

# ESTIMATING GASTRIC RESIDUAL VOLUME (GRV) IN CRITICALLY ILL PATIENTS

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Dr dr Luciana Sutanto MS SpGK - INDONESIA



## GASTRIC VOLUME

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- The cells of gastric gland secrete about 2.500 mL of gastric juice daily [Ganong W, 2001]
  - In fasting patient, stomach can secrete up to 50 mL of gastric juice an hour [Guyton A, 1986, Greenfield S, et al. BMJ 1997]
  - Empty gaster: 80 mL [Johnson & George, 1994]

## GASTIC VOLUME

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NO	AUTHOR	INTAKE	Mean Fast	Mean Fast
1	Miller et al (UK) 1983	toast + tea/coffee	3 ¼ h	9 h
2	Maltby et al (Canada) 1986	water 150ml	2 ½ h	16 ½ h
3	Sutherland et al (Canada) 1987	water 150ml	2 ½ h	13 ½ h
4	Hutchinson et al (Canada) 1988	coffee/juice 150ml	2 ½ h	14 ½ h
5	McGrady et al (UK) 1988	water 100ml	2 h	12 h
6	Agarwal et al (India) 1989	water 150ml	2 ½ h	12 h
7	Scarr et al (Canada) 1989	coffee/juice 150ml	2-3 h	>8 h
8	Maltby et al (Canada) 1991	coffee/juice no limit	2-3 h	>8 h
9	Ross et al (USA) 1991	water 225ml	½ h	>8 h
10	Mahiou et al (France) 1991	clear liquid 1000ml	2 h	11 h
11	Lam et al (Hong Kong) 1993	water 150ml	2-3 h	11 ½ h
12	Phillips et al (UK) 1993	clear liquid, no limit	2 ¼ h	13 h
13	Søreide et al (Norway) 1993	water 300-450ml	1 ½ h	13 h

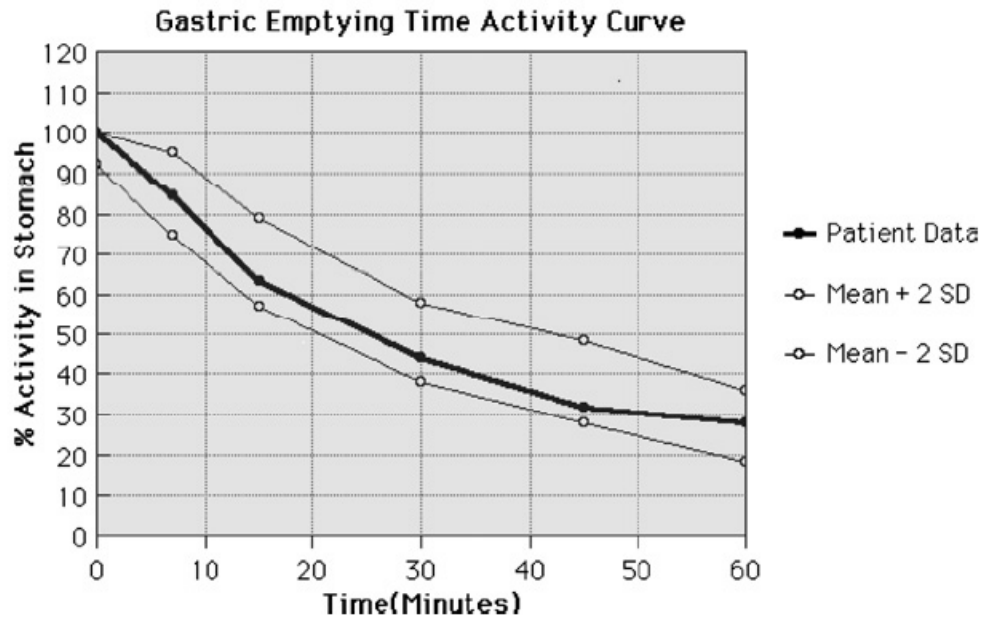
## GASTROINTESTINAL WATER MOVEMENT GANONG, 2005

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Volume secreted/day	mL
● Saliva	1 500
● Stomach	2 500
● Bile	500
● Pancreas	1 500
● Intestine	1 500
<hr style="width: 50%; margin: 0 auto;"/>	
<b>Total 7 500</b>	

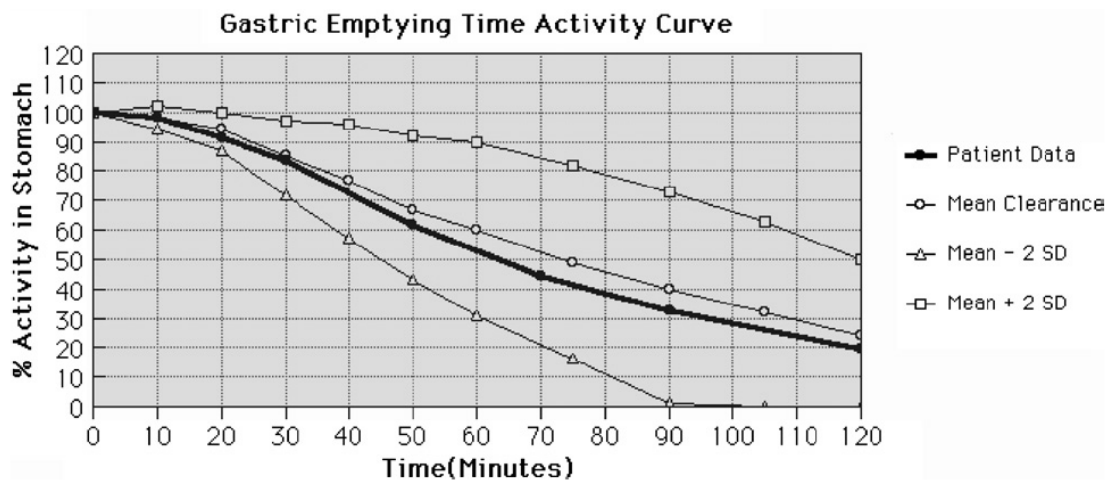
## GASTRIC EMPTYING OF 300 ML OF WATER

DIGESTIVE DISEASES AND SCIENCES, 2005



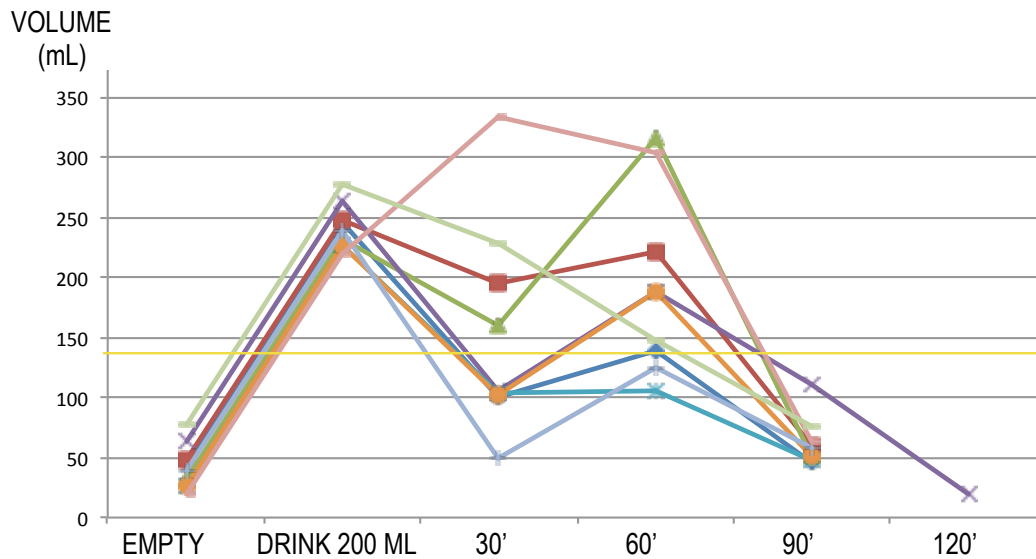
## GASTRIC EMPTYING OF A SOLID MEAL

DIGESTIVE DISEASES AND SCIENCES, 2005



## GASTRIC EMPTYING OF 200 ML ORAL NUTRITIONAL SUPPLEMENTS (ONS)

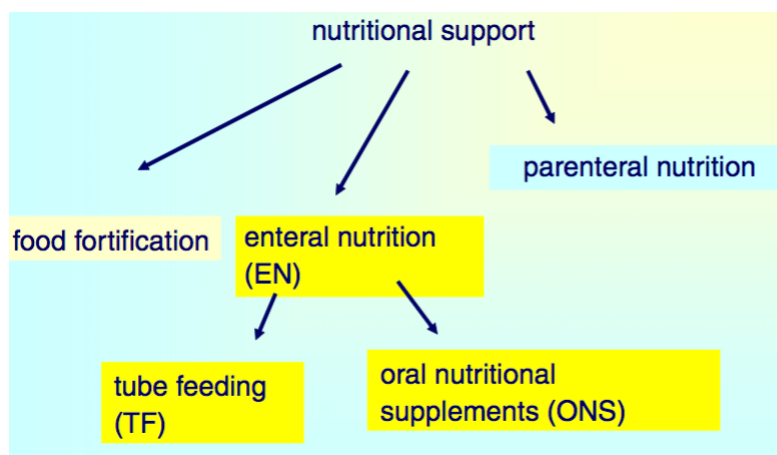
SUTANTO, ET ALL, 2011, PHILSPEN ONLINE JOURNAL OF PARENTERAL AND ENTERAL NUTRITION



## ORAL NUTRITIONAL SUPPLEMENTS (ONS) CLINICAL NUTRITION (2006) 25: 180–186

### DEFINITION

- ▶ Supplementary oral intake of dietary food for special medical purposes in addition to the normal food. ONS are usually liquid but they are also available in other forms like powder, dessert-style or bars. Synonyms used in literature: sip feeds.



## BUNDLE STATEMENTS



JPEN, 2016; 40(2):159–211.

Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.)

- Take steps as needed to reduce risk of aspiration or improve tolerance to gastric feeding (use prokinetic agent, continuous infusion, chlorhexidine mouthwash, **elevate the head of bed**, and divert level of feeding in the gastrointestinal tract).
- Implement enteral feeding protocols with institution-specific strategies to promote delivery of EN.
- Do not use gastric residual volumes as part of routine care to monitor ICU patients on EN.
- Start parenteral nutrition early when EN is not feasible or sufficient in high-risk or poorly nourished patients.

## MCCLAVE, ET ALL. J PARENTER ENTERAL NUTR 2009 33: 277-316.

- **Holding** EN for gastric residual volumes < 500 mL in the absence of other signs of intolerance **should be avoided**. (Grade: B)
- In all intubated ICU patients receiving EN, the **head of the bed should be elevated 30°-45°**. (Grade: C)
- For high-risk patients or those shown to be intolerant to gastric feeding, delivery of EN should be switched to **continuous infusion**. (Grade: D)
- Agents to promote motility such as pro kinetic drugs (**metoclopramide** and erythromycin) or narcotic antagonists (naloxone and alvimopan) should be initiated where clinically feasible. (Grade: C)
- Diverting the level of feeding by **post-pyloric tube placement** should be considered. (Grade: C)

## FACTORS REGULATING GASTRIC MOTILITY & EMPTYING IN ICU PATIENTS

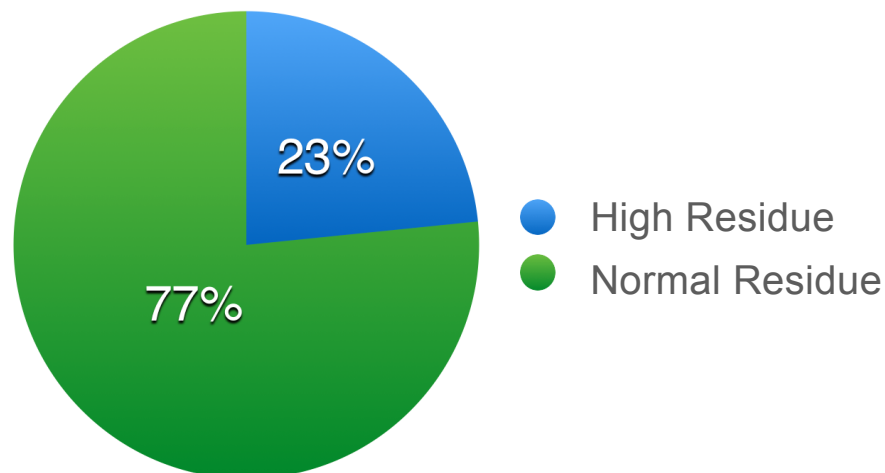
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- \* medications (opioid agonists, dopamine),
  - \* hyperglycemia
  - \* electrolyte disturbances
  - \* **ischemia/hypoxia**
  - \* burns, trauma, surgery, sepsis, increased intracranial pressure
  - \* the administration of calorically dense or hyperosmolar formulas.
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- \* Fruhwald S, et al. *Intensive Care Med.* 2006;33:36–44. Chapman, et al. *Curr Opin Crit Care.* 2007;13:187–94. 20. MacLaren. *Pharmacotherapy.* 2000;20:1486–98. Metheny, et al. *Heart Lung.* 2004;33:131–145.

## GASTRIC RESIDUAL VOLUME STATUS ICU PATIENT IN 24 HOURS

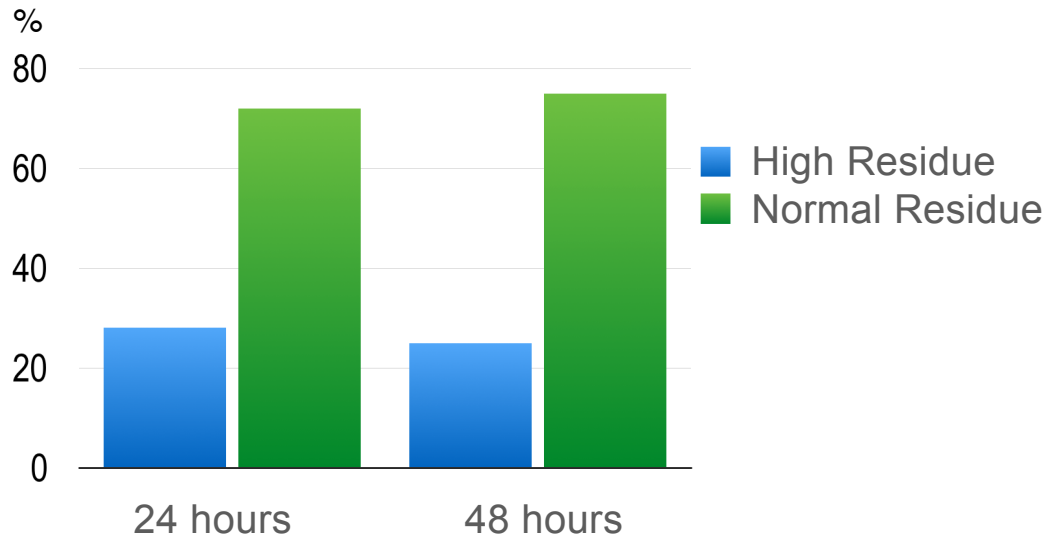
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- Josefina Junizar, Luciana B.Sutanto, Dita Aditiansih
- Poster presentation in MDA-AODA meeting, Malaysia, 2016
- ICU Ciptomangunkusumo Hospital, Jakarta



## GASTRIC RESIDUAL VOLUME STATUS ICU PATIENT IN 48 HOURS

- Pittara Pansawira, Luciana B.Sutanto, Dita Aditiansih
- Poster presentation in AICNU meeting, Colombo, 2016
- ICU Ciptomangunkusumo Hospital, Jakarta



*Clinical Nutrition* (2000) **19**(4): 233–236  
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doi:10.1054/clnu.2000.0097, available online at <http://www.idealibrary.com> on **IDEAL**<sup>®</sup>

### ORIGINAL ARTICLE

## The paracetamol absorption test: a useful addition to the enteral nutrition algorithm?

J. COHEN, A. AHARON, P. SINGER

*General Intensive Care Unit, Rabin Medical Center, Beilinson Campus, Petah Tiqva, and the Sackler School of Medicine, Tel Aviv University, Tel Aviv, Israel (Correspondence to: Dr P Singer Director, General Intensive Care Unit Rabin Medical Center, Beilinson Campus Petah Tiqva, 49100 Israel)*

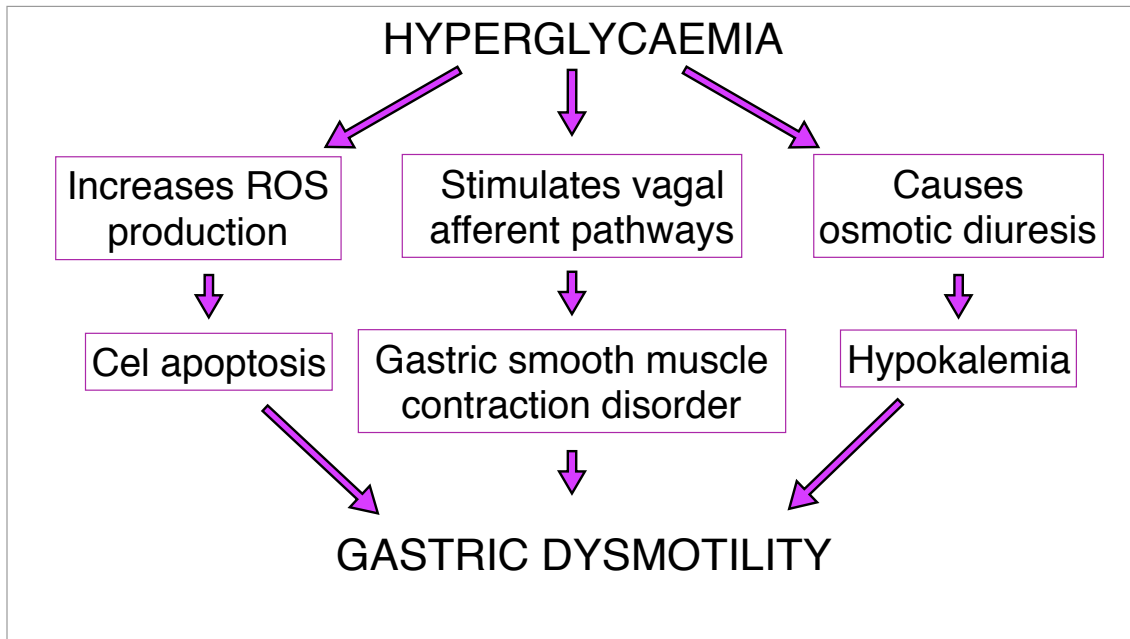
**Abstract—Background:** Enteral nutrition in critically ill patients given via the nasogastric route is often decreased or stopped because of large gastric residual volumes. **Aim:** To assess the effect of continuing enteral nutrition in patients

**Conclusion:** The paracetamol absorption test may be normal in patients with relatively high gastric residual volumes. These patients may continue to receive enteral nutrition.

the subgroup had to be stopped because of persistently elevated residual volumes. **Conclusion:** The paracetamol absorption test may be normal in patients with relatively high gastric residual volumes. These patients may continue to receive enteral nutrition. © 2000 Harcourt Publishers Ltd.

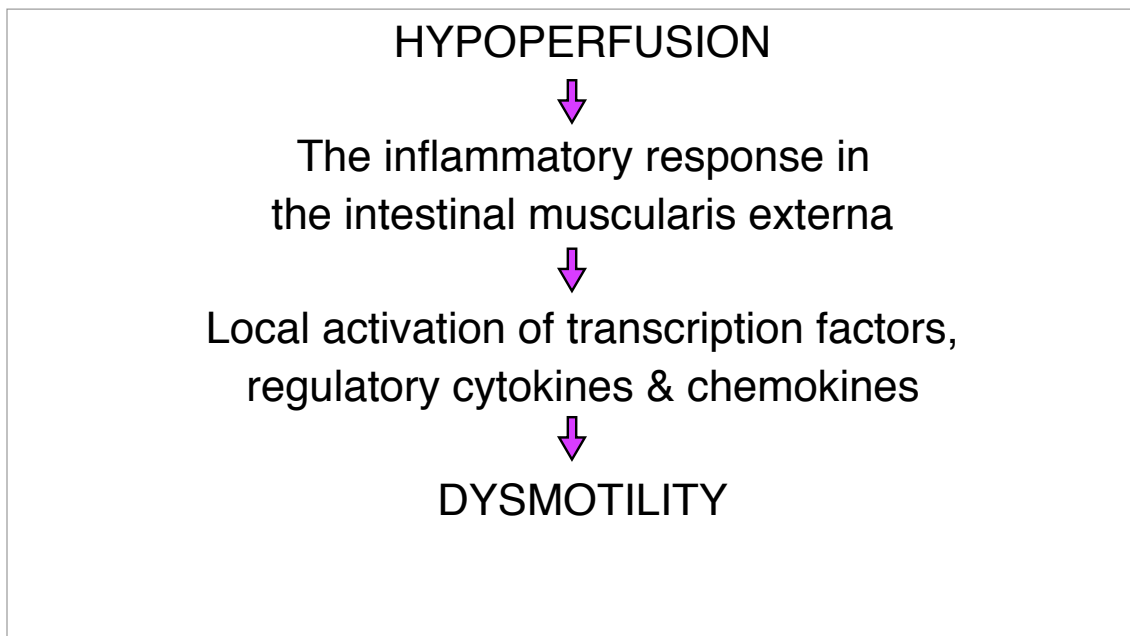
## FACTOR REGULATING GASTRIC MOTILITY & EMPTYING IN ICU PATIENTS

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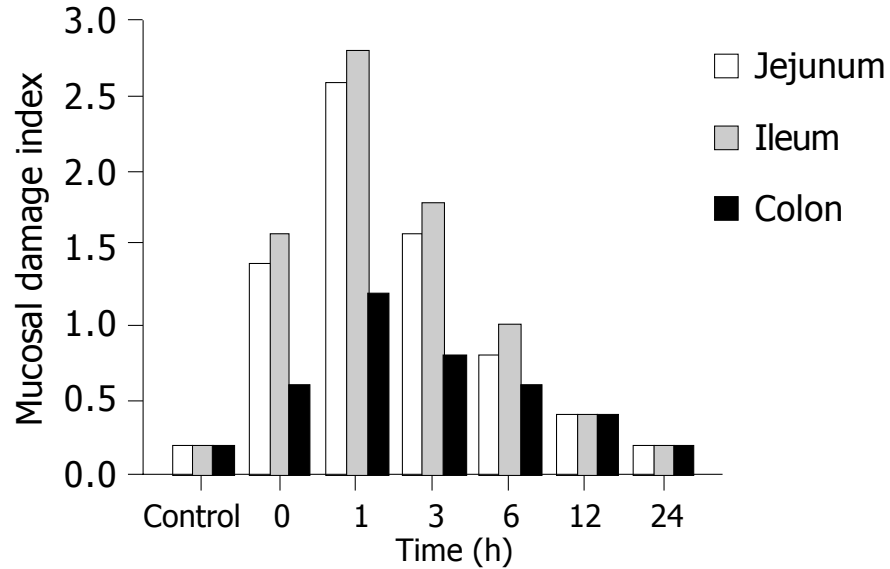
## FACTOR REGULATING GASTRIC MOTILITY & EMPTYING IN ICU PATIENTS

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## MUCOSAL DAMAGE INDEX IN GUT FOLLOWING RESUSCITATION AFTER HEMORRHAGIC SHOCK. CHANG, ET ALL. WORLD J GASTROENTEROL 2005



## COLOR OF GASTRIC RESIDUE

COLOR	INTERPRETATION
● Hemorrhagic	: Blood
● Bloodstained/coffee-ground type	: Blood
● Green	: Bile
● Light yellow	: Normal color
● Clear	: Normal color

## CONCLUSION

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- Measure gastric residue before starting enteral nutrition and every four hour, for the first 5 days (ICU)
- Measure gastric residue every 12 hours on days 6–20
- High gastric residue:  $\geq 150$  mL /single aspirate
- IV administration of metoclopramide or erythromycin should be considered in patients with intolerance to enteral feeding e.g. with high gastric residue

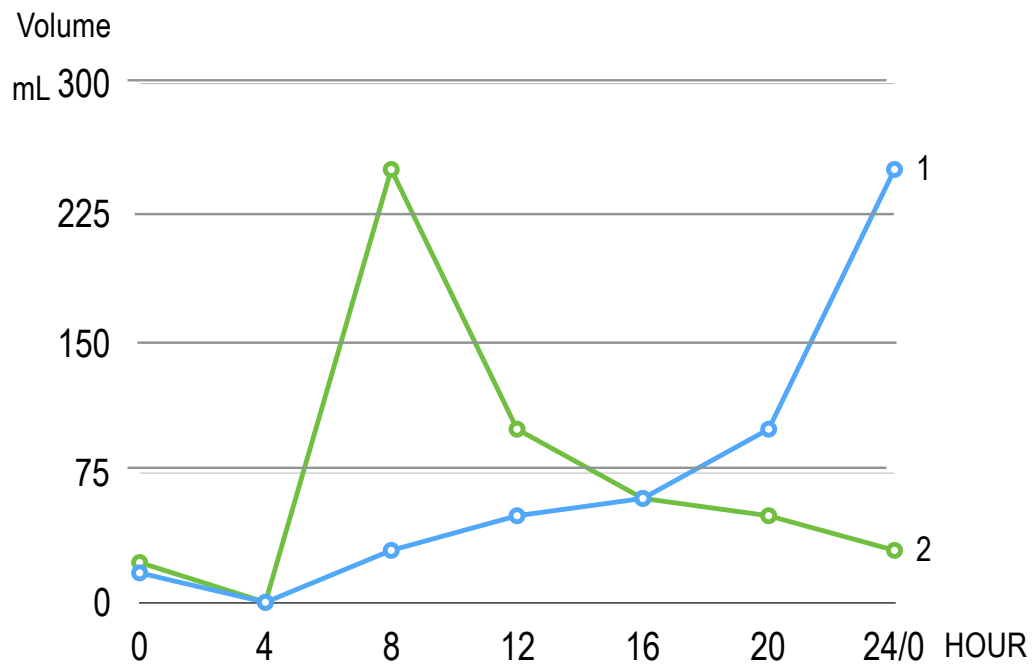
## CONCLUSION

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- Maintain blood glucose level 70 - 180 mg/dL
- Maintain blood Potassium level 4 mEq/L
- Maintain hemodynamic: MAP  $>65$

## GASTRIC RESIDUAL VOLUME 510 ML IN 24 HR

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# TERIMA KASIH

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AICNU 2016, Colombo