

## Supplementary material

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Gruchala-Niedoszytko M, Niedoszytko P, Zawiejska A, Kaczkan M. Cardiopulmonary exercise test and bioimpedance as prediction tools to predict the outcomes of obesity treatment. *Pol Arch Intern Med.* 2019; 129: 225-233. doi: 10.20452/pamw.4480

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**Table S1** The coexisting diseases in the obese patients

Coexisting diseases	Prevalence in the study group n (%)
Hypertension	20 (44%)
Hypercholesterolemia	11 (24%)
Arthritis	11 (25%)
Hypothyroidism	11 (25%)
Impaired glucose tolerance	10 (26%)
Varicose veins	8 (18%)
Gastroesophageal reflux disease	8 (18%)
Allergic rhinitis and polyps	7 (16%)
Hepatic steatosis	7 (16%)
Depression	6 (13%)
Gallstones	6 (13%)
Diabetes	6 (13%)
Nicotinism	4 (9%)
Coronary heart disease	4 (9%)
Asthma	3 (7%)
Sleep apnea	3 (7%)
Gout	1 (2%)

**Table S2** The comparison of the ergospirometry results in obese and controls

Analyzed parameter	Result in obese group mean (SD)	Result in control group mean (SD)	p
VO <sub>2</sub> peak, ml/min/kg	16.41 (SD=3.22)	40.72 (SD=9.14)	0,00001
VO <sub>2</sub> AT, ml/min/kg	11.77 (SD=3.77)	31.44 (SD=10.2)	0,00001
VE/VCO <sub>2</sub> slope	27.29 (SD=4.13)	26.28 (SD=3.73)	NS
BF Breath frequency	18.21 (SD=4.29)	19.76 (SD=3.83)	NS
BF Maximal breath frequency/ minute	29.92 (SD=6.91)	48.20 (SD=18.59)	0,00001
RER (VCO <sub>2</sub> /VO <sub>2</sub> ) Respiratory exchange ratio	1.11 (SD=0.11)	1.19 (SD=0.10)	0,014
VO <sub>2</sub> /WR slope	9.54 (SD=1.82)	14.27 (SD=6.3)	0,0004
Resting HR	86.7 (SD=13.4)	85.7 (SD=15)	NS
HR max	151.3 (SD=19.2)	183.5 (SD=8.8)	0,001
HRR	30 (SD=10)	22 (SD=9.8)	NS
RRs1	128 (SD=15)	132.7 (SD=12)	NS
RRs2	176 (SD=27)	186 (SD=24)	NS
RRd1	80.5 (SD=14)	83 (SD=11)	NS
RRd2	84.8 (SD=15)	82 (SD=25)	NS
FAT, g/h	13.65 (SD=7)	26.4 (SD=15)	0.001
FAT HR	106.95 (SD=16)	141.2 (SD=17)	0.0008
AT HR	127 (SD=20)	161.1 (SD=12.6)	0.0003
VO <sub>2</sub> peak, ml/min	1.68 (SD=0.41)	2.98 (SD=0.9)	0.0001
VO <sub>2</sub> AT, ml/min	1.27 (SD=0.4)	2.35 (SD=1)	0.0002
VO <sub>2</sub> /HR slope	5.08 (SD=1.5)	5.05 (SD=1)	NS
BF AT	25.7 (SD=8)	31.8 (SD=6)	0.02
VE	11.7 (SD=2.6)	15.14 (SD=6)	0.01

VE AT	36.8 (SD=14)	61.7 (SD=28)	0.0004
VE max	58.8 (SD=18)	103 (SD=33)	0.0002
VE % normal	49 (SD=9)	60.6 (SD=16)	0.02
VCO <sub>2</sub> , ml/min	1.92 (SD=0.5)	3.7 (SD=1.13)	0.001

The results presented as mean, SD – standard deviation, NS – not statistically significant  
AT HR – heart rate at anaerobic threshold, BF Breath frequency, BF AT - breath frequency in anaerobic threshold, FAT – fat mass, FAT HR – fat heart rate, HR max – maximal heart rate, HRR - heart rate recovery, RER - respiratory exchange ratio, Resting HR, RRs1, RRs2– systolic blood pressure, RRd1, RRd2– diastolic blood pressure, VE - ventilation, VE AT - ventilation in anaerobic threshold, VE max - maximal ventilation, VE % maximal ventilation as % of predicted VE/VCO<sub>2</sub>slope minute ventilation/carbon dioxide production, VCO<sub>2</sub> - rate of elimination of carbon dioxide, VO<sub>2</sub>AT - oxygen uptake at anaerobic threshold, VO<sub>2</sub>/HR slope - maximal oxygen uptake at anaerobic threshold, VO<sub>2</sub>peak - maximal oxygen uptake, VO<sub>2</sub>/WR slope - oxygen uptake/work rate relation curve slope

**Table S3** The comparison of BIA results in obese and control group

Analyzed parameter	Results in obese	Results in controls	p
RMR, kcal	1611 (SD=343)	1314 (SD=152)	0.007
FFM, kg	58,8 (SD=13)	49,7 (SD=8.1)	0.01
FFM, %	55,7 (SD=7.1)	73 (SD=3.3)	0.007
FAT, kg	46,7 (SD=10.9)	18,1 (SD=3.2)	0.00004
FAT, %	44,2 (SD=7.1)	26,7 (SD=3.5)	0.01
TBW, kg	45,7 (SD=8.6)	35,8 (SD=5.8)	0.01
ECW, l	47,2 (SD=2.4)	13,9 (SD=2.3)	0.004
ICW, l	23,9 (SD=4.8)	21,9 (SD=3.5)	NS

The results presented as mean, SD –standard deviation, NS- not statistically significant  
ECW – extracellular water, FAT – fat mass, FFM - fat free mass, ICW – intracellular water, RMR - resting metabolic rate, TBW - total body water

**Table S4** The gender differences in BIA results in obese group

Analyzed parameter	Women	Men	p
RMR, kcal	1512 (SD=180)	1975 (SD=396)	0.00007
FFM, kg	51.3 (SD=4.6)	81.18 (SD=11.8)	0.00001
FFM, %	52.4 (SD=4.08)	64.19 (SD=5)	0.00001
FAT, kg	47.3 (SD=9.9)	45.9 (SD=12.2)	NS
FAT, %	47.5 (SD=4.08)	35.8 (SD=5)	0.00001
TBW, kg	40.9 (SD=4.7)	61.02 (SD=9.53)	0.00001
TBW, %	42.3 (SD=2.39)	50 (SD=3.45)	0.00001
ECW, l	19.65 (SD=3)	29.3 (SD=5.7)	0.00001
ECW, %	47.04 (SD=2.38)	47.2 (SD=1.9)	NS
ICW, l	23.9 (SD=4.8)	22.8 (SD=4.3)	0.00001
ICW, %	52.78 (SD= 2.3)	52.7 (SD=2.5)	NS
ECW/ICW	0.90 (SD=0.08)	0.89 (SD=0.07)	NS
BCM, kg	28.9 (SD=2.5)	42.75 (SD=5.4)	0.00001
ECM, kg	22.16 (SD=2.2)	34.76 (SD=3.67)	0.00001
ECM/BCM	0.76 (SD=0.03)	0.81 (SD=0.03)	0.007
Prot, kg	6.8 (SD=0.8)	11.7 (SD=1.3)	0.00001
Musc, kg	22.3 (SD=2.08)	37.1 (SD=3.8)	0.00001
TBK, g	128.4 (SD=11.5)	196 (SD=44.3)	0.007
TBCa, g	1051.8 (SD=83.9)	1544 (SD=320)	0.007
Glyc, g	490.8 (SD=43.6)	725 (SD=92)	0.00001
Dry weight, kg	98.3 (SD=13.2)	122.4 (SD=22.8)	0.01
ECS, l	5.3 (SD=0.4)	8.1 (SD=0.9)	0.00001
ECF/ECS, l	20.8 (SD=3.22)	37.1 (SD=9.9)	0.00001
Plasm FI, l	4.16 (SD=0.64)	6.19 (SD=1.22)	0.0001
Body vol	96.0 (SD=22.6)	106 (SD=52.7)	NS
Body dens, kg/l	0.99 (SD=0.01)	1.0 (SD=0.01)	0.0002
5 kHz, 50 kHz, 100 kHz, 200 kHz Impedance	564/495/463/437 (SD=142/64/58/56)	431/355/333/312 (SD=66/51/45/42)	0.001 0.00005 0.00001 0.00001

5 kHz, 50 kHz, 100 kHz, 200 kHz Resistance	580/490/456/427 (SD=89/63/57/54)	431/351/328/289 (SD=66/49/43/48)	0.0006 0.00001 0.00001 0.00001
5 kHz, 50 kHz, 100 kHz, 200 kHz Reactance	42/74/82/98 (SD=70/16/15/20)	25/59/62/71 (SD=8/13/14/14)	NS 0.03 0.01 0.003
5 kHz, 50 kHz, 100 kHz, 200 kHz Phase angle	6/8/10/11 (SD=1.6/1.3/1/1.5)	3/9/10/13 (SD=0.7/1.1/1.5/2)	0.04 NS NS NS

The results presented as mean, SD –standard deviation, NS- not statistically significant

ECS – extracellular solids, ECF/ECS extracellular fluids/extracellular water, Glyc - glycogen, Musc - muscles, Plasm - Plasma, Prot - proteins, TBK - total body potassium, TBCa - total body calcium. Other abbreviations see supplementary material Table 2

**Table S5** The gender differences in ergospirometry results in obese group

Analyzed parameter	Women	Men	P
VO <sub>2</sub> peak, ml/min/kg	15.6 (SD=2.4)	19.12 (SD=4.18)	0.01
VO <sub>2</sub> AT	11.17 (SD=3.78)	13.8 (SD=3.0)	NS
VE/VCO <sub>2</sub> slope	27.2 (SD=4.16)	27.6 (SD=4.28)	NS
BF	18.69 (SD=4.06)	16.5 (SD=4.9)	NS
BF max	30.22 (SD=6.44)	28.88 (SD=8.78)	NS
RER	1.11 (SD=0.12)	1.10 (SD=0.10)	NS
VO <sub>2</sub> /WR slope	9.05 (SD=1.58)	11.25 (SD=1.66)	0.02
HR resting	88.95 (SD=13.4)	77.8 (SD=5.3)	0.017
HR max	154 (SD=19.0)	142 (SD=17.7)	NS
HRR	29.6 (SD=11.7)	33 (SD=13.11)	NS
RRs1	131 (SD=13)	119.6 (SD=19)	NS
RRs2	172 (SD=28)	179 (SD=24)	NS

RRd1	79.1 (SD=14.6)	84.8 (SD=12.8)	NS
RRd2	80.47 (SD=15.7)	91.6 (SD=9.23)	NS
FAT, g/h	11.7 (SD=5.7)	16.6 (SD=9)	NS
FAT HR	110.56 (SD=13.7)	92.6 (SD=9)	0.008
AT HR	129.3 (SD=18.4)	111.6 (SD=11.4)	NS
VO <sub>2</sub> peak, ml/min	1.54 (SD=0.23)	2.23 (SD=0.36)	0.01
VO <sub>2</sub> AT, ml/min	1.06 (SD=0.36)	1.60 (SD=0.27)	0.005
VO <sub>2</sub> HR slope	4.65 (SD=1.66)	5.40 (SD=1.06)	NS
BF AT	24.02 (SD=8.59)	24.8 (SD=5.03)	NS
VE	10.78 (SD=1.8)	13.04 (SD=4.6)	NS
VE AT	30.77 (SD=13)	46 (SD=9.49)	0.01
VE max	52.59 (SD=14.6)	79.78 (SD=18.98)	0.005
VE % predicted	49 (SD=11)	53.7 (SD=8.1)	NS
VCO <sub>2</sub>	1.73 (SD=0.32)	2.56 (SD=0.55)	0.0003

The results presented as mean, SD –standard deviation, NS- not statistically significant

The abbreviations see supplementary material Table 2

**Table S6** The results of the BIA according to obese severity

Analyzed parameter	Class I obesity	Class II and III obesity	p
RMR, kcal	1529 (SD=301)	1687 (SD=324)	0.04
FFM, kg	52.24 (SD=9.1)	64.2 (SD=16.7)	0.006
FFM, %	57.2 (SD=6.0)	55.12 (SD=7.3)	NS
FAT, kg	38.8 (SD=6.7)	51.12 (SD=9.7)	0.00001
FAT, %	42.7 (SD=6.0)	44.8 (SD=7.3)	NS
TBW, kg	40.2 (SD=7.1)	50.2 (SD=11.4)	0.0003
TBW, %	45.3 (SD=4.7)	42.8 (SD=3.3)	NS
ECW, l	19.2 (SD=3.7)	22.9 (SD=5.7)	0.03
ECW, %	46.7 (SD=1.01)	47.4 (SD=2.7)	NS
ICW, l	22.1 (SD=3.8)	25.1 (SD=5.4)	0.02
ICW, %	53.4 (SD=1)	52.3 (SD=2.6)	NS
ECW/ICW	0.87 (SD=0,04)	0.91 (SD=0.1)	NS

BCM, kg	29.4 (SD=5,1)	32.9 (SD=6.8)	NS
ECM, kg	23.7 (SD=4,9)	25.1 (SD=6)	NS
ECM/BCM	0.8 (SD=0,03)	0.76 (SD=0.04)	0.001
Prot, kg	8.4 (SD=2,1)	7.3 (SD=2.1)	0.006
Musc, kg	23.8 (SD=5,5)	26 (SD=6.9)	NS
TBK, g	128.7 (SD=26,1)	149 (SD=37)	0.01
TBCa (g)	1053.4 (SD=189)	1206 (SD=267)	0.01
Glyc, g	500 (SD=86,7)	559 (SD=116)	NS
Dry weight, kg	91.7 (SD=10,6)	110.1 (SD=18)	0.002
ECS, l	5.5 (SD=1)	6.1 (SD=1.3)	NS
ECF/ECS, l	25.5 (SD=11,2)	24.3 (SD=6)	NS
Plasm FI, l	4.08 (SD=0,8)	4.8 (SD=1.2)	0.02
Body vol	82.4 (SD=23,8)	107.8 (SD=29.4)	0.00004
Body dens, kg/l	1.0 (SD=0,01)	0.99 (SD=0.01)	0.006
Impedance 5 kHz, 50 kHz, 100 kHz, 200 kHz	599/498/466/440 (SD 80/67/64/62)	500/449/419/396 (SD 158/87/79/76)	0.04 NS NS NS
Resistance 5 kHz, 50 kHz, 100 kHz, 200 kHz	599/492/458/421 (SD=80/67/62/77)	521/445/413/387 (SD=106/86/77/74)	0.04 NS NS NS
Reactance 5 kHz, 50 kHz, 100 kHz, 200 kHz	30/80/87/103 (SD=5/11/14/19)	44/65/72/86 (SD=81/17/16/20)	NS 0.02 0.02 0.04
Phase angle 5 kHz, 50 kHz, 100 kHz, 200 kHz	3/9/10/13 (SD=0.6/0.8/1/1.5)	7/8/10/12 (SD=19/1.5/1/1.5)	NS NS NS NS

The results presented as mean, SD- standard deviation, NS- not statistically significant

The abbreviations see supplementary material Table 3

**Table S7** The results of the ergospirometry according to obese severity

Analyzed parameter	Class I obesity	Class II and III obesity	P
VO <sub>2</sub> peak (ml/min/kg)	17.07 (SD=2.8)	16 (SD=3.4)	NS
VO <sub>2</sub> AT	13.1 (SD=2.4)	11 (SD=4)	NS
VE/VCO <sub>2</sub> slope	27.5 (SD=5.5)	27.15 (SD=3.2)	NS
BF	17.9 (SD=3.5)	18.3 (SD=4.7)	NS
BF max	29.06 (SD=5.5)	30.4 (SD=7.6)	NS
RER	1.2 (SD=0.11)	1.10 (SD=0.12)	NS
VO <sub>2</sub> /WR slope	9.51 (SD=1.7)	9.5 (SD=1.9)	NS
HR resting	84.3 (SD=11.13)	88.6 (SD=14.3)	NS
HR max	174.6 (SD=9.5)	179.7 (SD=10.3)	NS
HRR	24.7 (SD=14.9)	32.7 (SD=9.4)	NS
RRs1	134 (SD=17)	125 (SD=11)	NS
RRs2	183 (SD=29)	168 (SD=25)	NS
RRd1	80.4 (SD=18.5)	79.8 (SD=11.3)	NS
RRd2	88 (SD=16.4)	79.6 (SD=14)	NS
FAT, g/h	10.4 (SD=4.4)	14 (SD=7)	NS
FAT HR	106.9 (SD=13)	107.6 (SD=16)	NS
AT HR	126 (SD=20)	126 (SD=18)	NS
VO <sub>2</sub> peak, ml/min	1.57 (SD=0.41)	1.68 (SD=0.35)	NS
VO <sub>2</sub> AT, ml/min	1.23 (SD=0.25)	1.12 (SD=0.48)	0.02
VO <sub>2</sub> HR slope	4.6 (SD=1)	4.8 (SD=1.8)	NS
BF AT	23 (SD=4.6)	24.8 (SD=9.6)	NS
VE	11.3 (SD=0.9)	11.08 (SD=3.2)	NS
VE AT	35.7 (SD=7.8)	32 (SD=16.4)	NS
VE max	54.9 (SD=17.7)	59 (SD=19)	NS
VE % predicted	46.5 (SD=9)	49 (SD=12.4)	NS
VCO <sub>2</sub>	1.8 (SD=0.5)	1.9 (SD=0.4)	NS



The results presented as mean, SD- standard deviation, NS- not statistically significant  
The abbreviations see supplementary material Table 2.

**Table S8** The change of the BIA results in patients who finished the treatment

Analyzed parameter	Initial result	Result at the end of the treatment	p
RMR, kcal	1611 (SD=343)	1687 (SD=332)	0.02
FFM, kg	58.8 (SD=13)	56.44 (SD=14.1)	NS
FFM, %	55.7 (SD=7.1)	58.9 (SD=10.1)	NS
FAT, kg	46.7 (SD=10.9)	39.3 (SD=9.5)	0.006
FAT%	44.2 (SD=7.1)	40.6 (SD=6.8)	NS
TBW, kg	45.7 (SD=8.6)	44.2 (SD=9.1)	NS
TBW, %	44.1 (SD=4.4)	44.2 (SD=7.8)	NS
ECW, l	47.2 (SD=2.4)	47 (SD=1.9)	NS
ICW, l	23.9 (SD=4.8)	22.8 (SD=4.3)	NS
ICW, %	52.5 (SD=2.3)	52.9 (SD=1.9)	NS
ECW/ICW	0.91 (SD=0.09)	0.89 (SD=0.07)	NS
BCM, kg	31.6 (SD=5.8)	30.6 (SD=5.7)	NS
ECM, kg	24.8 (SD=5.3)	24.5 (SD=5.1)	NS
ECM/BCM	0.77 (SD=0.04)	0.79 (SD=0.03)	NS
Prot, kg	7.94 (SD=2.4)	8.4 (SD=2.3)	NS
Musc, kg	25.3 (SD=6.2)	24.7 (SD=6)	NS
TBK, g	141.5 (SD=32)	139 (SD=31.3)	NS
TBCa, g	1145.9 (SD=232)	1128 (SD=225)	NS
Glyc, g	536.9 (SD=100)	518 (SD=97)	NS
Dry weight, kg	102.3 (SD=16)	94.8 (SD=14)	NS
ECS, l	5.9 (SD=1.16)	5.7 (SD=1)	NS
EC F/ECS, l	24.5 (SD=8.4)	21.6 (SD=4.7)	NS
Plasm FI, l	4.58 (SD=0.9)	4.33 (SD=0.9)	NS
Body vol	99.1 (SD=25.8)	94.5 (SD=15.9)	NS
Body dens, kg/l	0.99 (SD=0.01)	1.0 (SD=0.01)	NS

5 kHz, 50 kHz, 100 kHz, 200 kHz Impedance	543/455/428/404 (SD 87/71/66/65)	560/473/446/421 (SD 87/74/69/67)	NS
5 kHz, 50 kHz, 100 kHz, 200 kHz Resistance	543/450/428/390 (SD 87/70/64/69)	560/450/439/411 (SD 87/107/69/64)	NS
5 kHz, 50 kHz, 100 kHz, 200 kHz Reactance	26/69/75/89 (SD 6/13/14/17)	25/70/78/94 (SD 5/11/15/20)	NS
5 kHz, 50 kHz, 100 kHz, 200 kHz Phase angle	2/8/10/13 (SD 0.5/0.9/1.1/1.4)	2/8/10/13 (SD= 0.4/0.6/0.7/1.2)	NS

The results presented as mean, SD- standard deviation, NS- not statistically significant

The abbreviations see supplementary material Table 3

**Table S9** The change of the ergospirometry results in patients who finished the treatment

Analyzed parameter	Initial result	Result at the end of the treatment	p
VO <sub>2</sub> peak	16.41 (SD= 3.22)	18.24 (SD=3.9)	0.002
VO <sub>2</sub> AT	11.77 (SD= 3.77)	12.56 (SD=3.7)	NS
VE/VCO <sub>2</sub> slope	27.29 (SD=4.13)	27.54 (SD=2.8)	NS
BF	18.21 (SD=4.29)	18.13 (SD=4.13)	NS
BF max	29.92 (SD=6.91)	30.92 (SD=5.13)	NS
RER	1.11 (SD=0.11)	1.14 (SD=0.09)	NS
VO <sub>2</sub> /WR slope	9.54 (SD=1.82)	10.16 (SD=1.62)	NS
Resting heart rate	86.7 (SD=13.4)	77.15 (SD=14.6)	0.017
HR max	151.3 (SD=19.2)	145 (SD=22)	NS
HRR	30 (SD=10)	39.6 (SD=25)	NS
RRs1	128 (SD=15)	122 (SD=13)	NS
RRs2	176 (SD=27)	176 (SD=26)	NS
RRd1	80.5 (SD=14)	78.5 (SD=10)	NS

RRd2	84.8 (SD=15)	79 (SD=14.9)	NS
FAT, g/h	13.65 (SD=7)	13.7 (SD=5)	NS
FAT HR	106.95 (SD=16)	103.3 (SD=18)	NS
AT HR	127 (SD=20)	120 (SD=20)	NS
VO <sub>2</sub>	1.68 (SD=0.41)	1.69 (SD=0.43)	NS
VO <sub>2</sub> AT, ml/min	1.27 (SD=0.4)	1.19 (SD=0.3)	NS
VO <sub>2</sub> HR slope	5.08 (SD=1.5)	5.04 (SD=1.3)	NS
BF AT	25.7 (SD=8)	24.5 (SD=4.8)	NS
VE	11.7 (SD=2.6)	10.4 (SD=2.5)	NS
VE AT	36.8 (SD=14)	33 (SD=9)	NS
VE max	58.8 (SD=18)	58.6 (SD=18)	NS
VE % predicted	49 (SD=9)	49.4 (SD=10)	NS
VCO <sub>2</sub>	1.92 (SD=0.5)	1.97 (SD=0.5)	NS

The results presented as mean, SD- standard deviation, NS- not statistically significant

The abbreviations see supplementary material Table 2

**Table S10** The differences in the BIA and ergospirometry results in patients who finished the treatment according to the achievement of the  $\geq 5\%$  body mass reduction

Analyzed parameter	cut off <sup>1</sup>	AUC <sup>2</sup>	SE <sup>3</sup>	CI (-) <sup>4</sup>	CI (+) <sup>5</sup>	SEN <sup>6</sup>	SPE <sup>7</sup>	ACC <sup>8</sup>
FAT, kg	36.1 (>)	0.68	0.115	0.45	0.90	0.95	0.30	0.76
TBW %	37.8 (<)	0.39	0.137	0.12	0.67	1	0	0.68
Body vol, l	78.6 (>)	0.66	0.12	0.42	0.89	1	0.25	0.76
HR resting	81 (>)	0.77	0.09	0.58	0.96	0.82	0.62	0.76
FAT HR	103 (>)	0.76	0.09	0.57	0.96	0.82	0.75	0.80
AT HR	106 (>)	0.62	0.13	0.37	0.88	0.94	0.37	0.76

1. (result in patients who achieved  $\geq 5\%$  body mass reduction); 2. AUC (area under the curve)  
3. SE (standard error); 4. Coefiencie interval -95%; 5. Coefiencie interval + 95%; 6. SEN (sensitivity); 7. SPE (specificity); 8. ACC (accuracy)

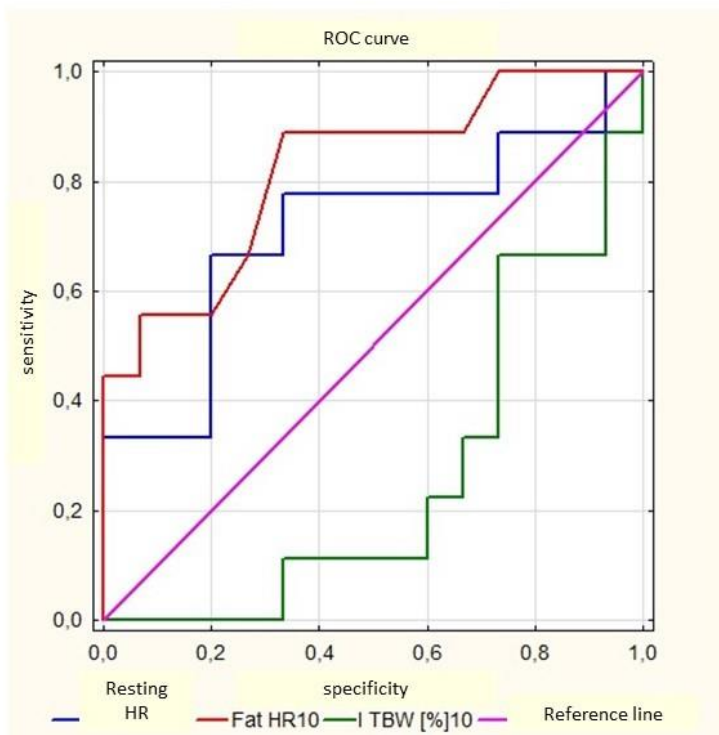
The abbreviations see supplementary material Table 2 and Table 3

**Table S11** The differences in the BIA and ergospirometry results in patients who finished the treatment according to the achievement of the > 10% body mass reduction

Analyzed parameter	cut off <sup>1</sup>	AUC <sup>2</sup>	SE <sup>3</sup>	CI (-) <sup>4</sup>	CI (+) <sup>5</sup>	SEN <sup>6</sup>	SPE <sup>7</sup>	ACC <sup>7</sup>
TBW %	55 (<)	0.29	0.105	0.09	0.5	0	0.93	0.60
HR resting	106 (>)	0.69	0.12	0.46	0.92	0.33	1	0.76
FAT HR	121 (>)	0.82	0.09	0.64	0.99	0.55	0.93	0.80

1. cut off level in patients who finished the treatment according to the achievement of the > 10% body mass reduction; 2. AUC (area under the curve) 3. SE (standard error); 4. Coefficient interval -95%; 5. Coefficient interval + 95%; 6. SEN (sensitivity); 7. SPE (specificity); 8. ACC (accuracy)

The abbreviations see supplementary material Table 2 and Table 3.



**Figure S1** The results of BIA and ergospirometry before the treatment differentiating patients who achieved >10% body mass reduction

The abbreviations see supplementary material Tables S2 and S3.

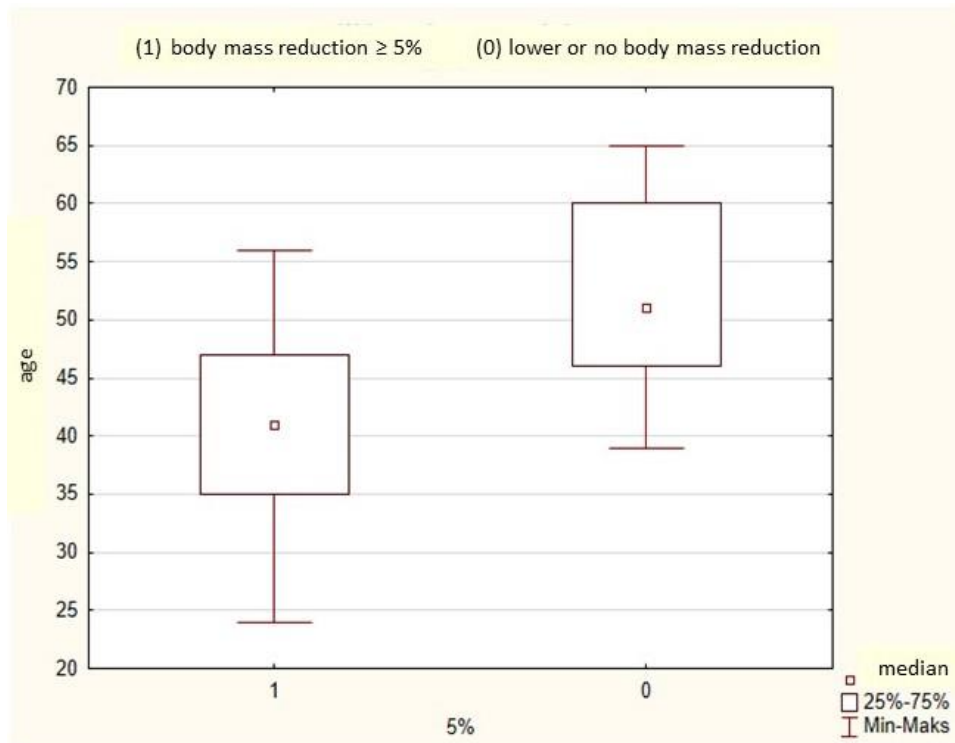
**Table S12** The prevalence of coexisting diseases and the efficacy of treatment

Coexisting diseases	The prevalence of coexisting diseases among 23 subjects who achieved $\geq 5\%$ body mass reduction	The prevalence of coexisting diseases among 9 subjects who did not achieved $\geq 5\%$ body mass reduction	P
Hypertension	9 (40%)	5 (55%)	NS
Hypercholesterolaemia	3 (13%)	5 (55%)	0.01
Arthritis	4 (17%)	4 (44%)	NS
Hypothyroidism	5 (23%)	2 (22%)	NS
Impaired glucose tolerance	7 (39%)	1 (12%)	NS
Varicose veins	2 (9%)	2 (22%)	NS

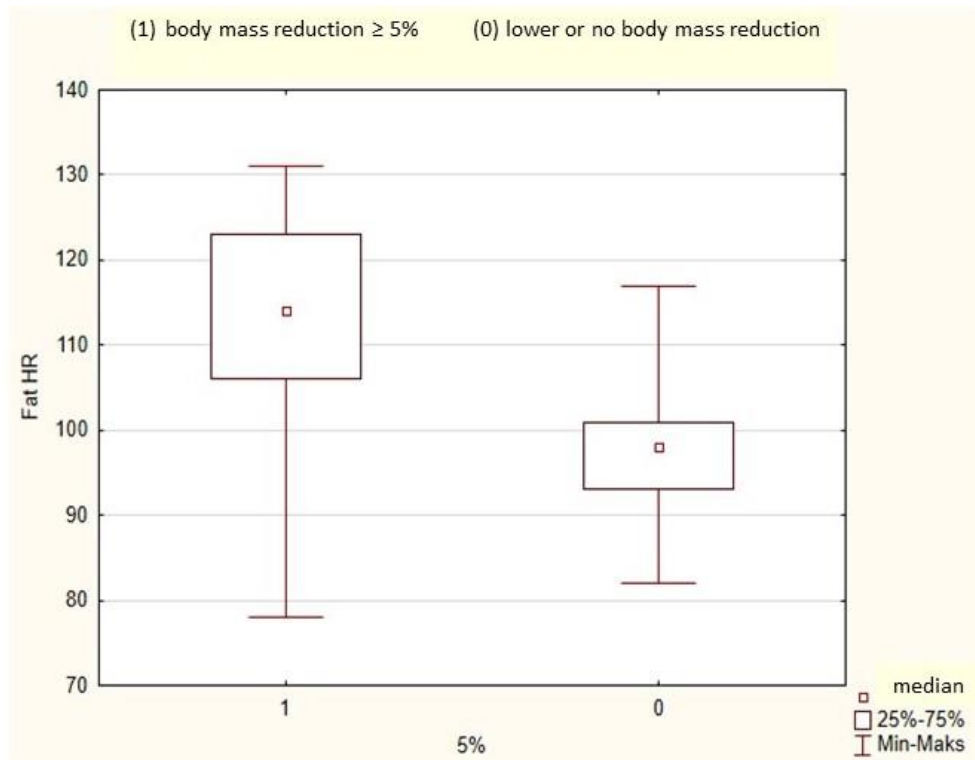
Gastroesophageal reflux disease	1 (4%)	2 (22%)	NS
Allergic rhinitis and polyps	3 (13%)	1 (11%)	NS
Hepatic steatosis	3 (13%)	1 (11%)	NS
Depression	1 (4%)	2 (22%)	NS
Gallstones	2 (8%)	1 (11%)	NS
Diabetes	2 (8%)	3 (33%)	NS
Nicotinism	3 (13%)	0	NS
Coronary artery disease	0	2 (22%)	0,01
Asthma	1 (4%)	1 (11%)	NS
Sleep apnea	2 (9%)	0	NS
Gout	0	1 (11%)	NS

The results presented as mean (%)

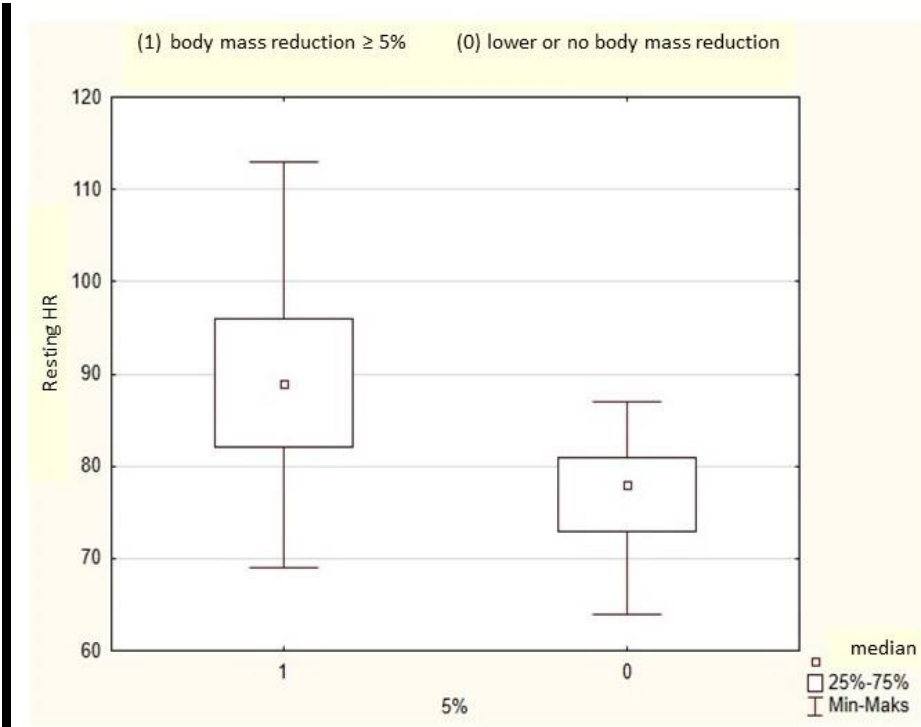
A)



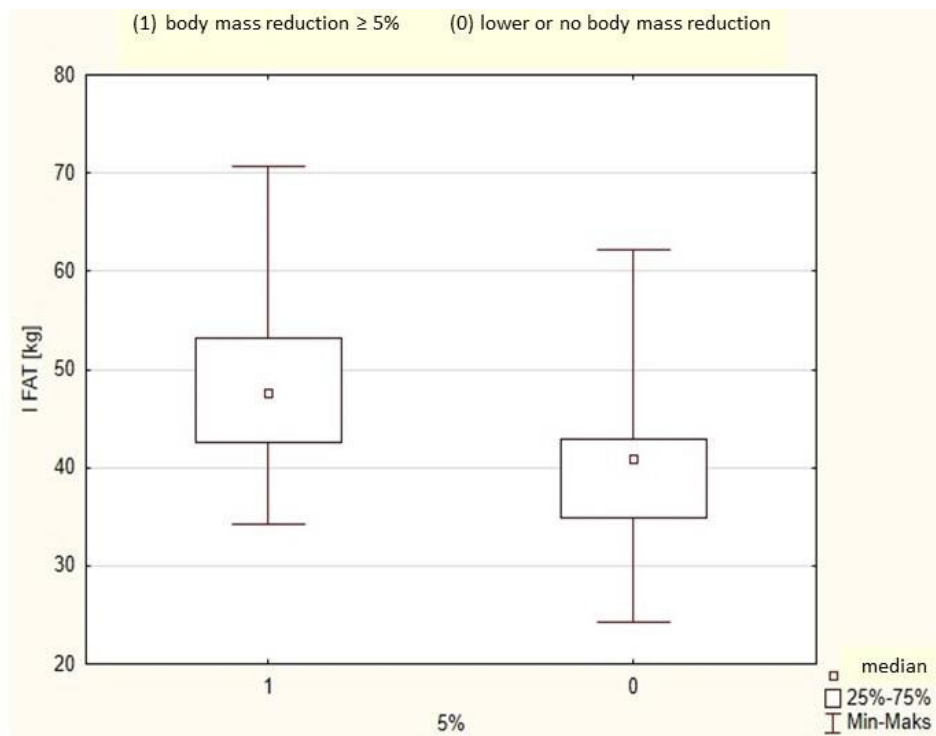
B)



C)



D)



**Figure S2** The comparison of age (A), FAT HR results (B), resting HR (C), FAT (D) in patients who achieved the body mass reduction  $\geq 5\%$  initial body mass (1) and subjects who did not achieve the body mass reduction (body mass reduction  $< 5\%$  of the initial body mass) (0)