Съезд Congress

5-7 сентября 2018 / Санкт-Петербург
September 5-7, 2018 / St. Petersburg

Gastric ultrasound imaging for anesthetists.
Ультрасонография желудка для анестезиолога.

Bulat Tuyakov.

MD, PhD, EDRA Diploma..

Katedra Anestezjologii i Intensywnej Terapii.
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План выступления:

1. Клинические основы применения УЗИ желудка.

2. УЗИ желудка у постели больного (POCUS -Point-of-care Ultrasound).

3. УЗИ желудка и принятие решения.

4. Различные клинические ситуации.

5. Недостатки метода.

Использование УЗИ в акушерскерской анестезииологии.

Weiniger and Sharoni. The use of ultrasound in obstetric anesthesia. Curr Opin Anesthesiol 2017, 30:000–000.

Оценка дых.путей.

Катетеризация центральных вен.

Ультрасонография лёгких.

TTE (echocacardiography).

Transcranial Doppler.

Центральные блокады.

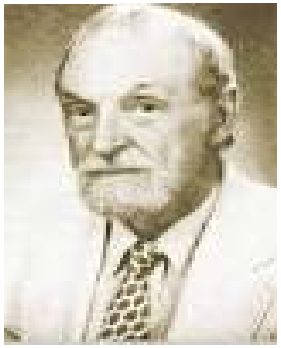
TAP/QL block.

Оценка ширины оболочки зрительного нерва (>ICP)

Оценка волемии (ширины нижней полой вены).

Ультрасонография желудка.

Aspiration and perioperative complications



CC/NUMBER 27
JULY 4, 1983

This Week's Citation Classic

Mendelson C L. The aspiration of stomach contents into the lungs during obstetric anesthesia. *Amer. J. Obstet. Gynecol.* **52**:191-205, 1946.
[Dept. Obstetrics and Gynecology, Cornell Univ. Medical Coll., and New York Hosp., NY]

This study described a new type of adult respiratory distress syndrome due to aspiration of gastric hydrochloric acid. The pertinent etiologic, pathologic, clinical, diagnostic, therapeutic, and prophylactic features were presented. [The *SCI*® indicates that this paper has been cited in over 270 publications since 1961—the 5th most-cited paper published in that journal.]

Curtis L. Mendelson
5427 Alta Way
Lake Worth, FL 33463

May 5, 1983

ting this message across was—and still is—a serious problem. Prophylactic recommendations included: withholding all oral feeding during labor; wider use of conduction anesthesia; gastric alkalinization; and emptying the stomach prior to general anesthesia. Treatment of aspiration was directed toward alleviating bronchiolar spasm, maintaining oxygenation and cardiopulmonary function, and preventing secondary bacterial infection: pneumonia and lung abscess.

"Other investigators[1-6] have confirmed the findings and have made important additional observations and recommendations.

The Royal College of Anaesthetists

The Difficult Airway Society

Aspiration and gastric content .

NAP4

- Aspiration was the single commonest cause of death in anaesthesia events. Poor judgement was the likely root cause in many cases which included elements of poor assessment of risk (patient and operation) and failure to use airway devices or techniques that would offer increased protection against aspiration. Several major events occurred when there were clear indications for a rapid sequence induction but this was not performed.

4th National Audit Project of
The Royal College of Anaesthe

Auroy Y, Benhamou D, Péquignot F, et al. Mortality related to anaesthesia in France: analysis of deaths related to airway complications. Anaesthesia. 2009;64:366–370.

Major complications of airway management in the United Kingdom

Report and findings
March 2011

Аспирация и желудочное содержимое.

смертельность 20%. Kozlow JH, Berenholtz SM, Garrett E, Dorman T, Pronovost PJ.Epidemiology and impact of aspiration pneumonia in patients undergoing surgery in Maryland, 1999–2000. Crit Care Med. 2003;31:1930–1937.
Auroy Y, Benhamou D, Péquignot F, et al. Mortality related to anaesthesia in France: analysis of deaths related to airway complications. Anaesthesia. 2009;64:366–370.

GUIDELINES

Perioperative fasting in adults and children: guidelines from the European Society of Anaesthesiology

Ian Smith, Peter Kranke, Isabelle Murat, Andrew Smith, Geraldine O'Sullivan, Eldar Søreide, Claudia Spies and Bas in't Veld

Жидкости, твердая пища и голодание

1. Summary of recommendations

	Evidence	Recommendation
Fasting in adults and children		
Adults and children should be encouraged to drink clear fluids (including water, pulp-free juice and tea or coffee without milk) up to 2h before elective surgery (including caesarean section)	1++	A
All but one member of the guidelines group consider that tea or coffee with milk added (up to about one fifth of the total volume) are still clear fluids		√
Solid food should be prohibited for 6 h before elective surgery in adults and children	1+	A
Patients with obesity, gastro-oesophageal reflux and diabetes and pregnant women not in labour can safely follow all of the above guidelines	2–	D
However, these factors may alter their overall anaesthetic management		
Patients should not ha… chewing gum, suckin… of anaesthesia		
The above is based so… nicotine gum and pa…		
Fasting in infants		
Infants should be fed … other milks up to 6 h…		
Prokinetic and other p…		
There is insufficient ev… antacids, metoclopra… non-obstetric patient…		
An H_2-receptor antago… elective caesarean s…		
The guidelines group r… such as changes in …		
An intravenous H_2-rece… section; this should … if general anaesthes…		
The guidelines group r… such as changes in …		
Oral carbohydrates		
It is safe for patients (… 2h before elective su…		
The evidence for safety… use (predominantly …		
Drinking carbohydrate-… well being, reduces t…		
To date, there is little c…		
Fasting in obstetric pa…		
Women should be allo…		
Solid food should be c…		
The guidelines group r… especially low-risk w…		
Postoperative resumpt…		
Adults and children should be allowed to resume drinking as soon as they wish after elective surgery. However, fluid intake should not be insisted upon before allowing discharge from a day or ambulatory surgery facility	1++	A

√, recommended best practice based on the clinical experience of the guidelines development group.

PREOPERATIVE FASTING	
Ingested Material	Minimum Fasting Period
Clear liquids	2 hours
Breast milk	4 hours
Infant formula	6 hours
Nonhuman milk	6 hours
Light meal	6 hours

Continuing Education in Anaesthesia, Critical Care & Pain Advance Access published November 21, 2013

Aspiration under anaesthesia: risk assessment and decision-making

Michael Robinson MB ChB FRCA
Andrew Davidson MA MBBS FRCA FFICM

Revalidation
FOR ANAESTHETISTS
RCA Revalidation matrix
Matrix reference 1C01, 1103, 2A03

Box 1 Risk factors for aspiration (adapted from Asai[6] with permission from the British Journal of Anaesthesia)

Patient factors
- (a) Full stomach
  - · Emergency surgery
  - · Inadequate fasting time
  - · Gastrointestinal obstruction
- (b) Delayed gastric emptying
  - · Systemic diseases, including diabetes mellitus and chronic kidney disease
  - · Recent trauma
  - · Opioids
  - · Raised intra-cranial pressure
  - · Previous gastrointestinal surgery
  - · Pregnancy (including active labour)
- (c) Incompetent lower oesophageal sphincter
  - · Hiatus hernia
  - · Recurrent regurgitation
  - · Dyspepsia
  - · Previous upper gastrointestinal surgery
  - · Pregnancy
- (d) Oesophageal diseases
  - · Previous gastrointestinal surgery
  - · Morbid obesity

Полный желудок и замедленное опорожнение желудка
- главные факторы аспирации.

Surgical factors
- · Upper gastrointestinal surgery
- · Lithotomy or head down position
- · Laparoscopy
- · Choleocystectomy

Anaesthetic factors
- · Light anaesthesia
- · Supra-glottic airways
- · Positive pressure ventilation
- · Length of surgery > 2 h
- · Difficult airway

Device factors
- · First-generation supra-glottic airway devices

Понимание и акцептация предоперационной голодовки.

Только 44% пациентов полностью понимает цель голодовки.

4% пациентов готовы рассмотреть вопрос о том, чтобы сказать неправду, если им было неудобно отложить операцию.

5% пациентов в день не приходят натощак, не постясь.

13% детей ест до операции.

10% пациентов считают, что дооперационный пост не включает сладости и напитки.

H. Walker et al. Patients' understanding of pre-operative fasting. Anaetsh .Intensive Care 2006 Jun;34(3):358-61.

Cantellow S, Lightfoot J, Bould H, Beringer R. Parents' understanding of and compliance with fasting instruction for pediatric day case surgery**.** *Paediatr Anaesth. 2012 Sep; 22(9):897-900.*

Table III. Patients' perception of and attitudes toward preoperative fasting.

Question	No. (%)
How important do you think it is to comply with preoperative fasting?*	
Very important	83 (64.3)
Important	38 (29.5)
Somewhat important	7 (5.4)
Not important	1 (0.8)
Do you think that following preoperative fasting instructions is necessary to avoid life-threatening problems?†	
Yes	103 (80.5)
No	25 (19.5)
Did you fast before your surgery today?	
Yes	128 (98.5)
No	2 (1.5)
If you fasted, how long did you fast for?†	
< 6 hrs	4 (3.1)
6–12 hrs	110 (85.9)
> 12 hrs	14 (10.9)
If you did not follow fasting instructions, and knew that your surgery will be delayed or postponed because of this, would you lie about fasting to your doctors and nurses?	
Yes	22 (16.9)
No	108 (83.1)

*1 patient did not provide an answer to this question. †2 patients did not provide an answer to these questions.

Original Article

Singapore Med J 2014; 55(1): 18-23
doi:10.11622/smedj.2014006

An audit of preoperative fasting compliance at a major tertiary referral hospital in Singapore

Hsien Jer Lim[1], MBBS, MMed, *Hanjing Lee*[2], MBBS, MMed, *Lian Kah Ti*[1,3], MBBS, MMed

Потенциальные возможности УЗ в визуализации желудка

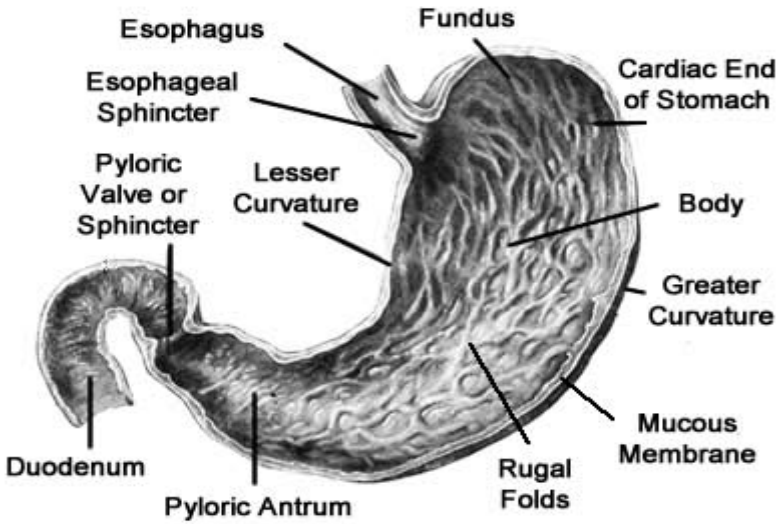
Оценка желудка в отделении реаниматологии.
Оценка гастропареза в отделении реаниматологии.
Даёт информацию о характере содержимого желудка и его обьёме у постели больного.
Является детектором инсуффляции желудка во время вентиляции маской.
Метод может помочь в определении характера желудочного содержимого (пустой желудок, жидкость в желудке, твёрдая пища)и может помочь в принятии решения относительно времени проведения операции и способа индукции общего обезболивания- Rapid Sequence Induction.

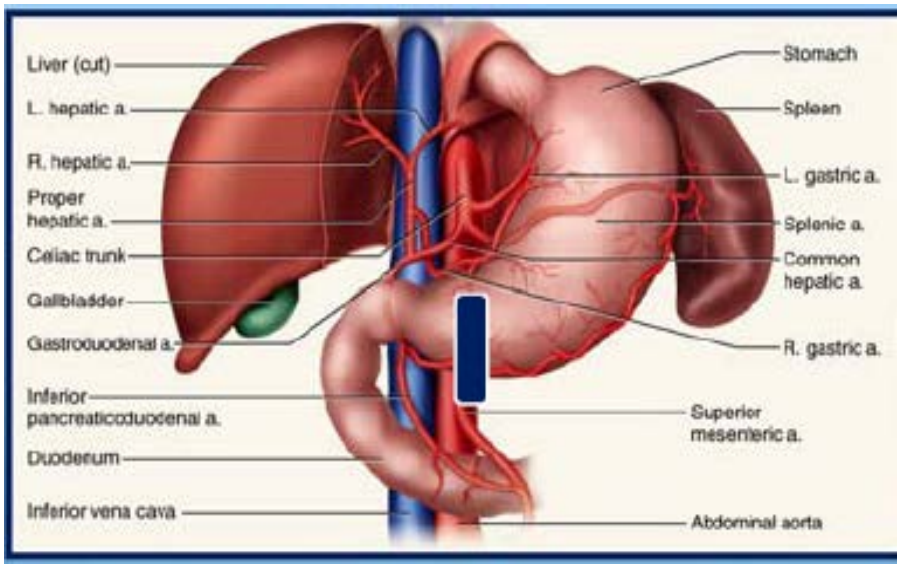
Clinical Indications for Gastric US

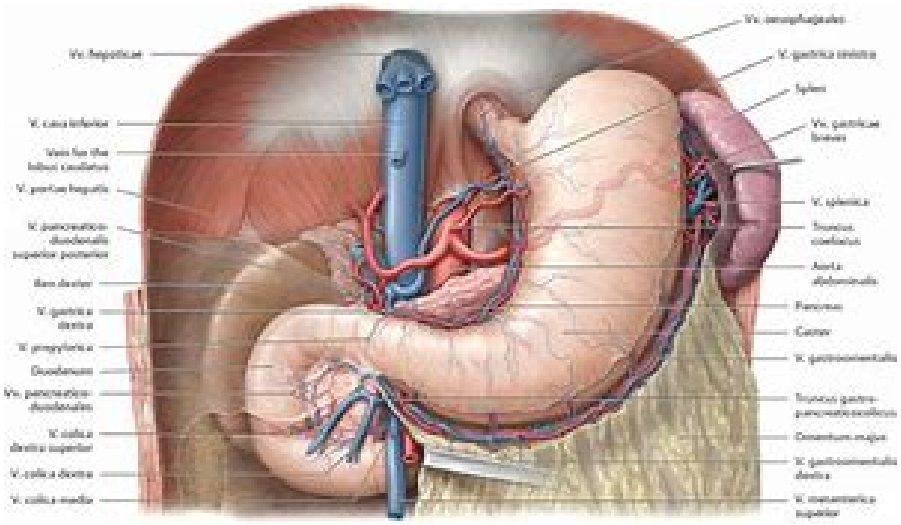
	Systemic Disease	Unconfirmed NPO Status	Special Patient Populations
Examples	• Diabetic gastroparesis • End-stage renal or liver disease • Critical illness • Neuromuscular disorders	• Language barriers • Altered mental status (dementia, delirium, trauma) • Inconsistent history	• Severe obesity • Pediatrics (communication difficulties, lack of appreciation of risk) • Obstetrics (prolonged gastric emptying)

Stomach anatomy

Antrum -proximal dilatation part of pyloris





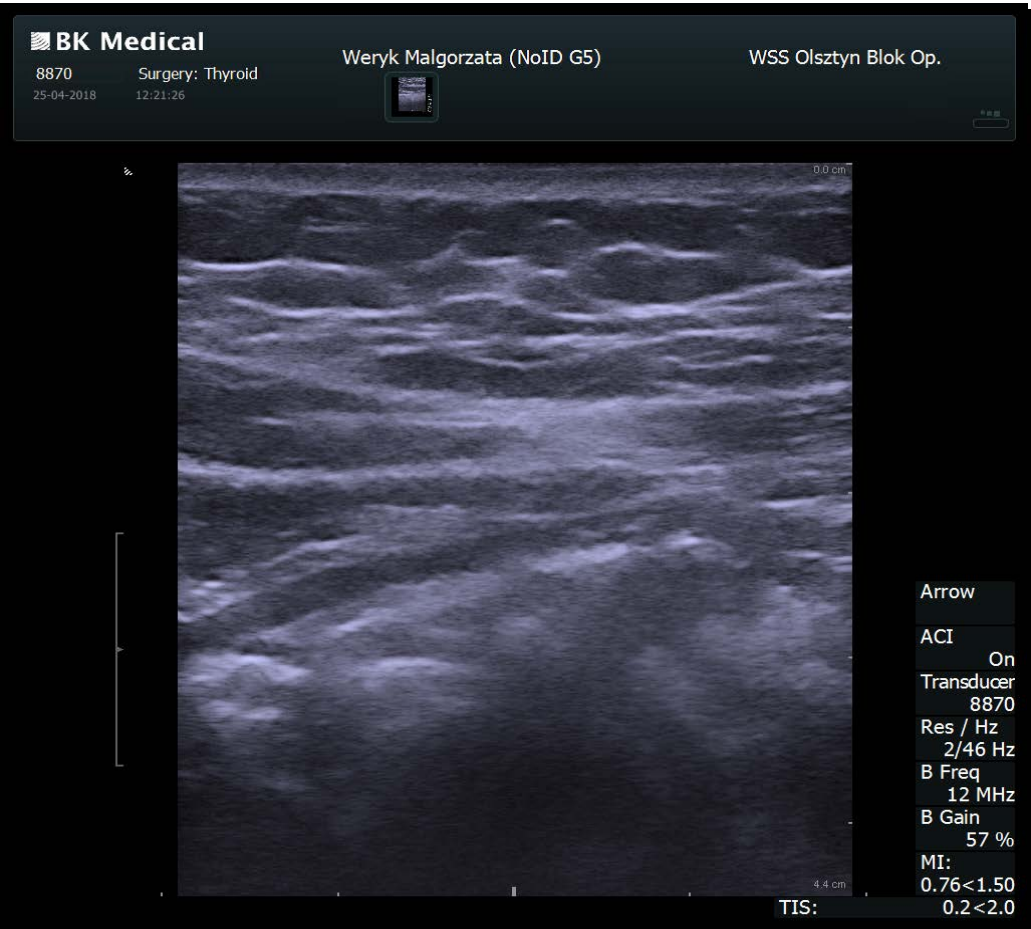


Gray"s Anatomy..

www.gastricultrasound.org

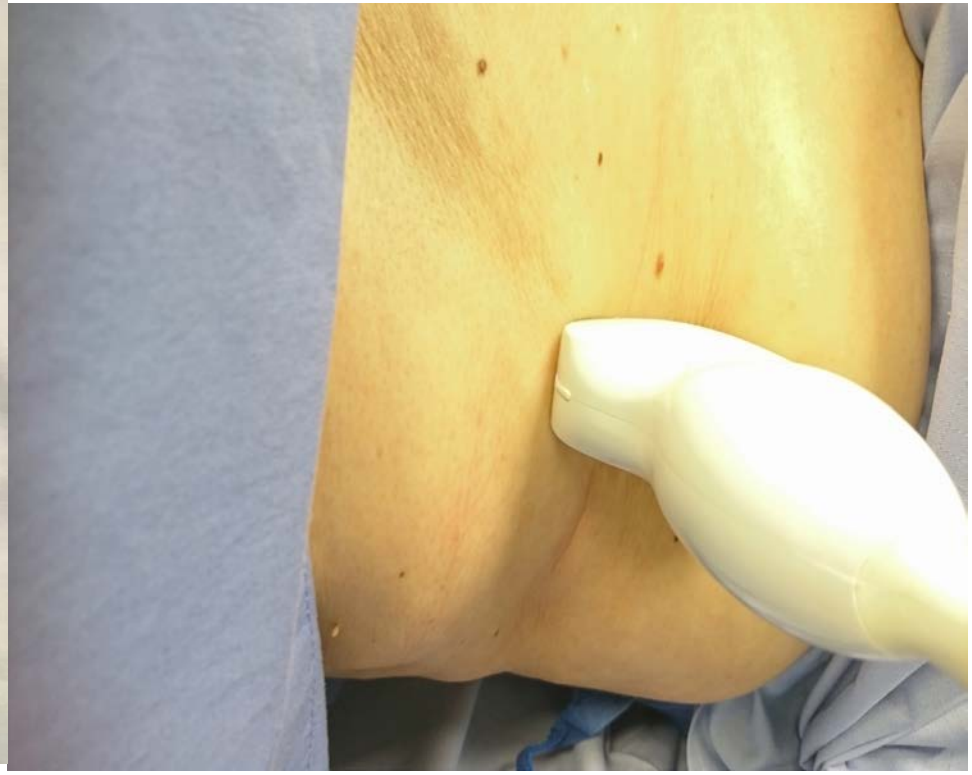
VOLUME (ML) = 27.0 + 14.6 X RIGHT-LAT CSA – 1.28 X AGE

Выбор датчика.
Датчик линеарный или датчик типа convex.



Использование линеарного датчика, позиция на спине.

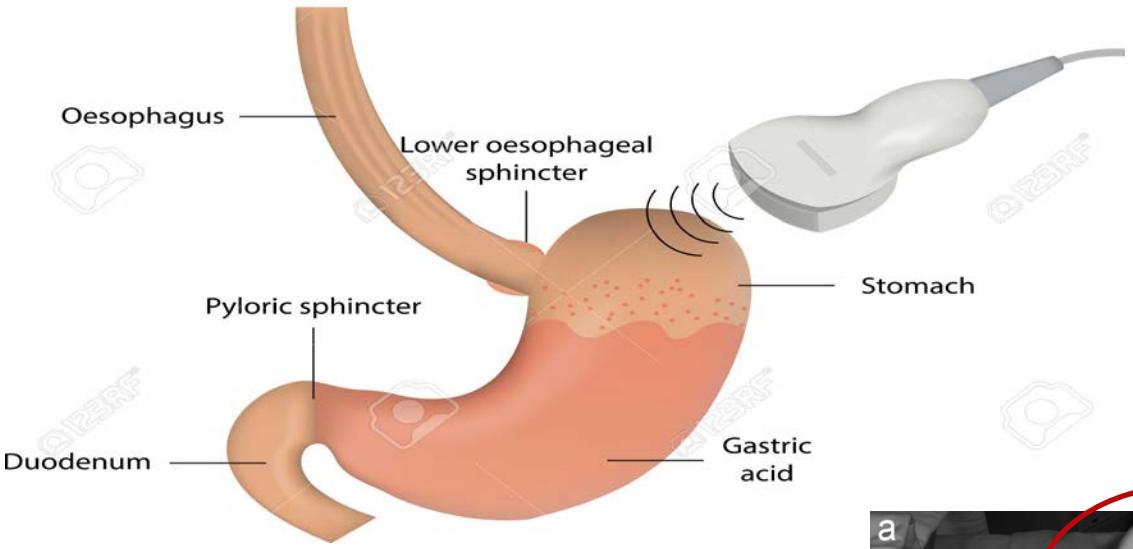
Использование датчика convex, позиция на правом боку.

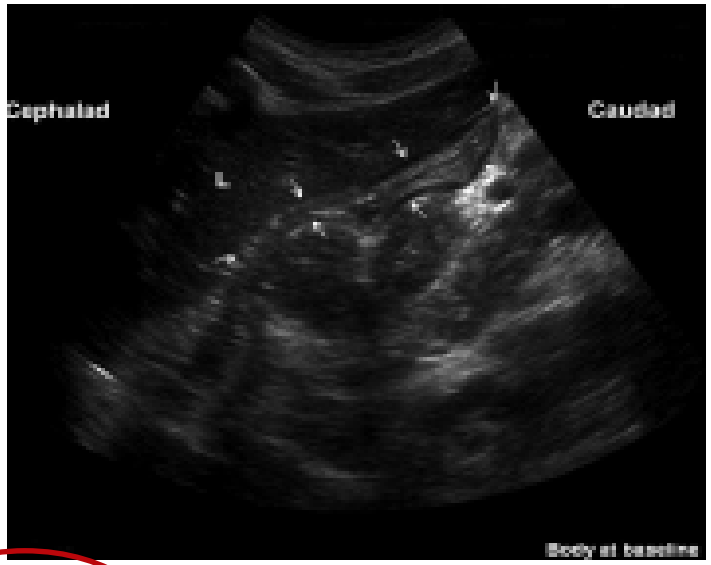


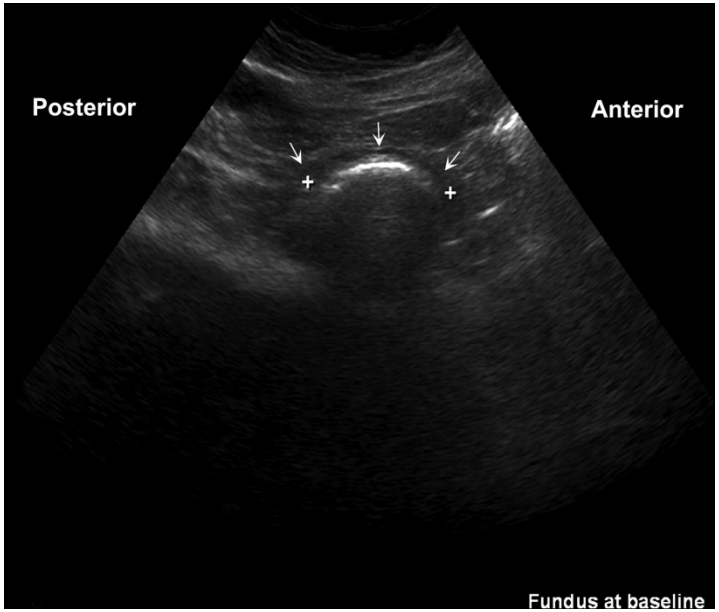
Слои желудочной стенки:

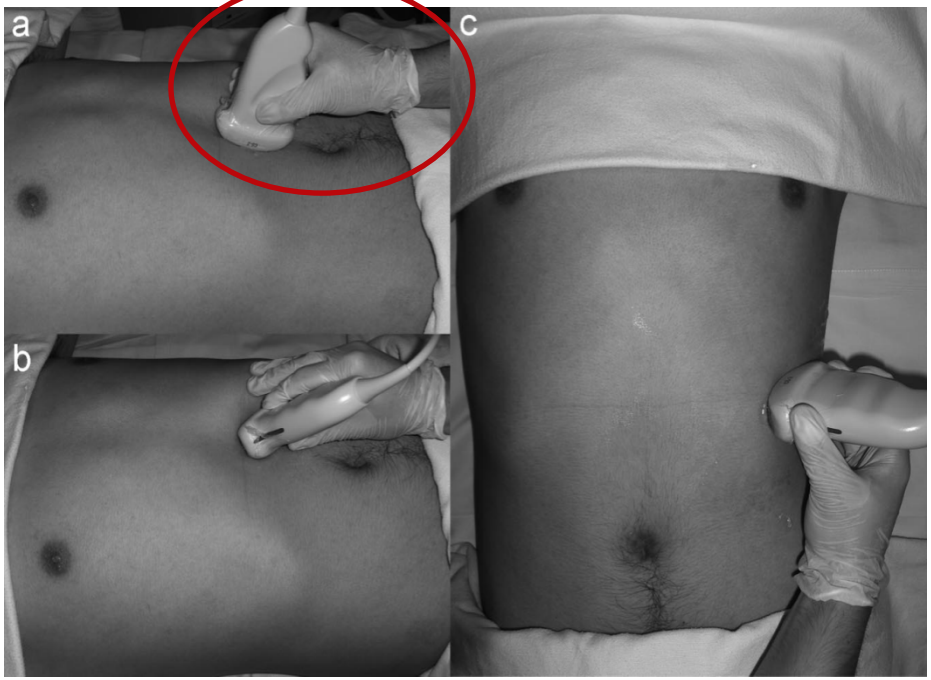
серозная оболочка(тонкая гиперэхогеническая)
мышечная оболочка(широкая гипоэхогеническая)
подслизистая оболочка(тонкая гиперэхогеническая)
подслизистая оболочка(тонкая гипоэхогеническая)
подмышечная слизистая оболочка(гипоэхогеническая)
слизистая оболочка-воздух (тонкая гиперэхогеническая)

Ultrasound Scan of the Stomach

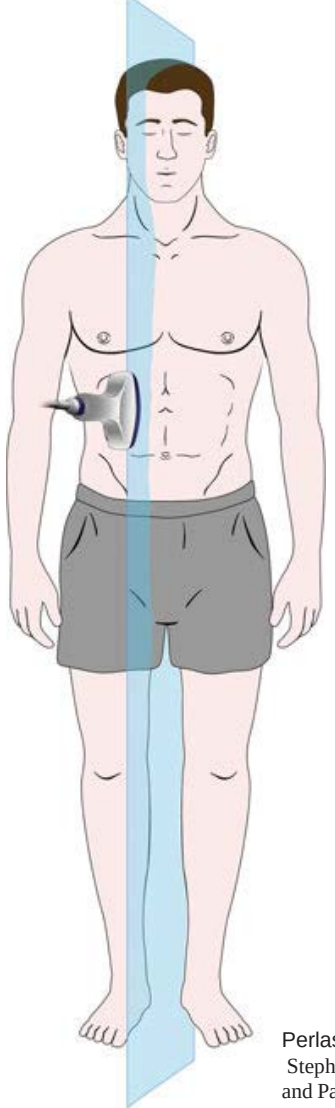


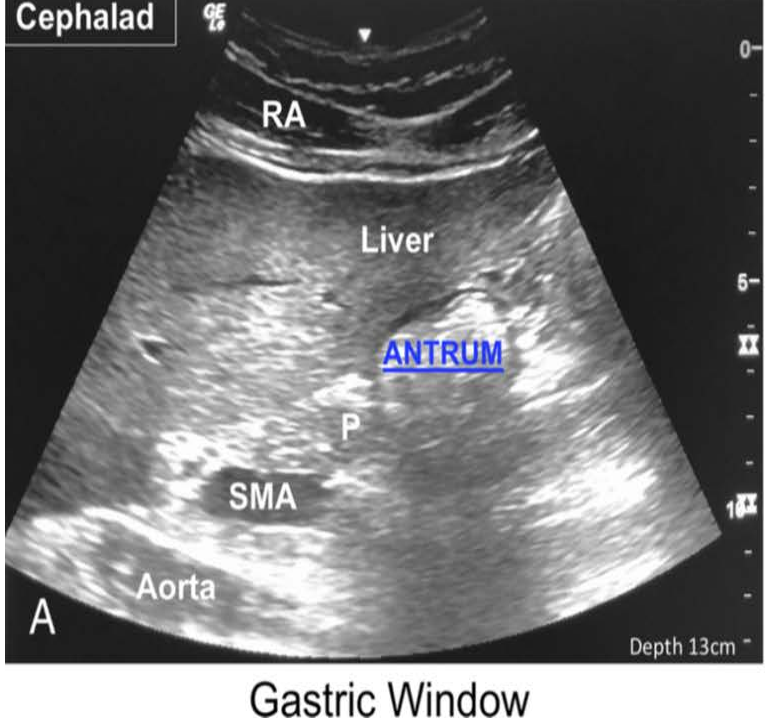




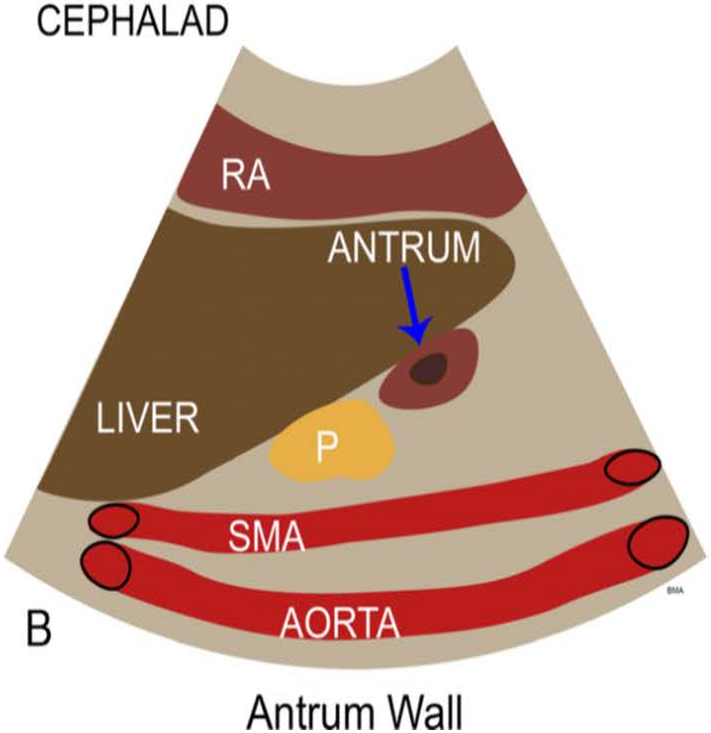


Соноанатомия антральной части желудка.





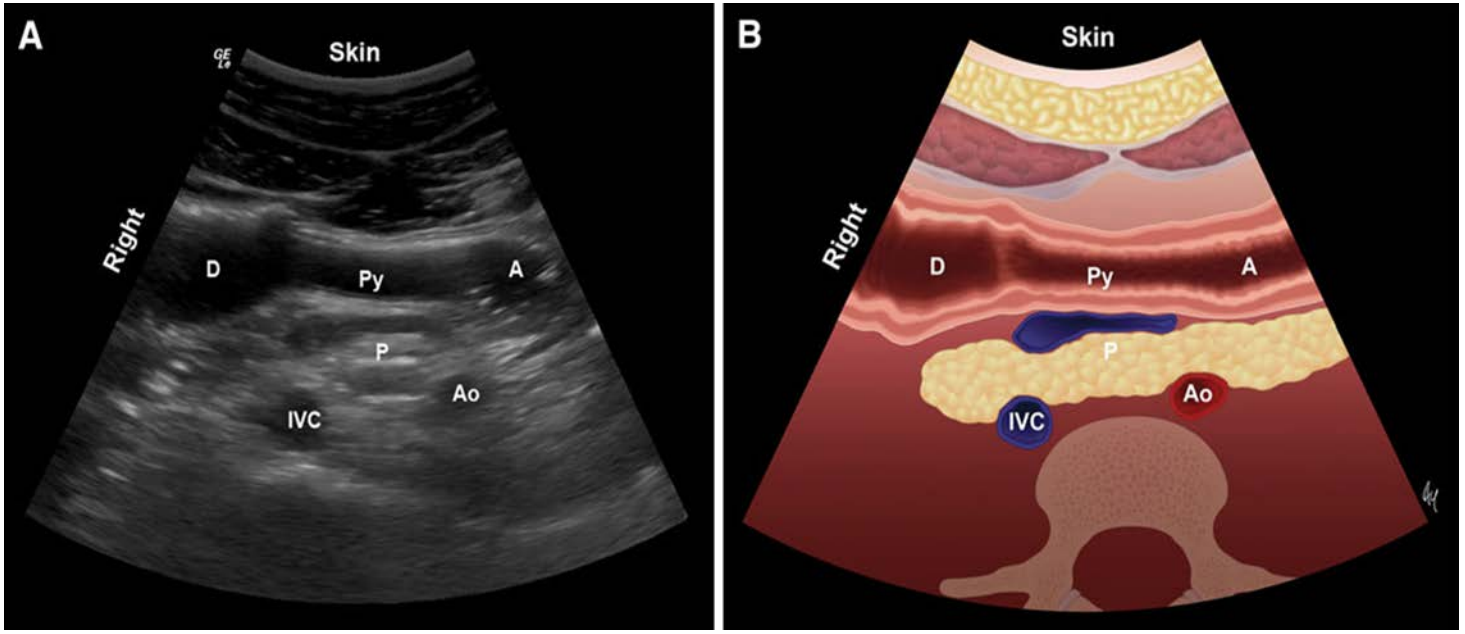
Gastric Window



Antrum Wall

Perlas A,Mitsakakis N, Liu L, et al. Validation of a mathematical model for ultrasound assessment of gastric volume by gastroscopic examination. Anesth Analg. 2013;116:3
Stephen C. Haskins, Richelle Kruisselbrink, Jan Boublik, Christopher L. Wu, Anahi Perlas.Gastric Ultrasound for the Regional Anesthesiologist and Pain Specialist. Regional Anesthesia and Pain Medicine. Volume 43, Number 7, October 2018

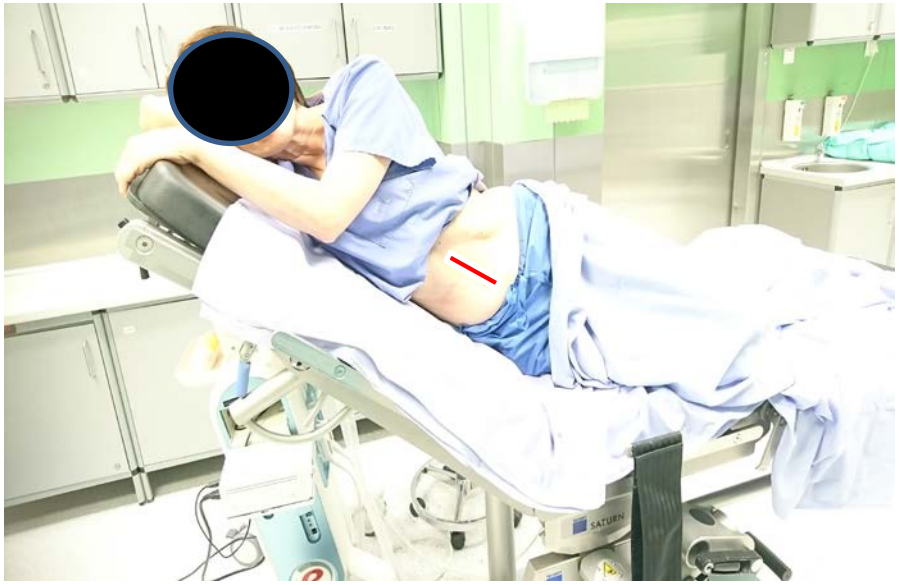
Желудок в поперечной проекции.

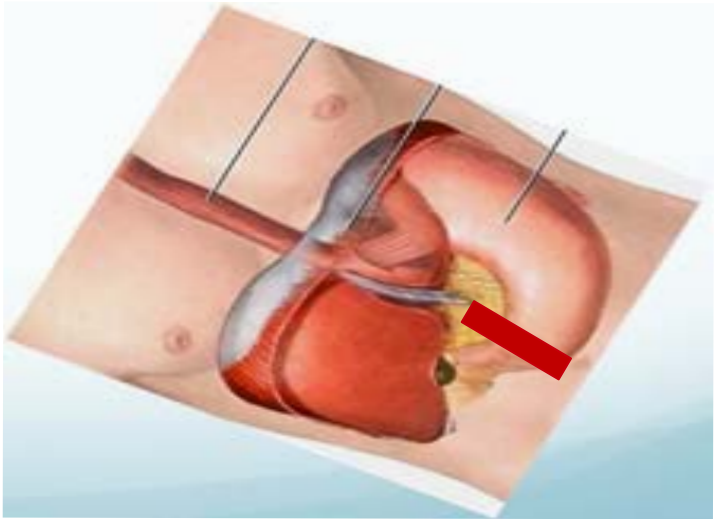


Perlas A,Mitsakakis N, Liu L, et al. Validation of a mathematical model for ultrasound assessment of gastric volume by gastroscopic examination. Anesth Analg. 2013;116:357–363.

Значение позиции пациента.

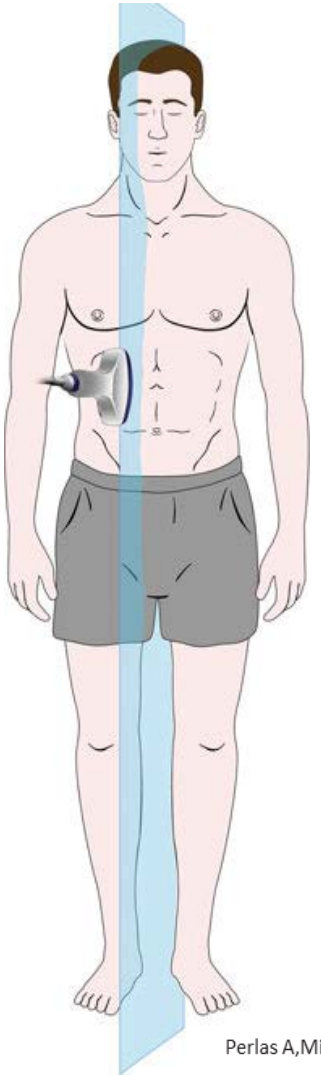
Желудочное содержимое под действием гравитации передвигается в антрум.

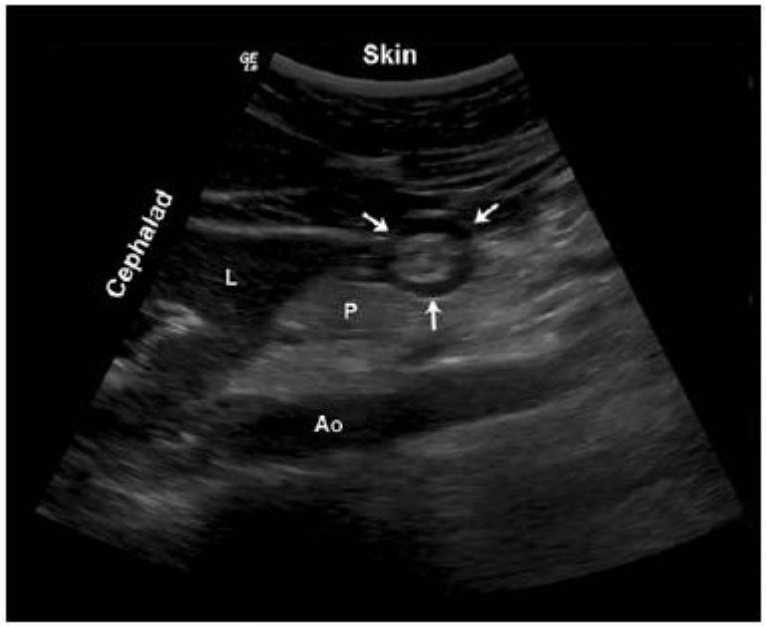




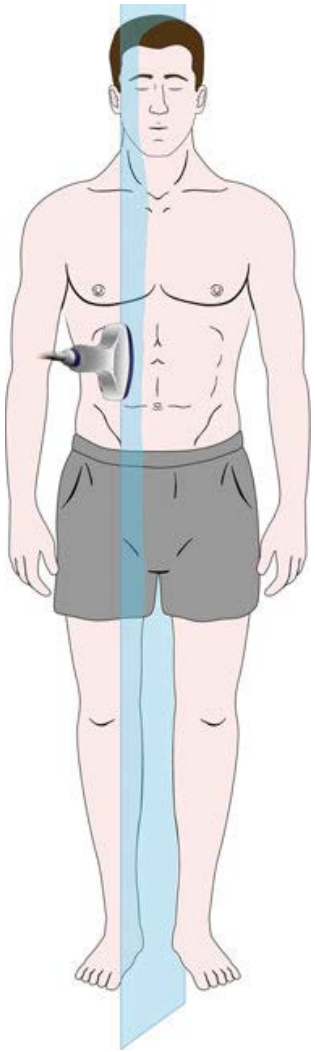
1. Желудочное содержимое быстрее передвигается дистальную часть желудка.
2. Лучшая визуализация желудочного содержимого в этой позиции.
3. Зависимость между обьёмом жидкости во всём желудке и антрум более точнная в этой позиции.
4. Лучшая возможность рассчитать зависимость между обьёмом желудка, веком и величиной антрум.

Пустой желудок.

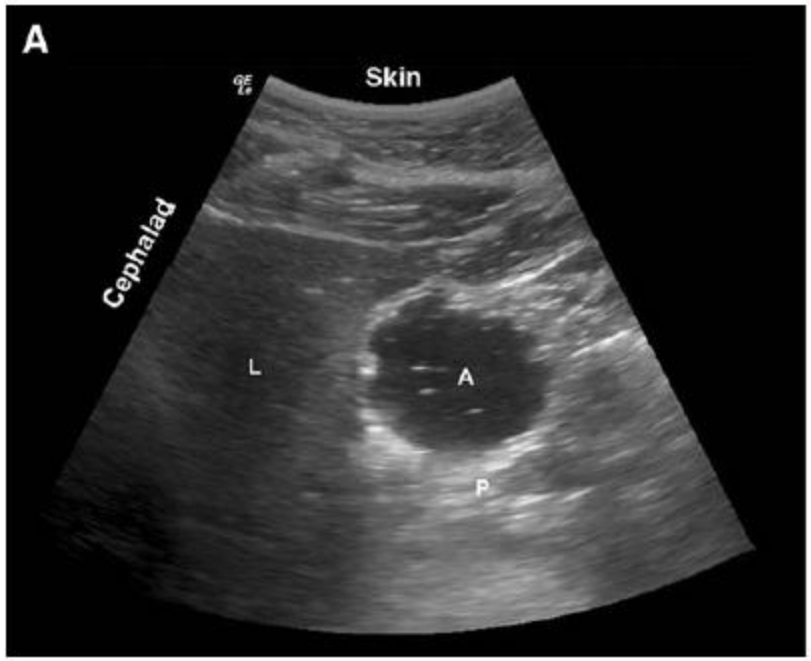




Perlas A,Mitsakakis N, Liu L, et al. Validation of a mathematical model for ultrasound assessment of gastric volume by gastroscopic examination. Anesth Analg. 2013;116:357–363.

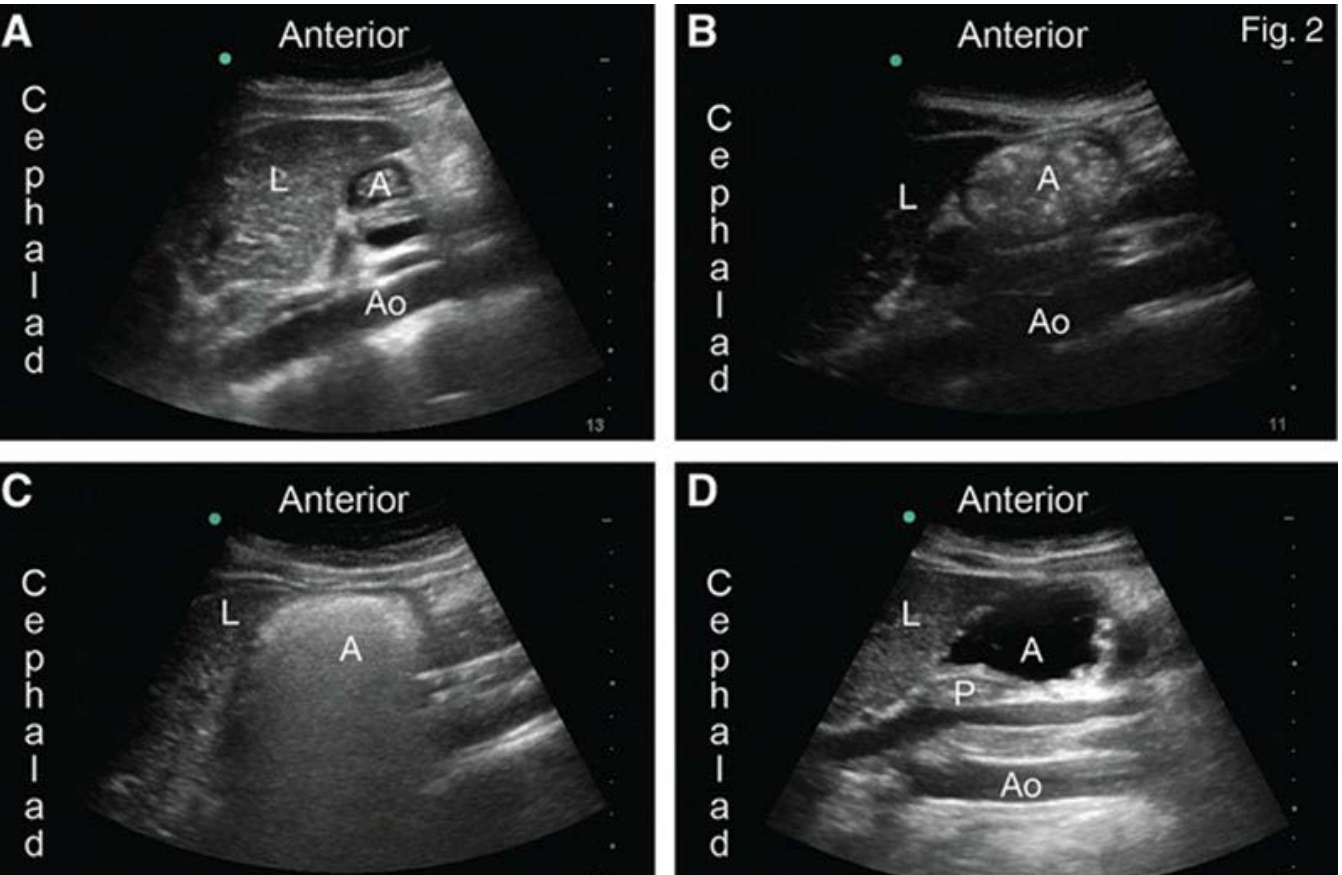


Прозрачная жидкость в желудке.



Твёрдое содержимое в желудке.


Fig .1


A
Anterior
Cephalad
L
A
Ao
13
B
Anterior
Fig. 2
Cephalad
L
A
Ao
11
C
Anterior
Cephalad
L
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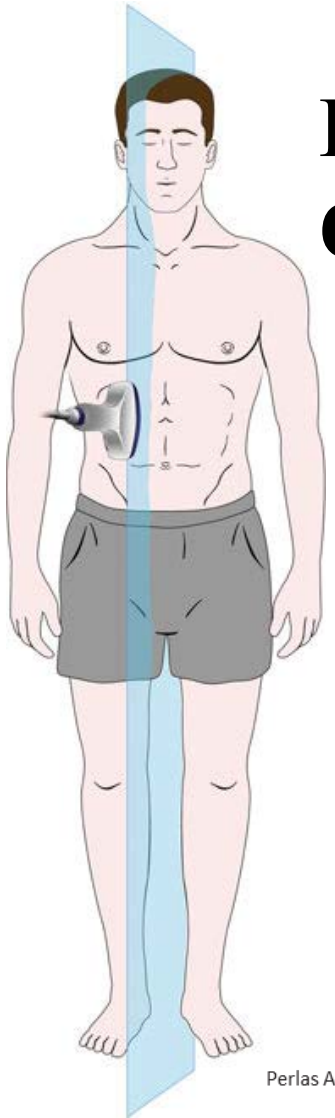
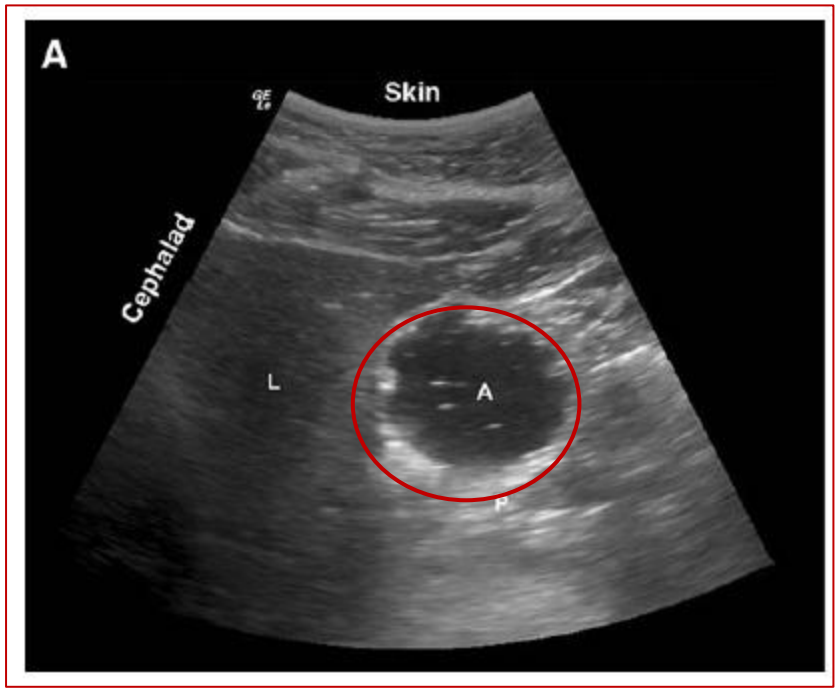


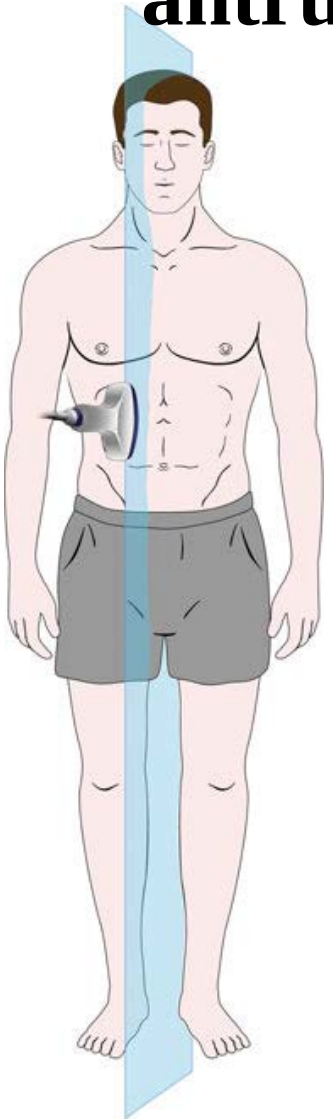
Расчет площади поверхности антрума

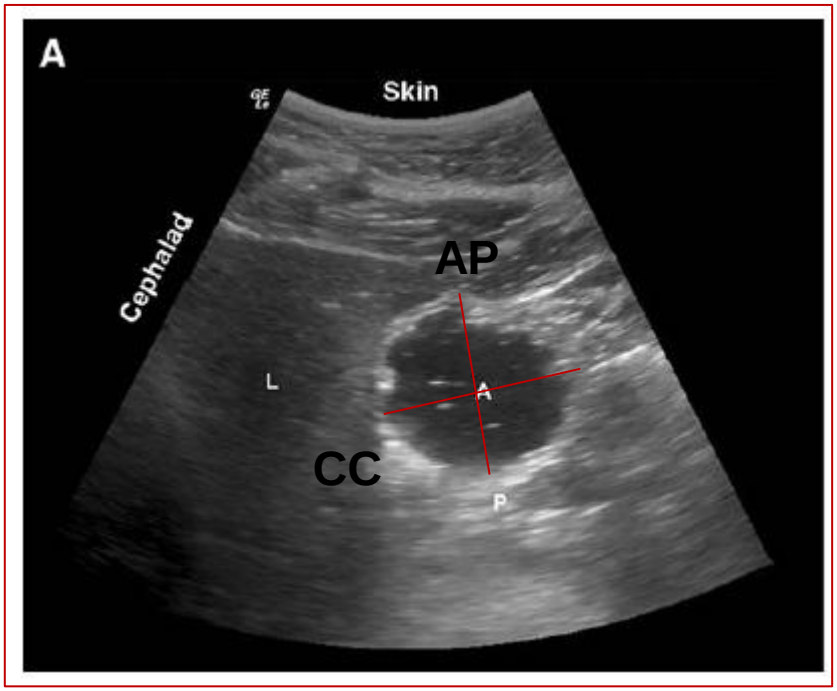
CSA= (AP x CC x π) / 4



Perlas A,Mitsakakis N, Liu L, et al. Validation of a mathematical model for ultrasound assessment of gastric volume by gastroscopic examination. Anesth Analg. 2013;116:357–363.

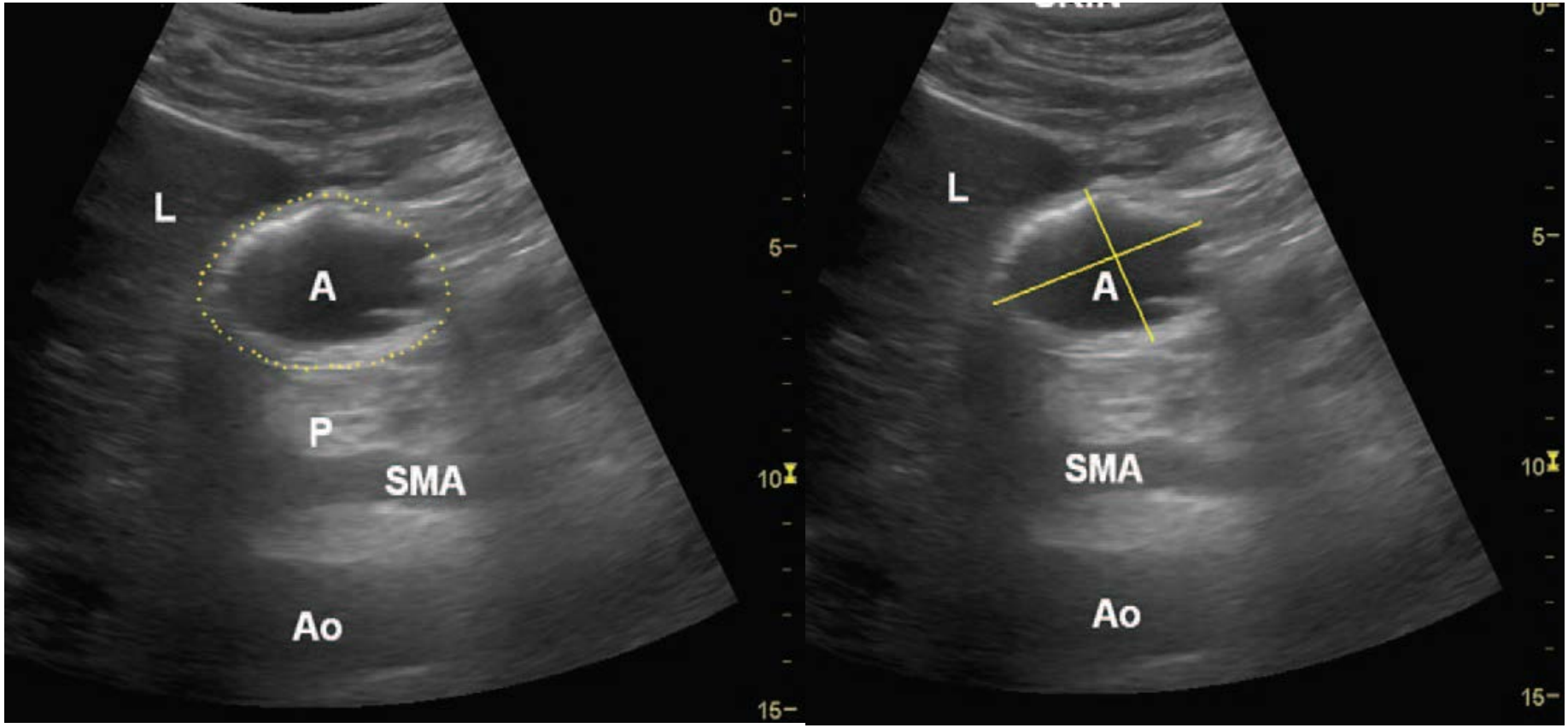
The calculation of the surface area of the antrum CSA= (AP x CC x π) / 4



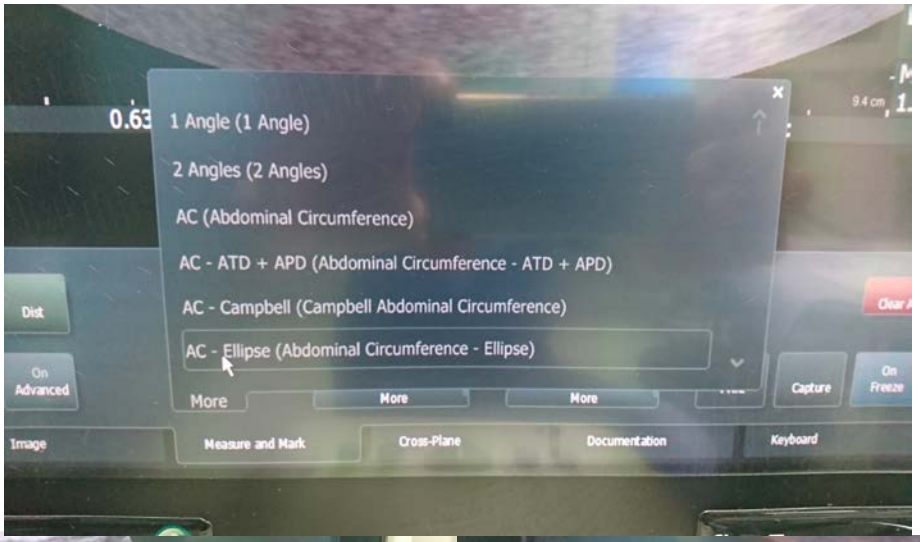


Perlas A,Mitsakakis N, Liu L, et al. Validation of a mathematical model for ultrasound assessment of gastric volume by gastroscopic examination. Anesth Analg. 2013;116:357–363.

Оба метода могут быть использованы для расчета поверхности антрума.



Perlas A,Mitsakakis N, Liu L, et al. Validation of a mathematical model for ultrasound assessment of gastric volume by gastroscopic examination. Anesth Analg. 2013;116:357–363.


1 Angle (1 Angle)
2 Angles (2 Angles)
AC (Abdominal Circumference)
AC - ATD + APD (Abdominal Circumference - ATD + APD)
AC - Campbell (Campbell Abdominal Circumference)
AC - Ellipse (Abdominal Circumference - Ellipse)
More
Dist
On Advanced
Capture
On Freeze
Image
Measure and Mark
Cross-Plane
Documentation
Keyboard


Arrow
ACI
On
Transducer
8862
Res / Hz
2/27 Hz
B Freq
6.5 MHz
B Gain
56 %
MI:
1.26<1.50
TIS:
0.7<2.0
Dist 0.63 mm
Area 4.74 cm²
Vol 10.4 cm³


Dist
0.63 mm
Ellipse
Freehand
Angle
More
Left
Right
Gallbladder
Cyst
Pancreas
Duct
Print
Image
Measure and Mark
Cross-Plane
Documentation
bk medical

Оценка объема содержимого желудка

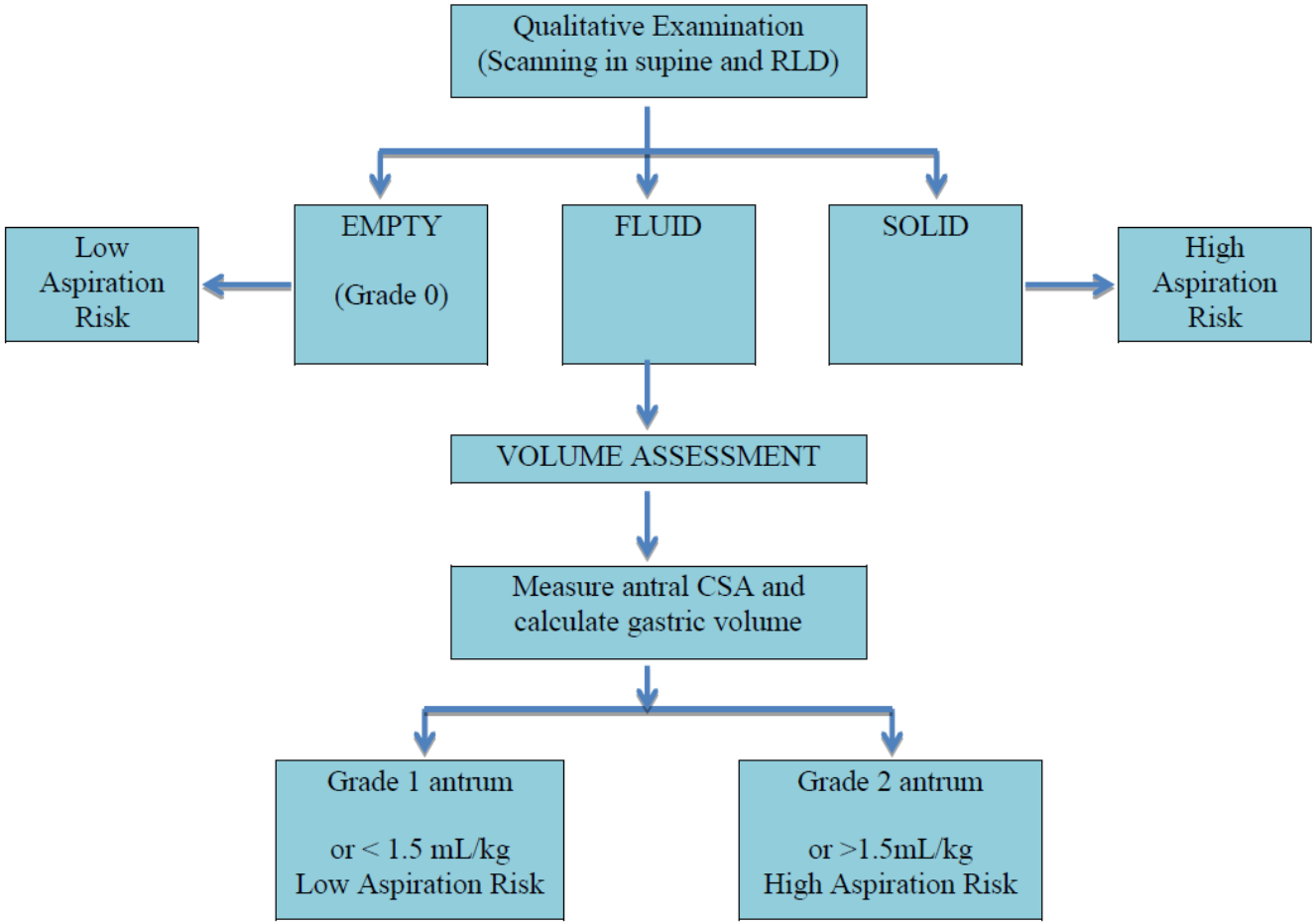
surface area -CSA **(AP x CC x π)/4**

AP is the anteroposterior diameter and CC is the craniocaudal diameter.

Right lat CSA	Age(y) 20	30	40	50	60	70	80
2	31	18	5	0	0	0	0
3	45	32	20	7	0	0	0
4	60	47	34	21	9	0	0
5	74	62	49	36	23	10	0
6	89	76	63	51	38	25	12
7	103	91	78	65	52	40	27
8	118	105	93	80	67	54	41
9	133	120	107	94	82	69	56
10	147	135	122	109	96	83	71
11	162	149	136	123	111	98	85
12	177	164	151	138	125	113	100
13	191	178	165	153	140	127	114
14	206	193	180	167	155	142	129
15	220	207	194	182	169	156	143
16	235	222	209	200	184	171	158
17	249	236	224	211	198	185	173
18	164	251	239	226	213	200	187
19	278	266	253	240	227	214	202
20	293	281	268	255	242	229	217
21	307	295	282	269	256	244	231
22	323	310	297	284	271	259	246
23	337	324	311	298	285	273	260
24	352	339	326	313	301	288	275
25	366	353	340	327	315	302	289
26	381	368	355	343	330	317	304
27	395	382	369	357	344	331	318
28	410	397	385	372	359	346	333
29	424	411	398	386	373	360	347
30	439	427	414	401	388	375	363

Perlas A, Mitsakakis N, Liu L, et al. Validation of a mathematical model for ultrasound assessment of gastric volume by gastroscopic examination. Anesth Analg 2013; 116(2):357-363.

Диагностический алгоритм.



УЗИ желудка и организация работы операционного блока.

Провести запланированую операцию.

Отложить запланированую операцию
(и через сколько часов провести).

Отменить операцию
(переложить на другой день).

УЗИ желудка и организация работы операционного блока.

Table 2 Detailed pre-test and post-test anesthetic management plan

Post-test anesthetic management	Pre-test anesthetic plan (n = 38)			
	Cancel (n = 7)	Delay (n = 23)	Proceed (n = 8)	P value[1]
Cancel (n = 8)	2 (28.6)	6 (26.1)	0 (0.0)	
Delay (n = 14)	0 (0.0)	10 (43.5)	4 (50.0)	0.008
Proceed (n = 16)	5 (71.4)	7 (30.4)	4 (50.0)	

[1] From Bowker's test of symmetry. Data are expressed as n (%)

In summary, this prospective case series suggests that a standardized point-of care gastric ultrasound examination informs anesthesiologists' perceived level of aspiration risk and leads to changes in anesthetic management in a significant proportion of elective patients who did not follow fasting instructions.

Can J Anesth/J Can Anesth (2015) 62:1188–1195
DOI 10.1007/s12630-015-0449-1

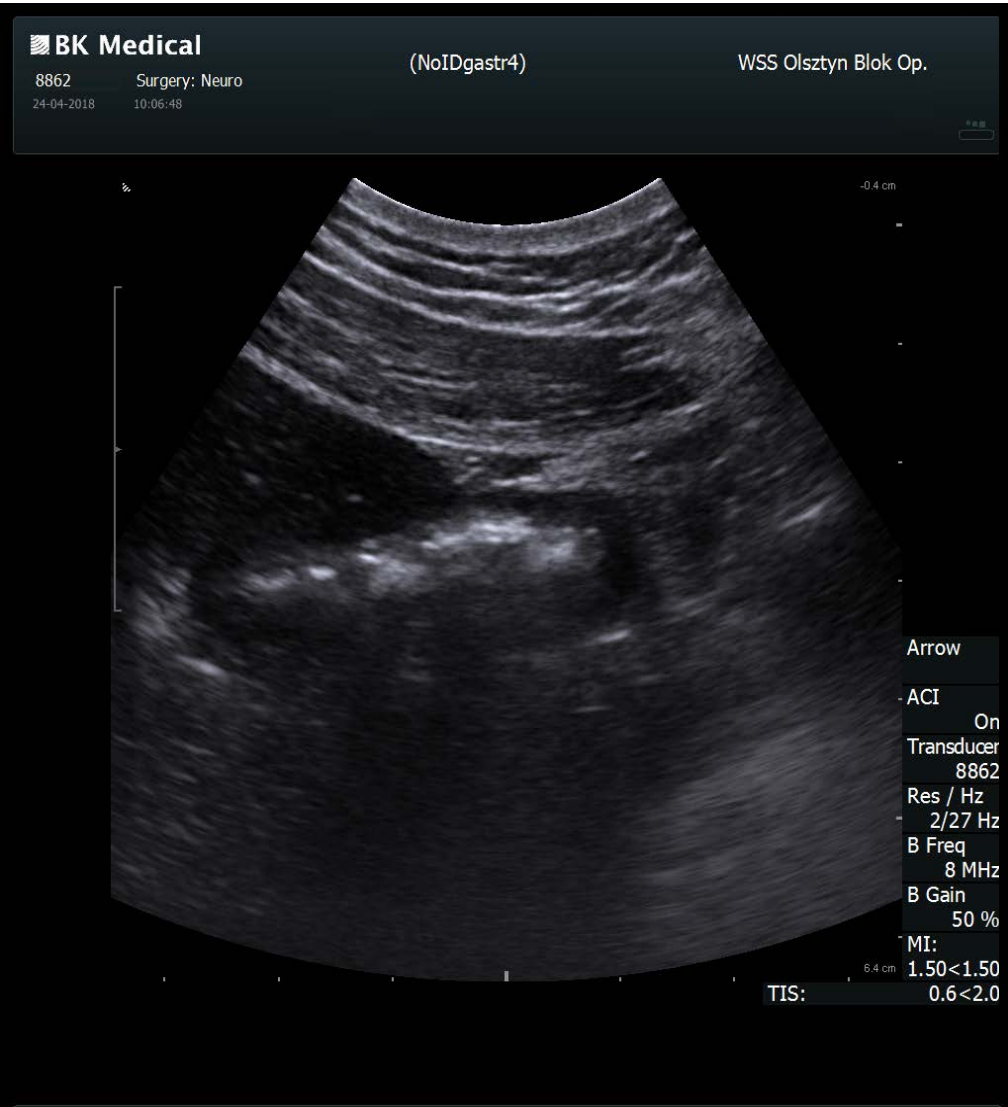
REPORTS OF ORIGINAL INVESTIGATIONS

Point-of-care ultrasound defines gastric content and changes the anesthetic management of elective surgical patients who have not followed fasting instructions: a prospective case series

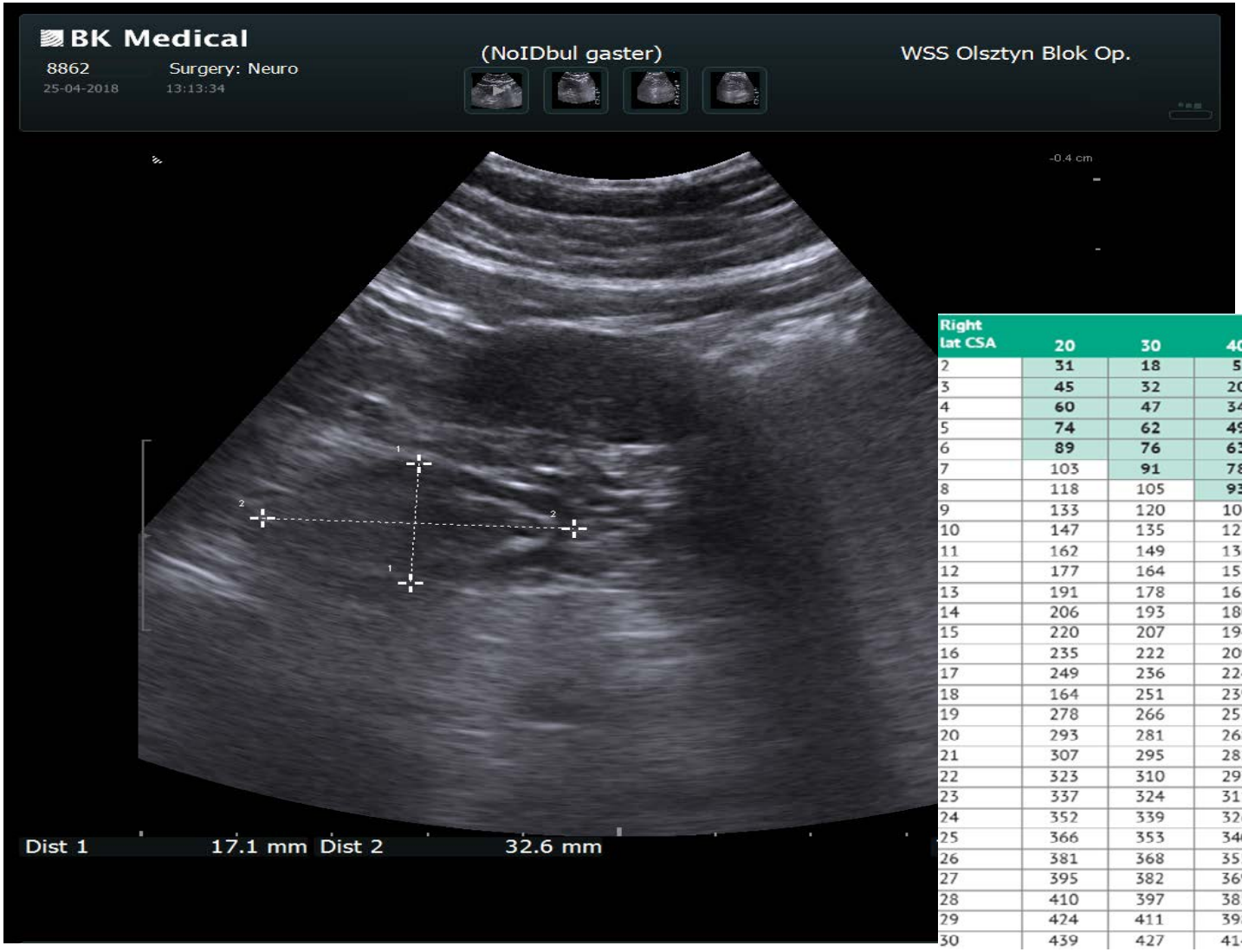
L'échographie au chevet détermine le contenu gastrique et modifie la prise en charge anesthésique des patients de chirurgie non urgente qui n'ont pas respecté les consignes de jeûne: une série de cas prospective

Husni Alakkad, MBBS · Richelle Kruisselbrink, MD · Ki Jinn Chin, MD · Ahtsham U. Niazi, MBBS · Sherif Abbas, MD · Vincent W. S. Chan, MD · Anahi Perlas, MD

Перед и после выпития 330мл йогурта.



Пациент 1,5 часа назад выпил 200мл воды.
Размер поверхности-4,38.
Остаточный обьём прозрачной жидкости- 36мл.
Пациент едет в операционную.



Right lat CSA	Age(y) 20	30	40	50	60	70	80
2	31	18	5	0	0	0	0
3	45	32	20	7	0	0	0
4	60	47	34	21	9	0	0
5	74	62	49	36	23	10	0
6	89	76	63	51	38	25	12
7	103	91	78	65	52	40	27
8	118	105	93	80	67	54	41
9	133	120	107	94	82	69	56
10	147	135	122	109	96	83	71
11	162	149	136	123	111	98	85
12	177	164	151	138	125	113	100
13	191	178	165	153	140	127	114
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27	395	382	369	357	344	331	318
28	410	397	385	372	359	346	333
29	424	411	398	386	373	360	347
30	439	427	414	401	388	375	363

Плановая операция перенесена на 2 часа. CSA-8,73, 25 лет.

Right lat CSA	Age(y) 20	30	40	50	60	70	80
2	31	18	5	0	0	0	0
3	45	32	20	7	0	0	0
4	60	47	34	21	9	0	0
5	74	62	49	36	23	10	0
6	89	76	63	51	38	25	12
7	103	91	78	65	52	40	27
8	118	105	93	80	67	54	41
9	133	120	107	94	82	69	56
10	147	135	122	109	96	83	71
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12	177	164	151	138	125	113	100
13	191	178	165	153	140	127	114
14	206	193	180	167	155	142	129
15	220	207	194	182	169	156	143
16	235	222	209	200	184	171	158
17	249	236	224	211	198	185	173
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26	381	368	355	343	330	317	304
27	395	382	369	357	344	331	318
28	410	397	385	372	359	346	333
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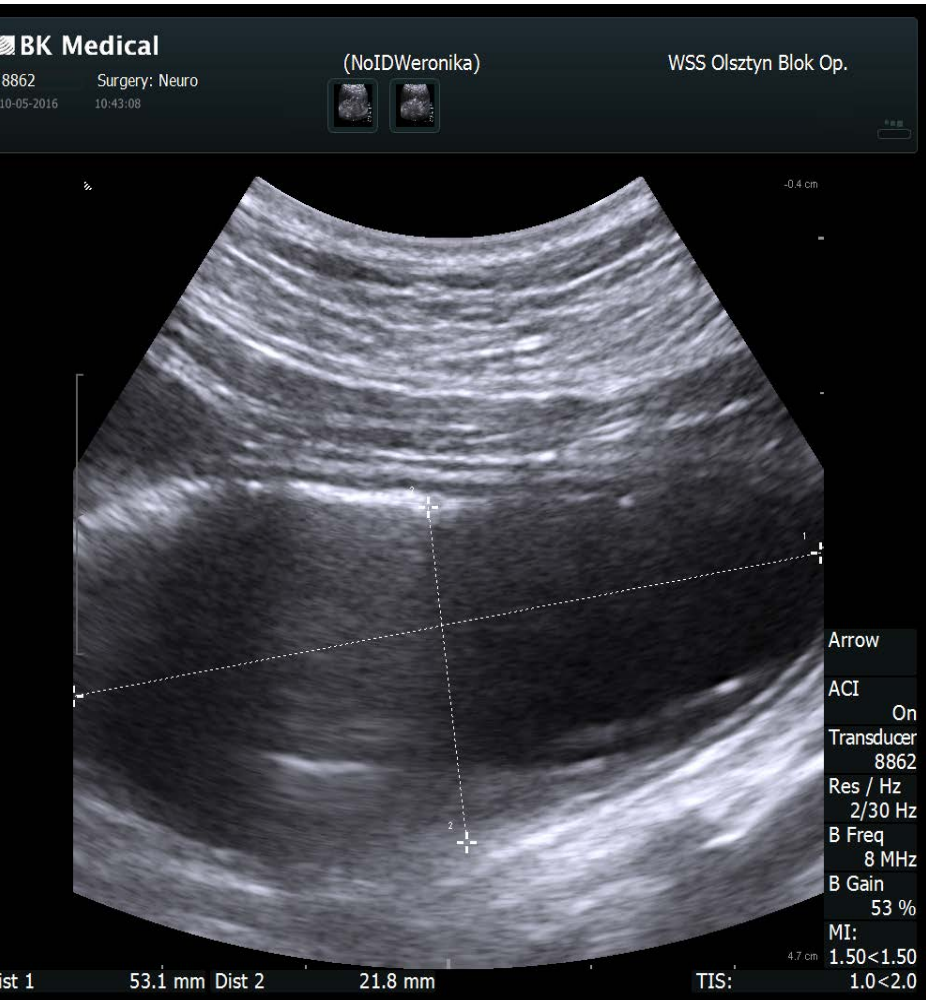

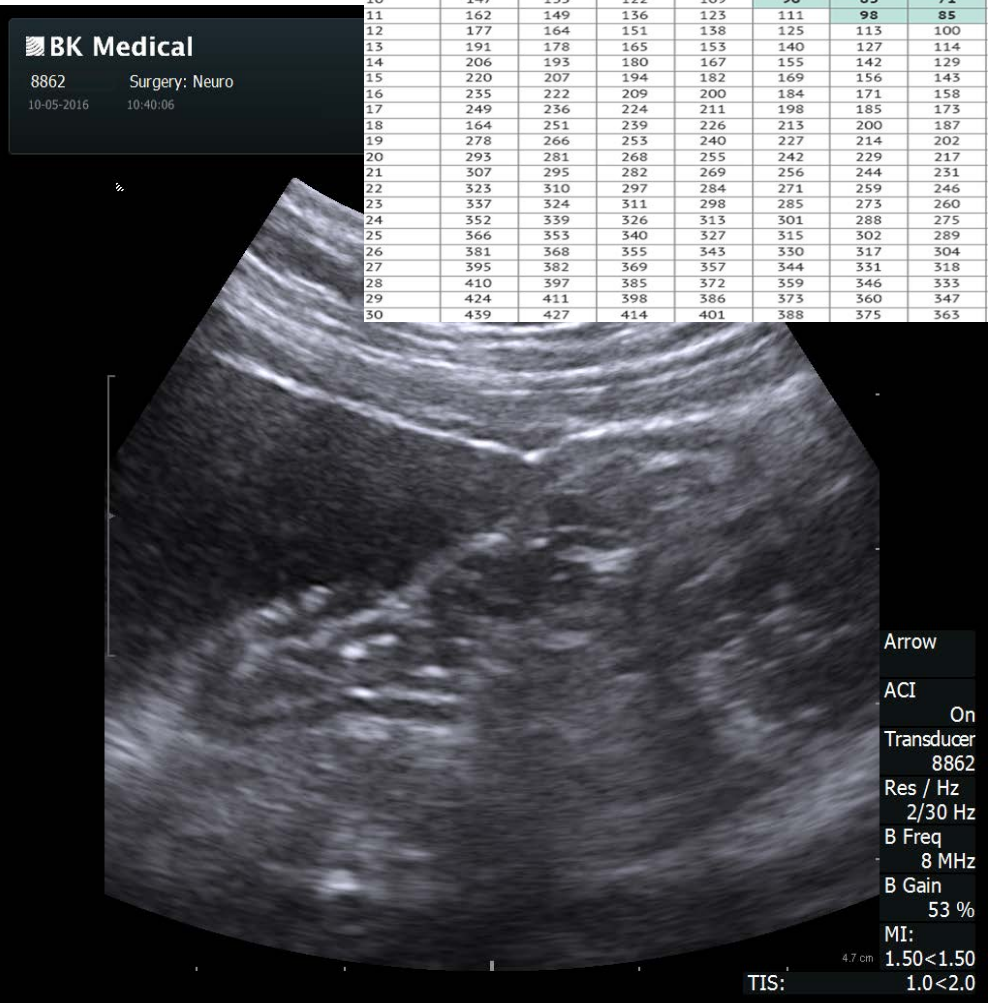

Плановая перация перенесена на 4 часа. CSA-10,06. 44 года

Right Lat CSA	Age(y) 20	30	40	50	60	70	80
2	31	18	5	0	0	0	0
3	45	32	20	7	0	0	0
4	60	47	34	21	9	0	0
5	74	62	49	36	23	10	0
6	89	76	63	51	38	25	12
7	103	91	78	65	52	40	27
8	118	105	93	80	67	54	41
9	133	120	107	94	82	69	56
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12	177	164	151	138	125	113	100
13	191	178	165	153	140	127	114
14	206	193	180	167	155	142	129
15	220	207	194	182	169	156	143
16	235	222	209	200	184	171	158
17	249	236	224	211	198	185	173
18	164	251	239	226	213	200	187
19	278	266	253	240	227	214	202
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21	307	295	282	269	256	244	231
22	323	310	297	284	271	259	246
23	337	324	311	298	285	273	260
24	352	339	326	313	301	288	275
25	366	353	340	327	315	302	289
26	381	368	355	343	330	317	304
27	395	382	369	357	344	331	318
28	410	397	385	372	359	346	333
29	424	411	398	386	373	360	347
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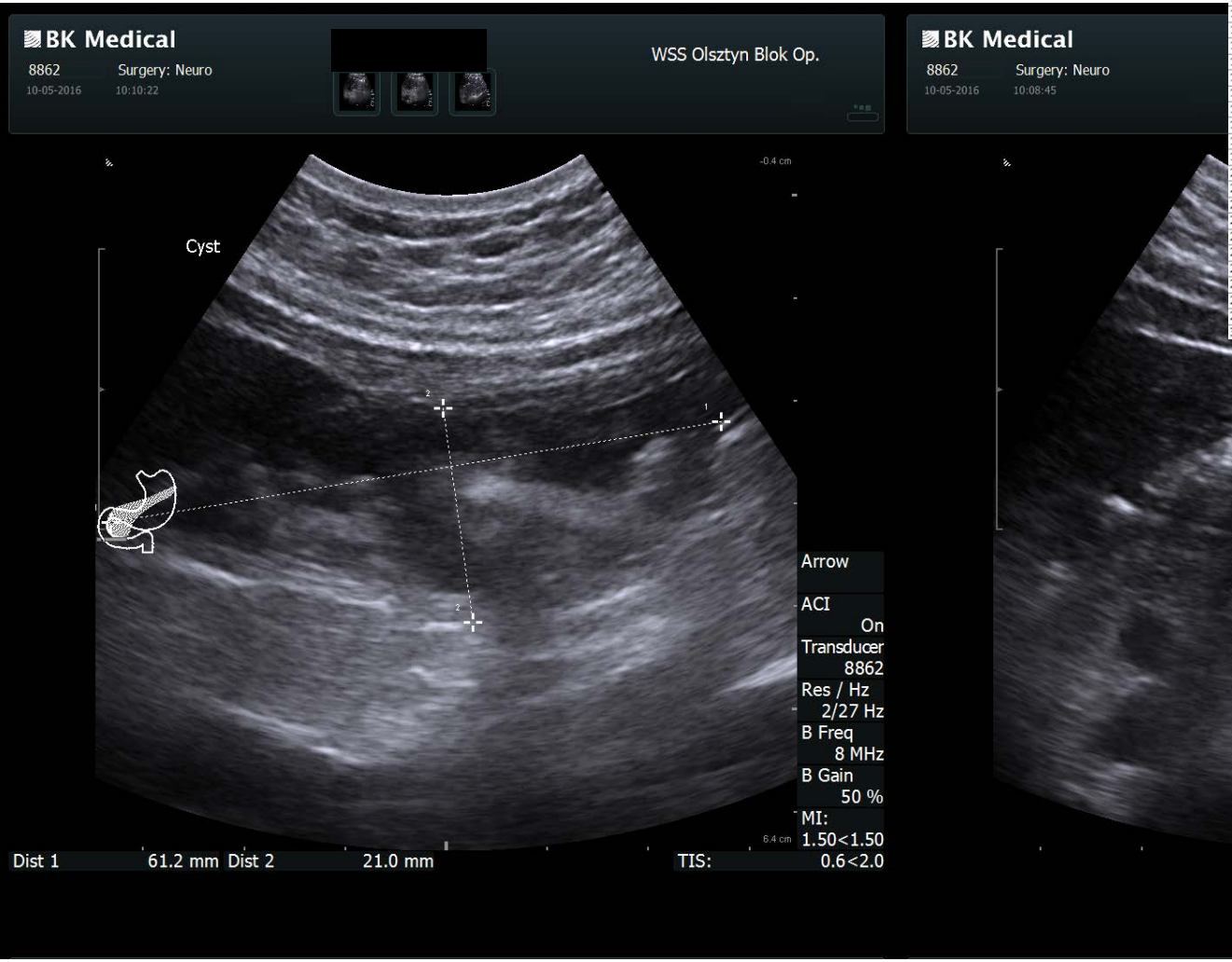
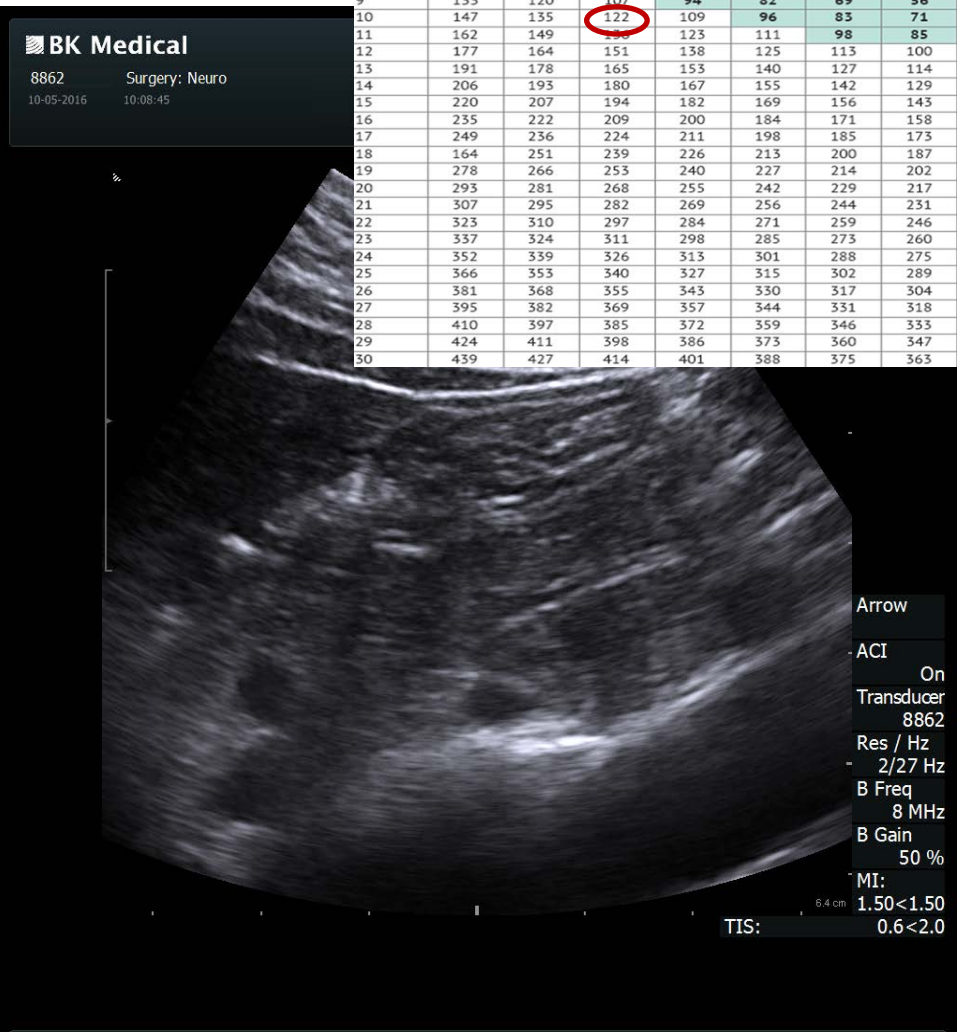
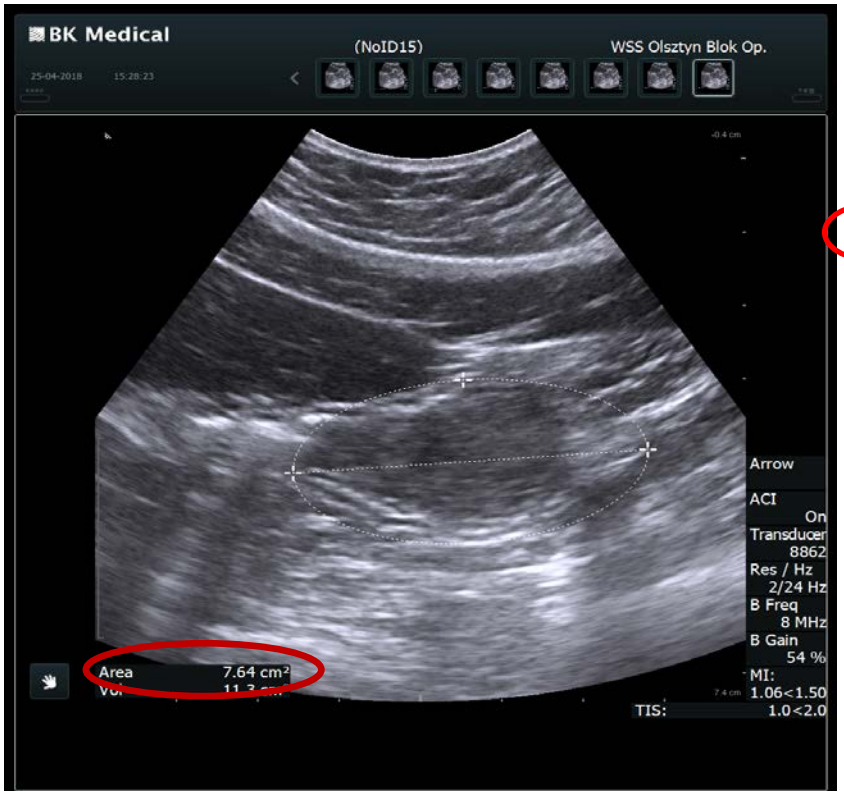




УЗИ желудка и организация работы операционного блока.



Right lat CSA	Age(y) 20	30	40	50	60	70	80
2	31	18	5	0	0	0	0
3	45	32	20	7	0	0	0
4	60	47	34	21	9	0	0
5	74	62	49	36	23	10	0
6	89	76	63	51	38	25	12
7	103	91	78	65	52	40	27
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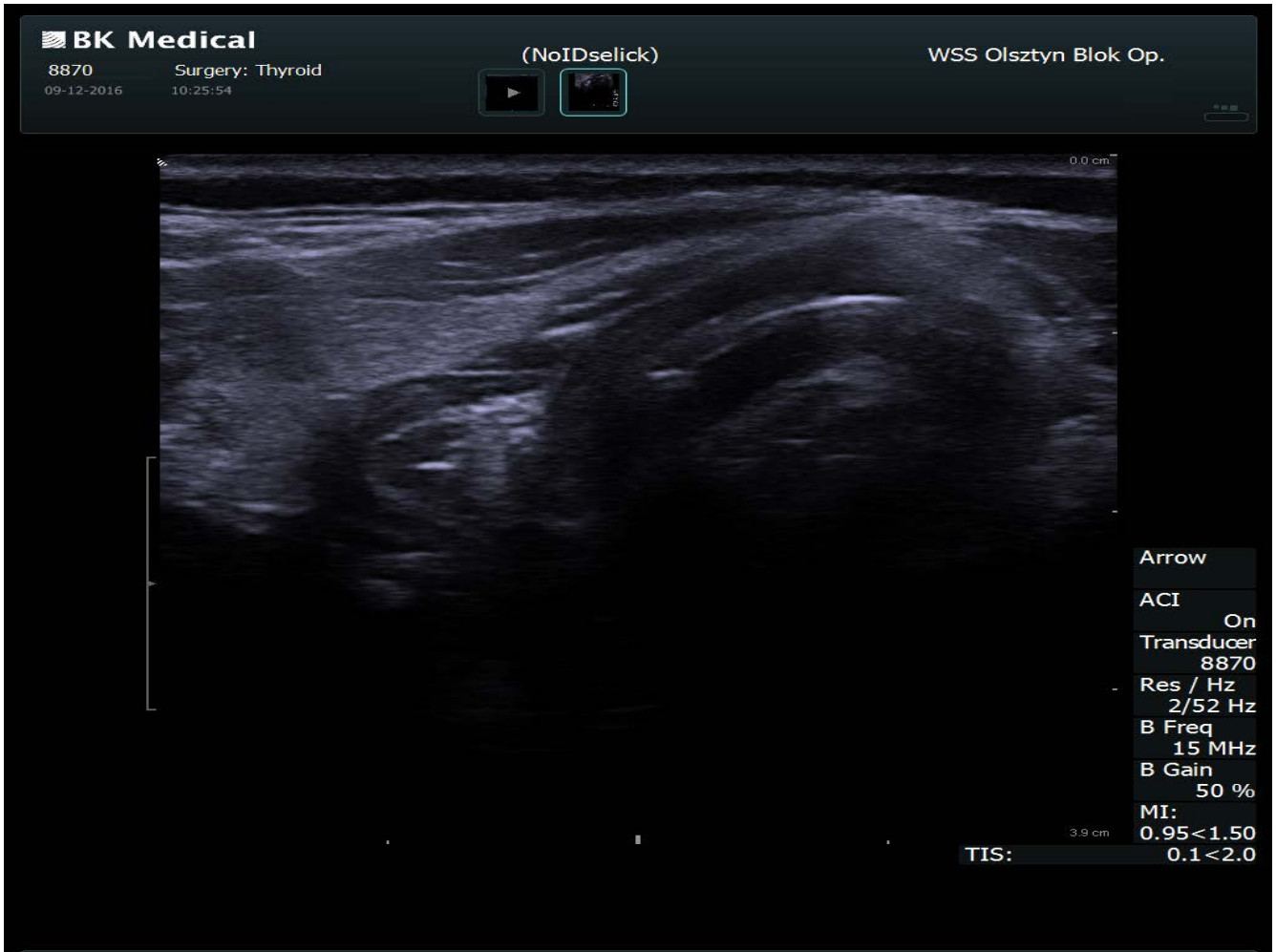
28	410	397	385	372	359	346	333
29	424	411	398	386	373	360	347
30	439	427	414	401	388	375	363

Пациент с полным желудком. Проведение экстренной операции. Индукция -Rapid sequence induction. Приём Селлика - неэффективен?



Медицинская документация

USG ocena żołądka

Nazwisko i imię

PESEL

waga wzrost

Operacja Proponowane znieczulenie

Rodzaj procedury: planowa odroczona
natychmiastowa

Rodzaj przejmowanego płynu /pokarmu .....
nieznany

Odstęp czasowy od ostatniego posiłku /picia :

..... godzin nieznany

Czynniki ryzyka aspiracji : GERD poród
udar mózgowy cukrzyca choroby nerwowo-mięśniowe

Rodzaj głowicy USG: convex liniowa

Pozycja chorego: na wznak na lewym boku

Czy antrum zidentyfikowany ?: Tak Nie

Czy zidentyfikowane narządy sąsiadujące?

Aorta Wątroba Trzustka Żyła
dolna próżna

Rodzaj zawartości żołądka: Pusty

Treść płynna: *powierzchnia antrum w pozycji na lewym boku:* *Oszacowana objętość:*

Pokarmy stałe

Komentarz:

Wnioski: trudności techniczne

pusty żoładek Stopień 0

Treść płynna Stopień 1

Stopień 2

Pokarm stały

Gastric UltraSound

A Point-of-care tool for aspiration risk assessment

GASTRIC SONOGRAPHY REPORT FORM

EXAM INFORMATION	
Date (dd/mm/yy):	Time:
Sonographer:	Referring physician:
☐ Initial exam	☐ Repeat exam

PATIENT INFORMATION					
Last name:			First name:		
Date of birth (dd/mm/yy):			Referring physician:		
Weight (kg):			Height (cm):	☐ M	☐ F
Proposed procedure:			Proposed anesthesia:		
Procedure classification:	☐ Elective	☐ Urgent	☐ Emergency		
Type of intake per os:					☐ Unknown
Time interval since last intake (h):					☐ Unknown
Aspiration risk factors:	☐ GERD	☐ Labour	☐ Diabetes	☐ Stroke	☐ NMD

TECHNICAL ASPECTS					
Probe type:	☐ Curved	☐ Linear	Patient position:	☐ Supine	☐ RLD

PATIENT INFORMATION					
Antrum identified?	☐ Yes	☐ No			
Aspiration risk factors:	☐ Liver	☐ Aorta	☐ Pancreas	☐ IVC	
Gastric content type:	☐ Empty				
	☐ Clear fluid	Antral area in RLD: cm²		Estimated volume: mL	
	☐ Thick fluid/solid				
Aspiration risk factors:	☐ GERD	☐ Labour	☐ Diabetes	☐ Stroke	☐ NMD

COMMENTS

SUMMARY AND INTERPRETATION	
☐ Inconclusive / technically difficult	
☐ Empty stomach	☐ *grade 0*
☐ Clear fluid: mL	☐ *grade 1*: consistent with baseline gastric secretions
	☐ *grade 2*: likely in excess of baseline gastric secretions
☐ Thick fluid/solid	

www. gastricultrasound.org

Съезд Congress

АССОЦИАЦИЯ АКУШЕРОВ-ГИНЕКОЛОГОВ * АССОЦИАЦИЯ АНЕСТЕЗИОЛОГОВ-РЕАНИМАТОЛОГОВ

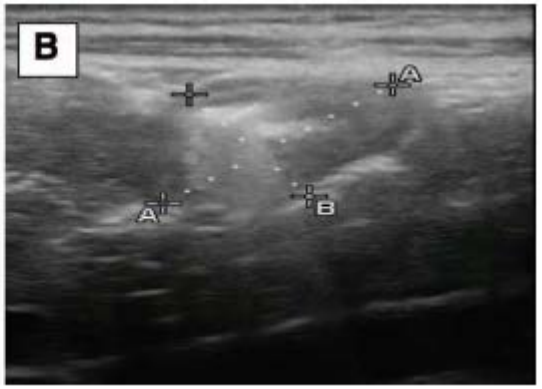
5-7 сентября 2018 / Санкт-Петербург

September 5-7, 2018 / St. Petersburg

Real-time Detection of Gastric Insufflation Related to Facemask Pressure–controlled Ventilation Using Ultrasonography of the Antrum and Epigastric Auscultation in Nonparalyzed Patients

A Prospective, Randomized, Double-blind Study

Lionel Bouvet, M.D., Marie-Laure Albert, M.D., Caroline Augris, M.D., Emmanuel Boselli, M.D., Ph.D., René Ecochard, M.D., Ph.D., Muriel Rabilloud, M.D., Ph.D., Dominique Chassard, M.D., Ph.D., Bernard Allaouchiche, M.D., Ph.D.



Инсуффляция воздухом желудка во время ручной вентиляции.

Оценка антрум у больных с ожирением.

Ожирение,само по себе, не задерживает эвакуации желудка.

Влияние других факторов связаных с ожирением:
трудные дых.пути
рефлюкс 21%
инсуффляция воздухом желудка
во время вентиляции маской.
визуализация у 90% людей с ожирением.

Применение алгоритма оценки обьёма жидкости и стратификация степени риска возможны у больных с ожирением?

Ограничения метода: оценка усложнена и невозможна в позиции на правом боку.

Van de Putte P, Perlas A. Gastric sonography in the severely obese surgical patient: a feasibility study. Anesth Analg 2014;119:1105–10

Ультрасонография желудка во время беременности.

Проблемы с визуализацией антрум у беременых:
увеличенная матка и двигающийся плод
желудок смещён выше и в правую сторону
быстрый и поверхностный дыхательный ритм
гипердинамический тип кровообращения
острый угол между ксифоидным отростком и животом.

Оптималиэаця визуализации желудка у беременных:
положение на правом боку
острожное смещение матки
глубокий вдох с задержкой

Ультрасонография желудка во время беременности.

In conclusion, this study demonstrates that antral area measured in the semirecumbent position decreases after caesarean section, and reaches values close to those previously reported in non-pregnant
adults; conventional modelling would suggest that there was emptying of stomach contents over this period.
However, this finding was not consistent with the qualitative assessment of gastric contents, which did not change between the two measurements. Taking account of the measurements indicating a change in
anatomical position of the stomach, this implies that the relationship between antral cross-sectional area and stomach contents that has been established in non-pregnant subjects cannot be assumed to apply in
pregnant subjects.

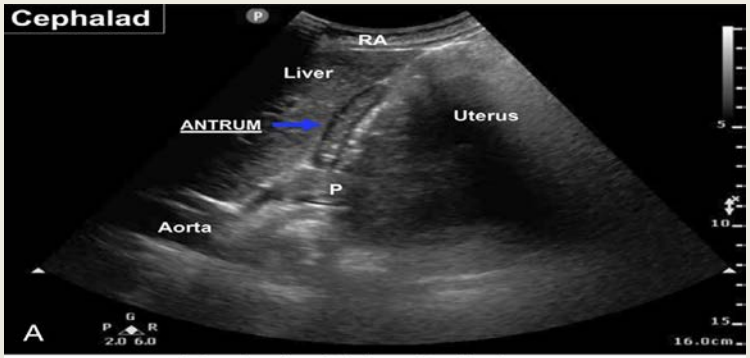
Anaesthesia 2016, 71, 1284–1290 doi:10.1111/anae.13605

Original Article

Changes in qualitative and quantitative ultrasound assessment of the gastric antrum before and after elective caesarean section in term pregnant women: a prospective cohort study

C. Rouget,[1] D. Chassard,[2,3] C. Bonnard,[4] M. Pop,[4] F. P. Desgranges[4] and L. Bouvet[4,5]

Ультрасонография желудка во время беременности.



Parturient Empty Antrum

Parturient Clear Fluid

Parturient Late Stage Solids

Stephen C. Haskins, Richelle Kruisselbrink,
Jan Boublik, Christopher L. Wu, Anahi Perlas.
Gastric Ultrasound for the Regional Anesthesiologist
and Pain Specialist. Regional Anesthesia and Pain Medicine.
Volume 43, Number 7, October 2018

Ультрасонография желудка у детей.

In younger/smaller patients (< 40 kg) a high-frequency linear transducer provides the best images.

In older/bigger children, a low-frequency curvilinear transducer may be required.

Gastric volume may be calculated based on antral CSA and the patient's age.

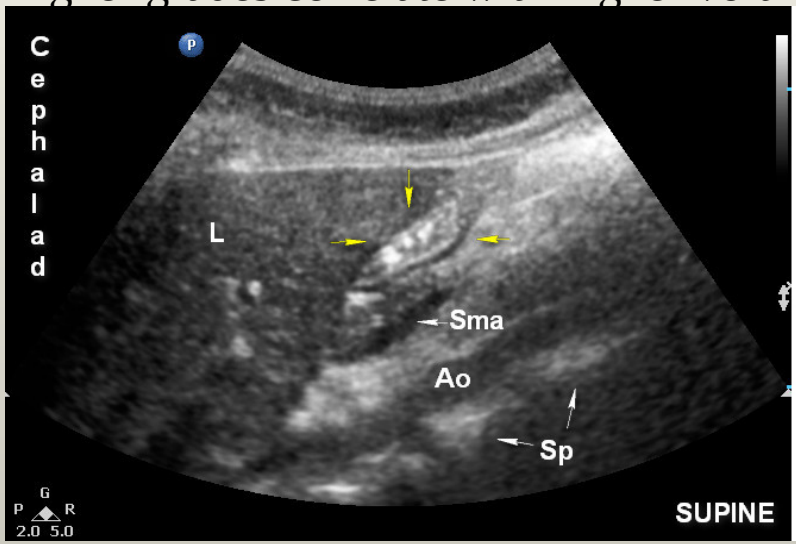
The following model has been developed for children based on a cohort of 100 fasted children between the ages of 11 months and 17 years old

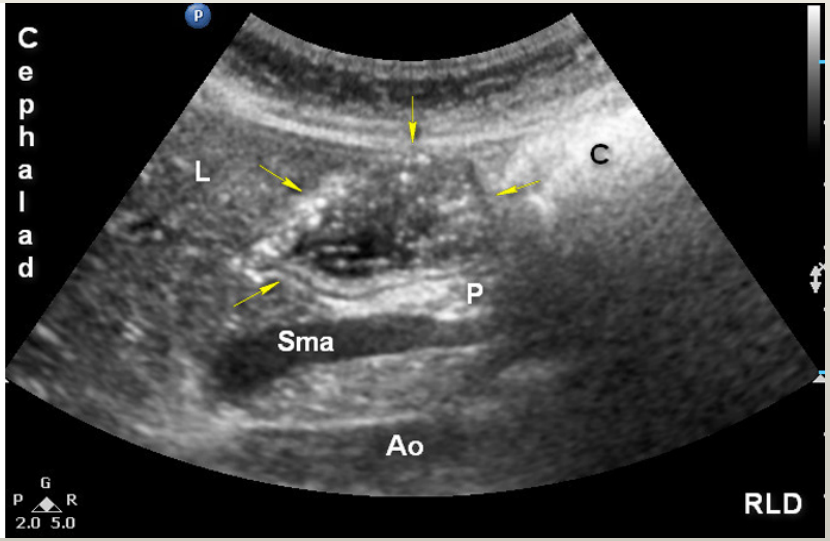
Volume = -7.8 + (3.5 X RLD CSA) + (0.127) x age (months)

The upper limit of normal fasting volume in children is 1.1–1.2 mL/kg

A similar 3-point grading system as described for adults (link) can be used

Higher grades correlate with higher volumes.





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Ограничения метода :

1.Трудная визуализация у некоторых пациентов - <10%.

2.Большая грыжа пищеводного отверстия.

3.Гастрэктомия или операция на желудке типа gastric by-pass.

4.Фундопластики в анамнезе.

5. Наличие портативного аппарата УЗИ.

Заключение

Почему УЗИ желудка еще не является частью нашей клинической практики? Это просто, и это действительно работает!

These are examples of recent applications of stomach ultrasound imaging applied to anaesthesia and intensive care medicine. After a long period of validation,[34] there can be no doubt that its clinical application will continue to grow. Use it often: it is simple and it works.

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Ultrasound assessment of gastric contents in the perioperative period: why is this not part of our daily practice?

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Съезд Congress

5-7 сентября 2018 / Санкт-Петербург
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"It is possible that ultrasound imaging may become the stethoscope of the future." NJ. Skubas.

Teaching whole body point-of-care ultrasound: advancing the skills of tomorrow's anesthesiologists. Anesthesiology 2015;123:499–500

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Благодарю вас за внимание