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Severe obesity (BMI more than 35kg/m^2) with gastric cancer , how should we do?

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01

Status of obesity

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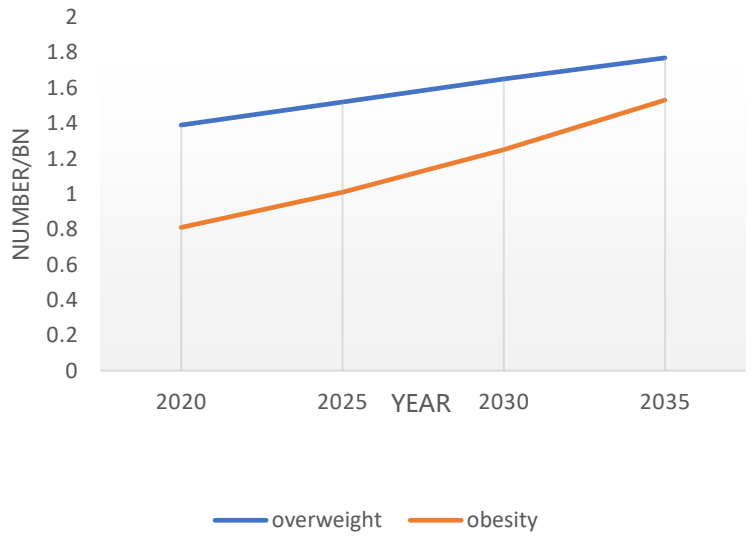
Status of obesity

	2020	2025	2030	2035
Adults with overweight (BMI ≥25 to 30 kg/m^2)	1.39bn	1.52bn	1.65bn	1.77bn
Adults with obesity (BMI ≥30 kg/m^2)	0.81bn	1.01bn	1.25bn	1.53bn
Adults with overweight or obesity as a proportion of all adults globally	42%	46%	50%	54%

- The number of overweight or obese adults is projected to reach nearly 3.3 billion by 2035, compared with 2.2 billion in 2020.
- This reflects an increase from 42% of adults in 2020 to over 54% by 2035.

Global estimate (2020) and projected number of adults (2025-2035) with high BMI



Source:World Obesity Federation, 2023b

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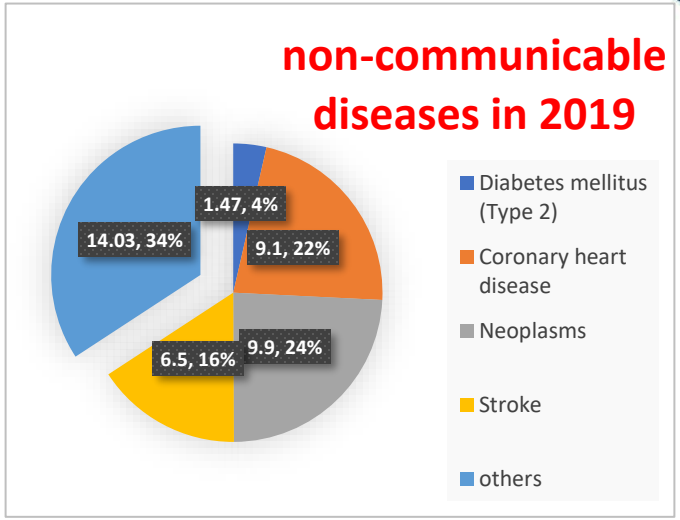
Status of obesity

	Total deaths 2019	Of which, attributable to high BMI
All causes	50.3m	5.0m (10%)
Of which non-communicable diseases	41.0m	5.0m (12%)
Of which		
…..Diabetes mellitus (Type 2)	1.47m	0.62m (42%)
…..Coronary heart disease	9.1m	1.7m (19%)
…..Neoplasms	9.9m	0.46m (5%)
…..Stroke	6.5m	1.1m (17%)



- Over 50.3 million deaths (adults and children) occurred in 2019, of which 41 million were caused by non-communicable diseases (NCDs).
- Two-thirds of these NCD deaths by just four conditions: cancers (neoplasms), coronary heart disease, stroke and diabetes.

- Each of these conditions is associated with overweight and obesity.

Source:IHME, 2024

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02

Status of gastric cancer

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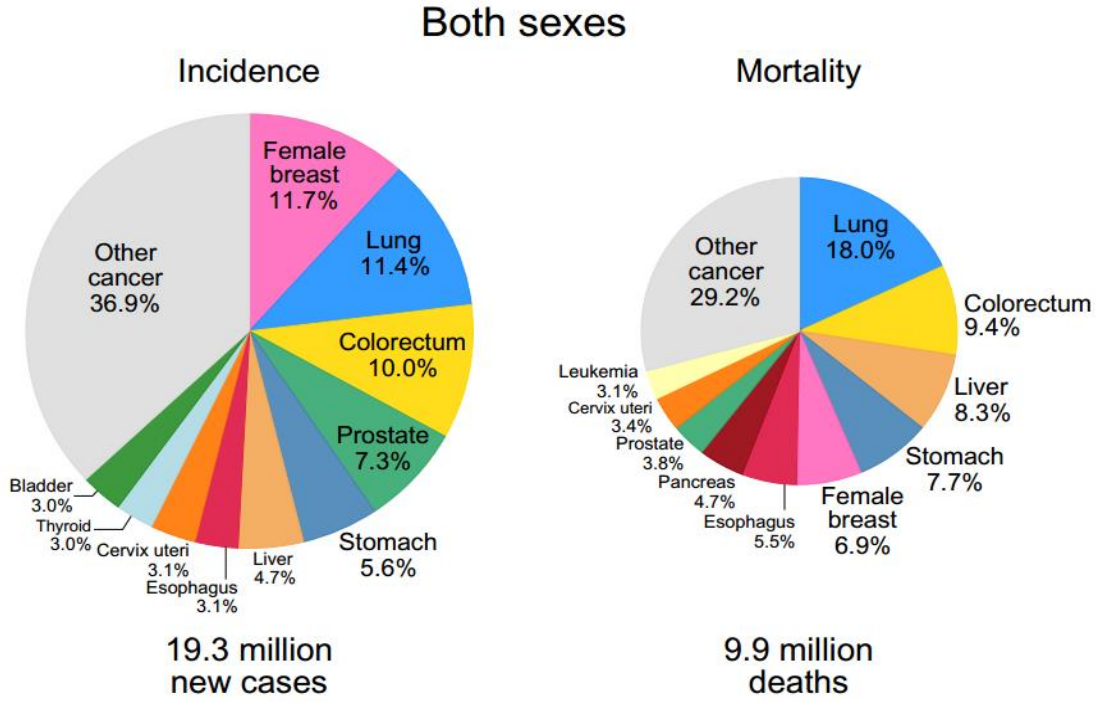
Status of gastric cancer

CANCER SITE	NO. OF NEW CASES (% OF ALL SITES)		NO. OF NEW DEATHS (% OF ALL SITES)	
Female breast	2,261,419	(11.7)	684,996	(6.9)
Lung	2,206,771	(11.4)	1,796,144	(18.0)
Prostate	1,414,259	(7.3)	375,304	(3.8)
Nonmelanoma of skin[a]	1,198,073	(6.2)	63,731	(0.6)
Colon	1,148,515	(6.0)	576,858	(5.8)
Stomach	1,089,103	(5.6)	768,793	(7.7)
Liver	905,677	(4.7)	830,180	(8.3)
Rectum	732,210	(3.8)	339,022	(3.4)
Cervix uteri	604,127	(3.1)	341,831	(3.4)
Esophagus	604,100	(3.1)	544,076	(5.5)



- There are 1089103 new cases and 768793 deaths from gastric cancer in 2020.
- Gastric cancer is the fifth most common cancer and the fourth leading cause of cancer death worldwide

Source: H Sung et al. CA Cancer J Clin (2021)

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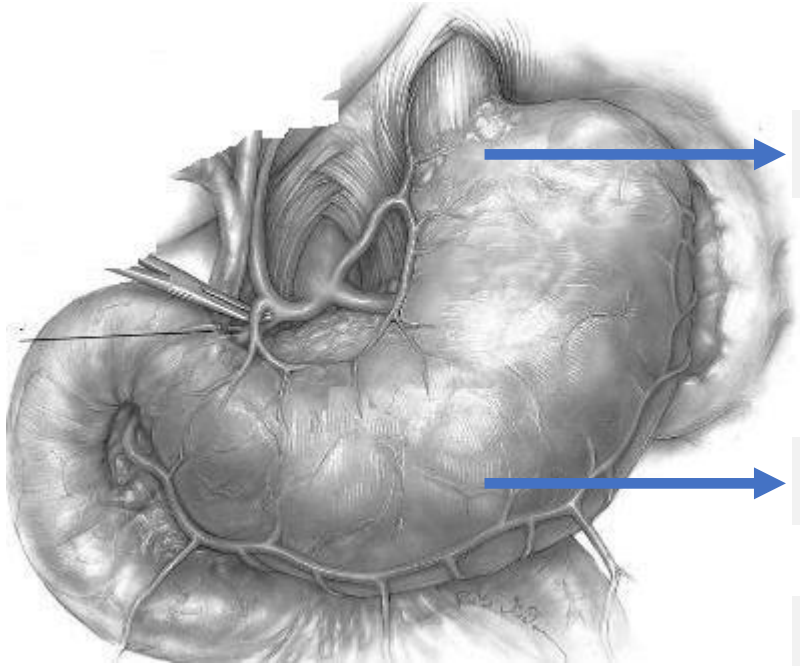
Status of gastric cancer



Cardia Gastric Cancer (CGC)

Non-cardia Gastric Cancer (NCGC)

Common etiological pathways: Smoking and heavy alcohol consumption

Cardia Gastric Cancer: **Body weight** and gastroesophageal reflux disease (GERD)

Non-cardia Gastric Cancer: H. pylori infection

Source: (1)F He et al. Lancet Reg Health West Pac (2024);(2) M Arnold et al. Gut (2020)

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03

The pathogenesis of obesity and gastric cancer

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The pathogenesis of obesity and gastric cancer

- Obesity with GERD
- Obesity with insulin-like growth factors (IGFs)
- Obesity with leptin
- Obesity with adiponectin
- Obesity with sex hormone
- ……

Source: Konstatinos I Avgerinos et al. Metabolism. 2019

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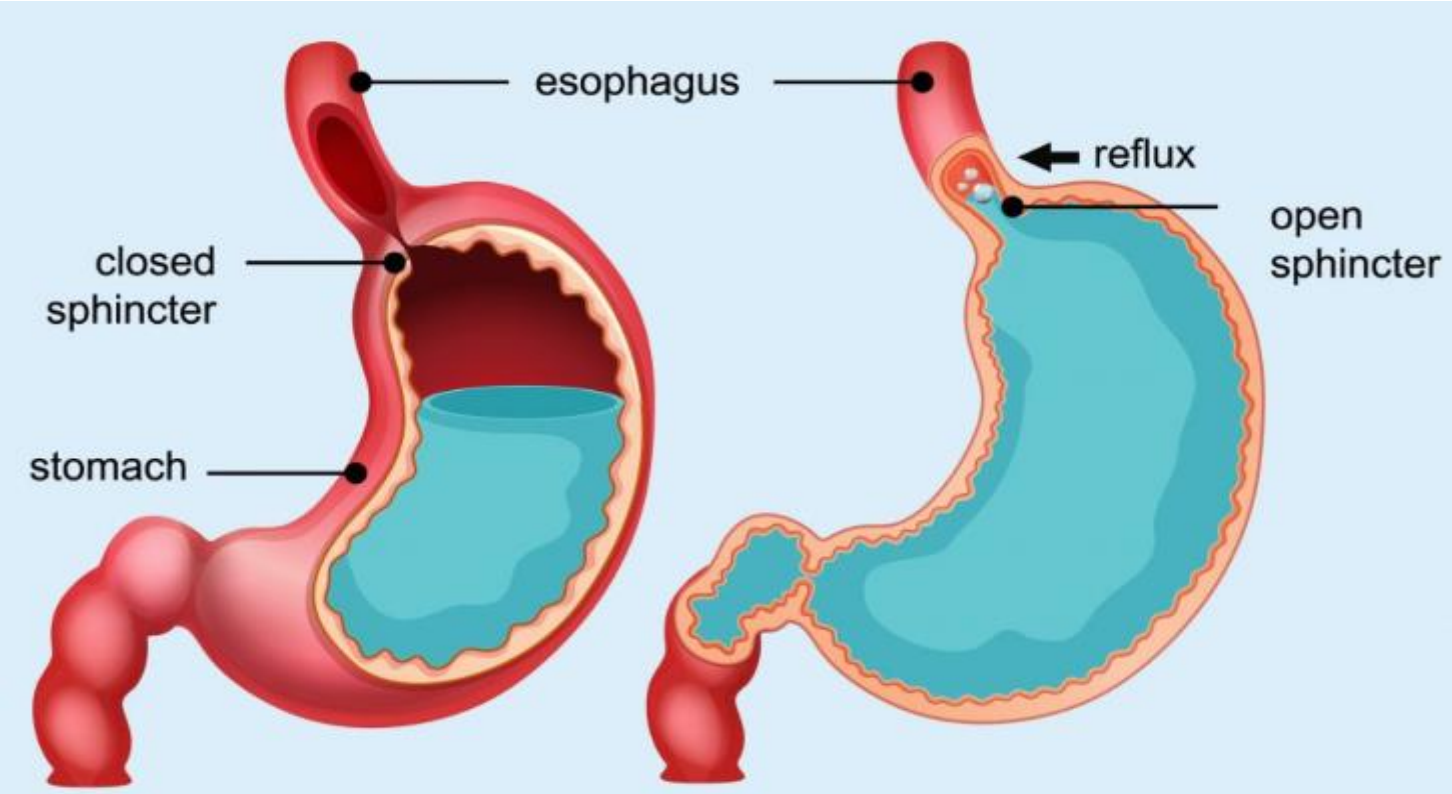
The pathogenesis of obesity and gastric cancer

- **Obesity with GERD**



- Higher intraperitoneal pressure
- Lower esophageal sphincter pressure
- Gastric emptying disturbance

Source: Konstatinos I Avgerinos et al. Metabolism. 2019

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The pathogenesis of obesity and gastric cancer

- **Obesity with GERD**

Gastro-oesophageal reflux

Combination of gastric atrophy, reflux symptoms and histological subtype indicates two distinct aetiologies of gastric cardia cancer

M H Derakhshan,[1,2] R Malekzadeh,[2] H Watabe,[1] A Yazdanbod,[3] V Fyfe,[1] A Kazemi,[2]

Table 4 Relationship between risk of gastric cardia cancer and pepsinogen I/II, smoking, GORD symptoms and *H pylori* sero-status

	Univariate		Multivariate	
	Odds ratio (95% CI)	p value	Odds ratio (95% CI)	p value
PG ratio quintiles				
5th: 6.008–11.586	1.00		1.00	
4th: 3.848–6.004	1.10 (0.50 to 2.40)	0.817	0.92 (0.37 to 2.26)	0.852
3rd: 3.062–3.734	0.50 (0.20 to 1.25)	0.138	0.62 (0.23 to 1.71)	0.355
2nd: 2.378–3.017	0.50 (0.20 to 1.25)	0.138	0.49 (0.18 to 1.38)	0.177
1st: 0.479–2.370	2.77 (1.36 to 5.63)	0.005	3.92 (1.77 to 8.67)	0.001
Smoking				
Non-smoker	1.00		1.00	
Ever smoker	1.70 (0.79 to 3.67)	0.175	1.40 (0.56 to 3.51)	0.476
GORD symptoms				
<1 time per week	1.00		1.00	
1–2 times per week	0.95 (0.40 to 2.29)	0.915	1.47 (0.54 to 4.00)	0.451
>2 more times per week	3.15 (1.17 to 8.49)	0.024	10.08 (2.29 to 44.36)	0.002
H pylori sero-status				
Negative	1.00		1.00	
Positive	1.46 (0.68 to 3.14)	0.332	2.42 (0.84 to 7.02)	0.103

- Gastric cardia cancer was positively associated with frequent GERD symptoms

GORD symptoms	Univariate Odds ratio(95% CI)	p value	Multivariate Odds ratio(95%CI)	p value
< 1 time per week	1		1	
1-2 times per week	0.95(0.4 to 2.29)	0.915	1.47(0.54 to 4.00)	0.451
> 2 more times per week	3.15(1.17 to 8.49)	0.024	10.08(2.29 to 44.36)	0.002

Source: M H Derakhshan et al.Gut.2008

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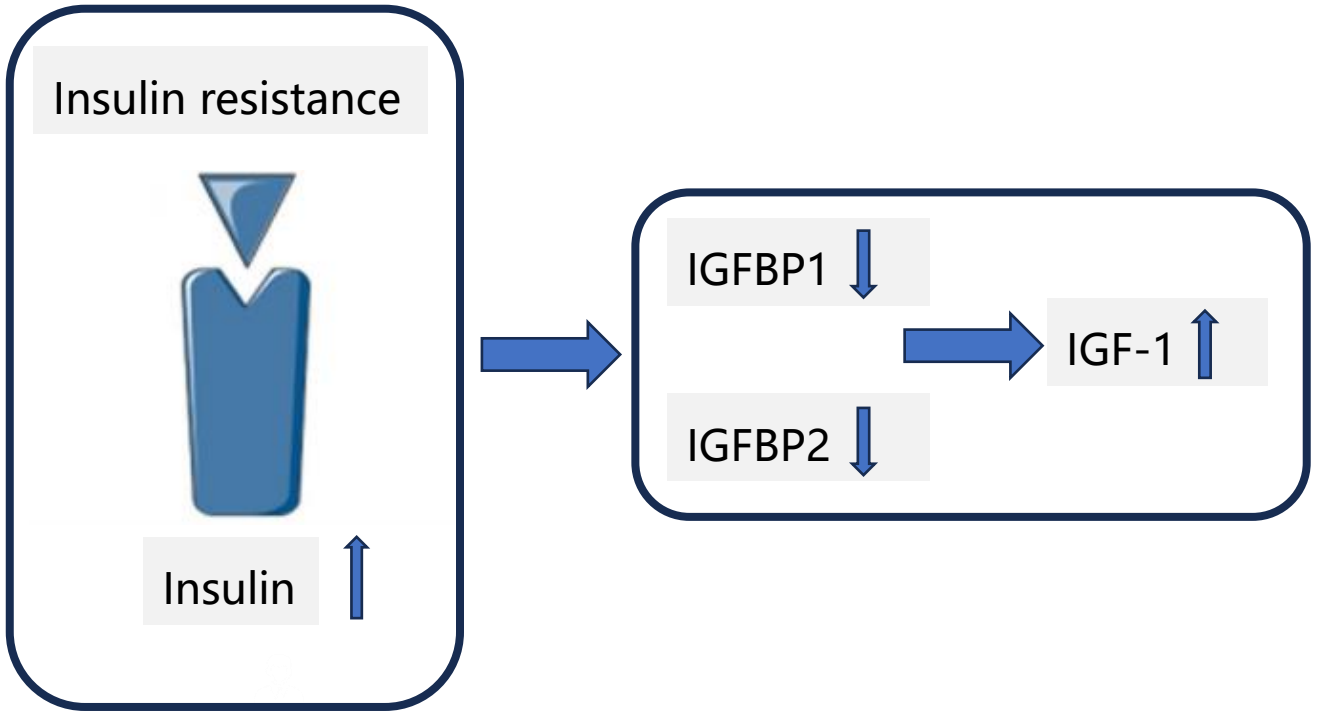
The pathogenesis of obesity and gastric cancer

- **Obesity with insulin-like growth factors (IGFs)**



Source: Konstatinos I Avgerinos et al. Metabolism. 2019

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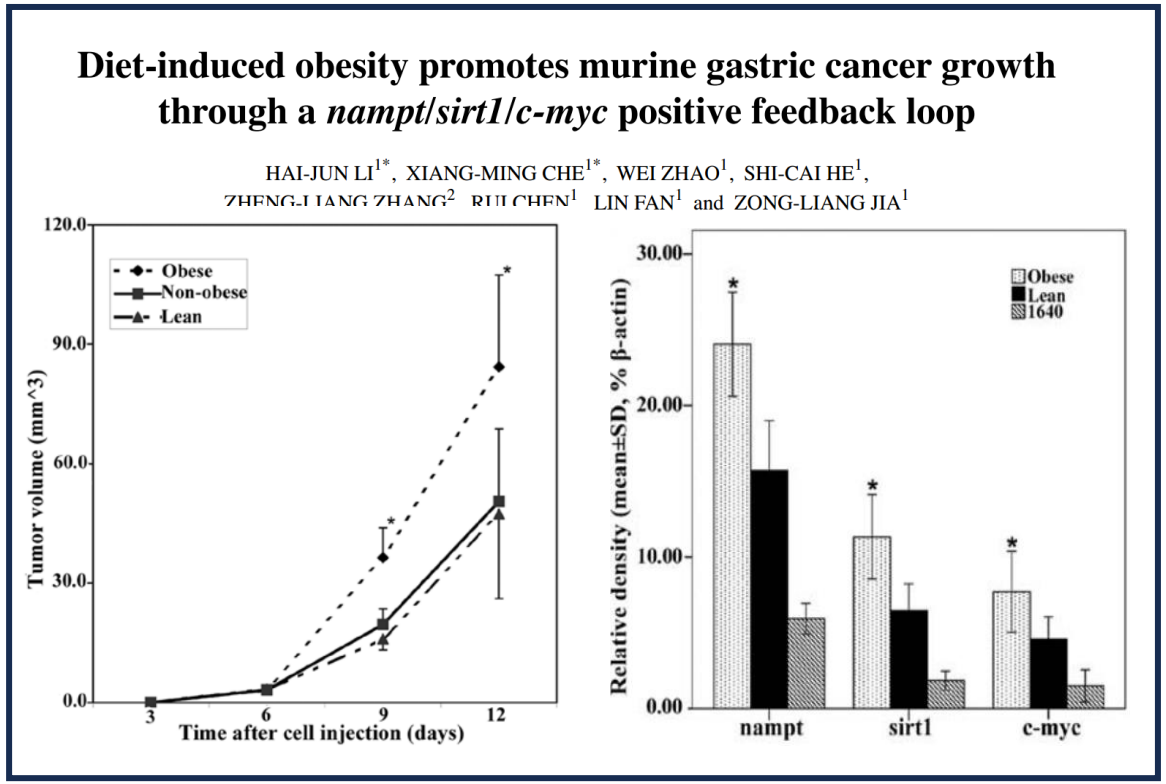
The pathogenesis of obesity and gastric cancer

- **Obesity with insulin-like growth factors (IGFs)**



- Diet-induced obese mice were insulin-resistant
- The expression of genes that promote the growth of gastric cancer, such as NAMPT, SIRT1 and C-MYC, is up-regulate in the blood of obese mice

Source: Hai-Jun Li et al. Oncol. 2013

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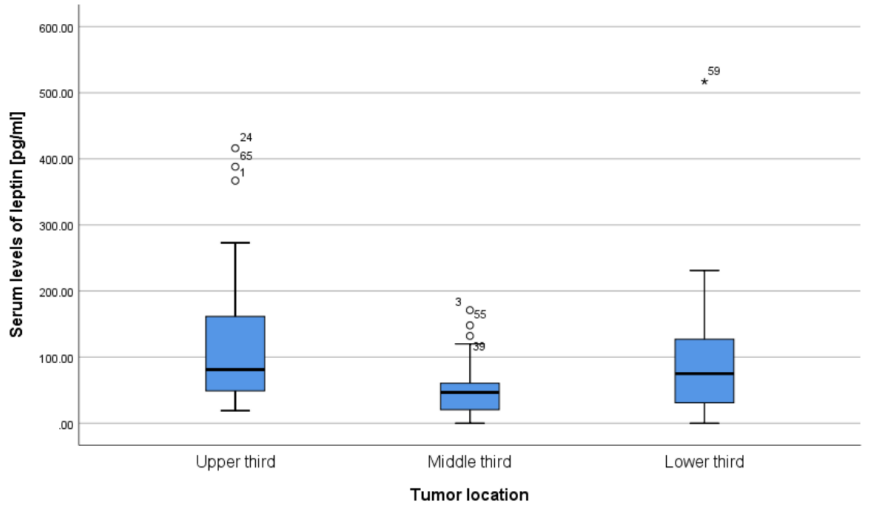
The pathogenesis of obesity and gastric cancer

- **Obesity with leptin**

Leptin serum levels are about 5 times higher in obese people than in normal individuals

Does leptin cause proximal gastric cancer in the obese? The role of serum leptin in the etiology of proximal gastric cancer.

Jagric T[1], Hladnik G[2], Kolaric R[2], Dugonik M[3], Homsak E[3]



Source: (1)Tamaral Jaffe et al. Int J Cancer. 2008;(2) Tomaz Jagric et al.Horm Mol Biol Clin Investig.2023

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04 Treatment of obesity with gastric cancer

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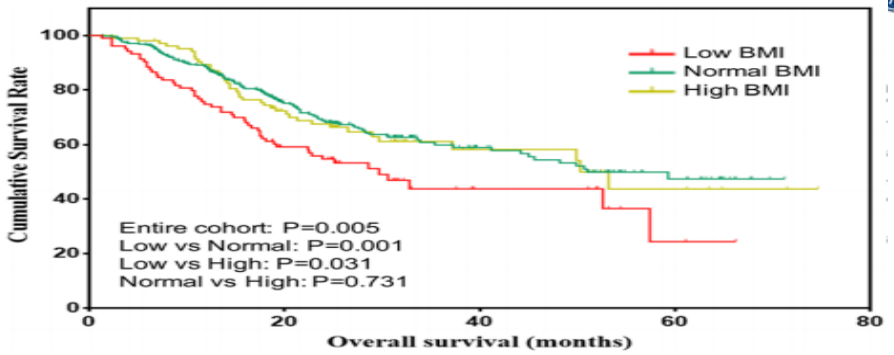
Treatment of obesity with gastric cancer

Impact of body mass index on surgical outcomes of gastric cancer

Fan Feng[1†], Gaozan Zheng[1†], Xiaohua Guo[1†], Zhen Liu[1], Guanghui Xu[1], Fei Wang[1,2], Qiao Wang[1,3], Man Guo[1], Xiao Lian[1] and Hongwei Zhang[1*]

Characteristics	Low BMI	Normal BMI	High BMI	P value
Blood loss(ml)	150(100,200)	150(100,200)	200(150,350)	< 0.001
Operation time(min)	170(140,220)	185(150,230)	217.5(175,263.75)	< 0.001
Number of retrieved lymph nodes	26(22,23)	26(21,32)	23(19,27)	< 0.001
Length of postoperative stay	7(6,9)	7(6,9)	8(6,9)	0.179



- High BMI was associated with increased blood loss and operation time, and deceased number of retrieved lymph nodes.
- Low BMI was associated with decreased survival.

Source: F Feng et al.BMC Cancer. 2018

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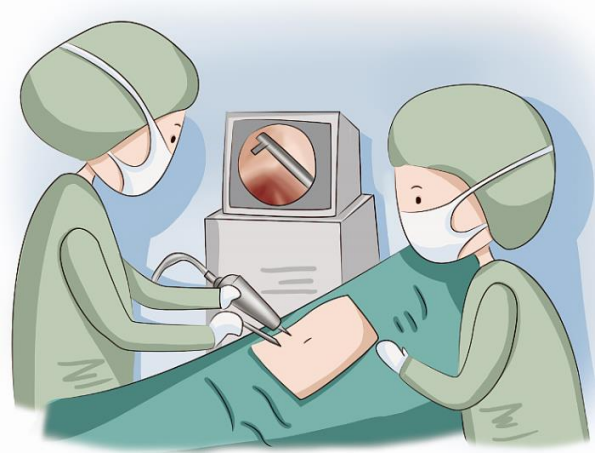
Treatment of obesity with gastric cancer



Increased BMI with longer operative time

- Accumulation of visceral and pancreatic fat
- Enlarged omentum and mesentery
- Complexity of anesthesia
- The need for meticulous wound closure
- ……

Source: H Hai et al.Scientific repotrs.2024

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Treatment of obesity with gastric cancer

Application of Laparoscopic Gastrectomy in Obese Patients (BMI ≥ 30 kg/m^2) with Gastric Cancer: A Comparison With Open Gastrectomy Regarding Short-term Outcomes

Ke Chen, MD, Yu Pan, MD, Wei-hua Yu, MD, Xue-yong Zheng, MD, Ling-hua Zhu, MD, and Xian-fa Wang, MD

TABLE 2. Comparison of Surgical Outcomes and Postoperative Recovery

Variables	LG (n = 33)	OG (n = 23)	*P*
Operative time (min)	245.3 ± 43.4	254.4 ± 14.1	0.34
Blood loss (mL)	165.5 ± 23.9	230.9 ± 30.6	< 0.01
No. harvested lymph nodes	35.7 ± 5.9	36.2 ± 8.2	0.78
Time to first flatus (d)	4.8 ± 1.0	5.0 ± 0.9	0.26
Time to starting liquid diet (d)	5.9 ± 2.2	6.6 ± 2.4	0.32
Time to starting soft diet (d)	8.0 ± 2.8	9.0 ± 3.3	0.26
Postoperative hospital stay (d)	12.6 ± 4.1	14.7 ± 5.3	0.09
Weight loss (%)	78.2 ± 12.2	75.2 ± 15.2	0.42

Quantitative data are expressed as means ± SDs.
LG indicates laparoscopic gastrectomy; OG, open gastrectomy.

- LG was associated with significantly lesser blood loss,
- Both groups had a similar operative time, and number of harvested lymph nodes

Source: ke chen et al.Surg Laparosc Endosc Percutan Tech. 2018

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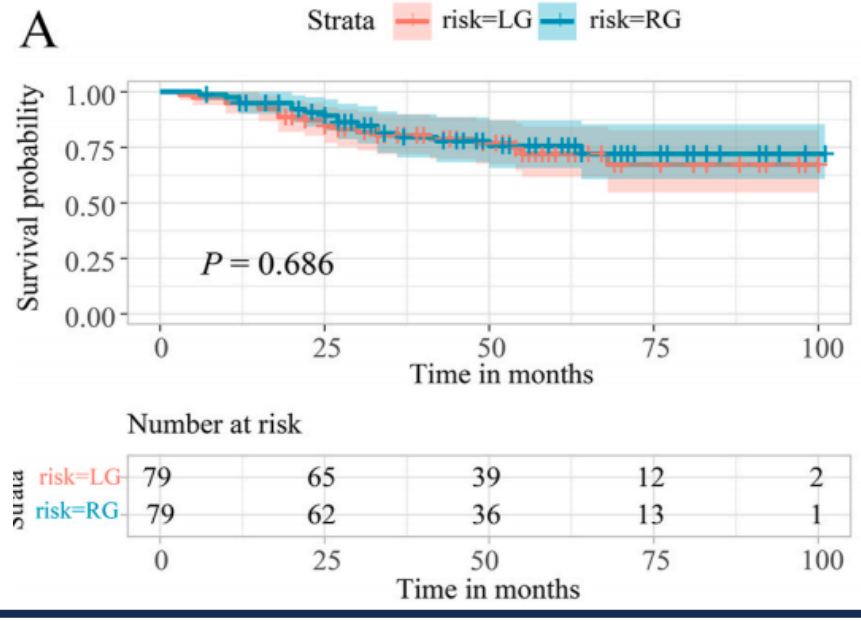
Treatment of obesity with gastric cancer

Short- and long-term comparison of robotic versus laparoscopic gastrectomy for gastric cancer patients with BMI≥30 kg/m²: A propensity score matched analysis

Cheng Meng [a,b], Shougen Cao [a,b], Qin Yu [c], Yulong Tian [a,b], Zequn Li [a,b], Xiaodong Liu [a,b], Yuqi Sun [a,b], Qi Liu [a,b], Hao Zhong [a,b], Zhaojian Niu [a,b], Yanbing Zhou [a,b,*]

[a] Affiliated Hospital of Qingdao University, Department of Gastrointestinal Surgery, China
[b] Shandong Provincial Key Laboratory of Gastrointestinal Tumor Basic and Translational Medicine, China
[c] General Internal Medicine, Jimo People's Hospital, Qingdao, China



Variables	Matched cohort		*P* -Value
	RG group (n = 79)	LG group (n = 79)	
Surgical procedure, no. (%)			0.139
Distal gastrectomy	24 (30.4 %)	15 (19.0 %)	
Total gastrectomy	55 (69.6 %)	64 (81.0 %)	
Type of GI reconstruction, no. (%)			0.843
B-I	0 (0.0 %)	1 (1.3 %)	
B-II, or + Braun	15 (19.0 %)	16 (20.3 %)	
Roux-en-Y	64 (81.0 %)	62 (78.5 %)	
Extent of LN dissection, no. (%)			0.843
D1 + (α, β)	15 (19.0 %)	17 (21.5 %)	
D2	64 (81.0 %)	62 (78.5 %)	
Number of harvest LN (Mean ± SD)	31.80 ± 12.65	27.25 ± 11.79	0.021
Supra-pancreatic regions	13.51 ± 5.76	9.85 ± 4.50	< 0.001
Perigastric regions	18.29 ± 7.03	17.41 ± 7.31	0.439
Operative time (min ±SD)	240.49 ± 59.89	274.97 ± 61.63	< 0.001
Pure operation time (min ± SD)	222.86 ± 60.34	274.97 ± 61.63	< 0.001
Docking time (min ± SD)	12.83 ± 3.77	–	–
Undocking time (min ± SD)	4.80 ± 1.30	–	–
EBL (mL ± SD)	81.70 ± 66.44	118.35 ± 57.07	< 0.001
Conversion, no. (%)	1 (1.3 %)	3 (3.8 %)	0.620
Reoperation, no. (%)	0(0.00 %)	1(1.3 %)	1.000
Bowel function recovery (days ± SD)	3.42 ± 1.16	4.16 ± 1.31	< 0.001
Soft diet (days ± SD)	4.38 ± 1.32	5.35 ± 1.40	< 0.001
Postoperative hospital stay (days ± SD)	8.29 ± 3.73	9.71 ± 4.15	0.025
30-day readmission, no. (%)	2 (2.6 %)	5 (6.4 %)	0.442
Total cost (USD ± SD)	14625.43 ± 2634.92	11136.75 ± 2329.20	< 0.001

- RG is a safe and feasible approach for gastric cancer with a BMI≥30 kg/m2 and has better short-term clinical outcomes than LG.
- However, RG is similar to LG in terms of long-term prognosis.

Source: Cheng Meng et al.Eur J Surg Oncol. 2024

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05

How to prevent obesity and gastric cancer

Authors:Liyong Zhu

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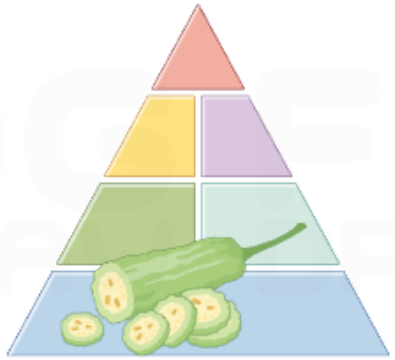
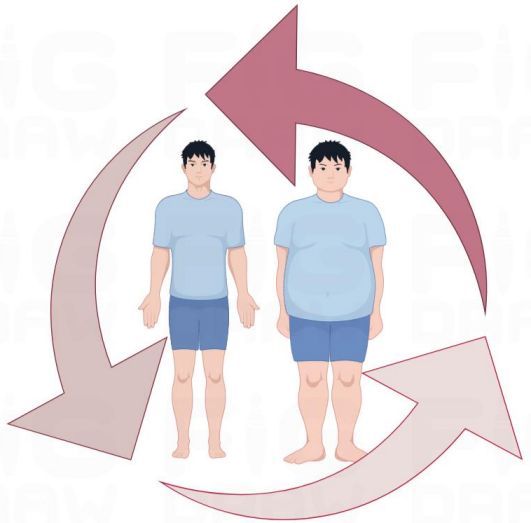
How to prevent obesity and gastric cancer





- Rational diet
- Proper exercise
- No smoking
- No alcohol

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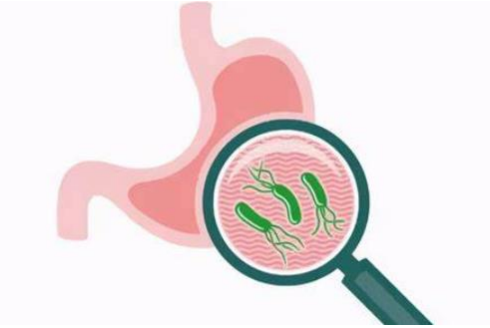
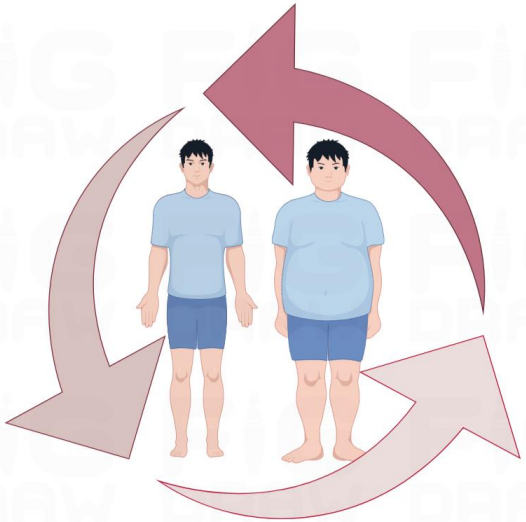
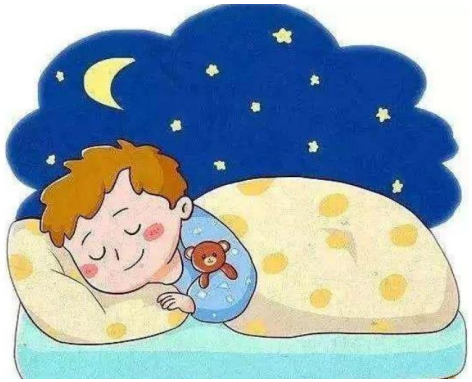
How to prevent obesity and gastric cancer







- Treatment of H-pylori
- Vegetable and fruit
- Enough sleep
- Regularity detection

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Thanks!