (6%)
Reduced rectoanal gradient

All normal n=78 (49%)

B

Receiver Operating Characteristic

Supplemental Table 1: Normal values for anorectal pressures in healthy controls with a normal balloon expulsion test

	male (n=47)	female under 50 (n=78)	female 50 and over (n=39)	combined females (n=117)
	10-90%	10-90%	10-90%	10-90%
Mean resting anal pressure, mmHg	59 to 119.4	63.5 to 120.6	43.2 to 107.1	53.2 to 117.9
Anal squeeze pressure increment, mmHg	73 to 315	37.3 to 181	35.4 to 189.4	35.7 to 182.8
Evacuation				
Rectal pressure increment, mmHg	15.7 to 84	-4.1 to 48.7	2.3 to 58	-1.5 to 52.3
Residual anal pressure, mmHg	57.3 to 167	43.2 to 107.4	36.7 to 104.4	40.9 to 104.4
Anal relaxation (%)	-70 to 32%	-2 to 51%	-95 to 43%	-24 to 47%
Rectoanal gradient, mmHg	-119.3 to -8	-73.8 to -5.7	-66.7 to 3.7	-67.3 to -2.5
Volume threshold for urge sensation (ml)	60 to 120	50 to 120	60 to 120	50 to 120

These values differ slightly from our most recent paper because they include additional asymptomatic participants who were studied after that paper was published.[9]