Case Discussion

Supervisor: F2吳亮廷
Presentor:R1 羅志威
100.12.13

Patient Information

- Age: 2 y/o
- Gender: Female

- 2011 22:11
- 檢傷主訴: 噁心嘔吐
- GCS: E4V5M6　SpO2:??　BW: 13.0Kg
- TPR:　36.6°C /　??　/　18/min　BP: 123/88mmHg
- No known underlying

History

- 今天一直吐
- No fever, no cry, no obvious abdominal pain
- No change in appetite
- 一直要東西吃，吃完再吐

Past History

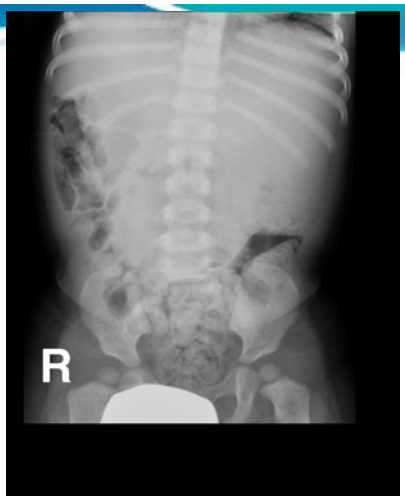
- Birth History: no known perinatal insult
  - G2P1AA0 A1 GA: 39 + wks　Birth weight:3325gm VED
- Developmental milestone: no obvious abnormality
- Medical dz: non specific
- Vaccination: as scheduled, pneumococcus(-)
- Allergy: denied
- Travel hx: denied
- Animal contact: denied

Physical examinations

Order

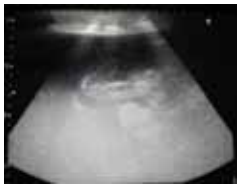
- 22:46
  - KUB
  - Bedside ECHO

KUB



Bedside ECHO

- Multiple dilated bowel loop, compatible with bowel obstruction



Order

- 23:13
  - Hb/WBC/DC/Plt
  - BCS
  - VBG3
  - 0.33% G/S 40ml/hr
  - ABD CT with contrast medium
  - NPO(19:00)

Lab Data

AST	32 U/L
BUN	16mg/dL
Cr	0.4 mg/dL
Na	142 meq/L
K	3.8 meq/L
Cl	99 meq/L
iCa	4.73 mg/dL
CRP	0.128 mg/dL

PH=7.498
PCO2=33.7 mmHg
PO2=49 mmHg
BE=3 mmol/L
HCO3=26.2 mmol/L
TCO2=27 mmol/L
SO2=88 %

CBC/DC

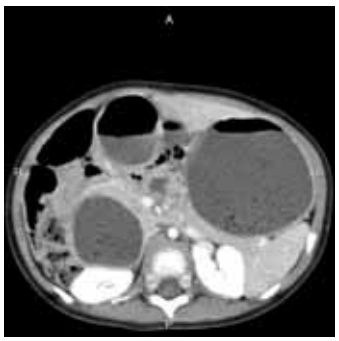
WBC:	6800/ul
RBC:	5.49 million
Hb:	14.4 gm/dl
Ht	41.6%
MCV	75.8 fl
MCH	26.2 pg
MCHC	34.6%
RDW	13.4%
Plt	357,000/ul

Differential count:
Seg: 48.0%
Lym 43.0%
Monocyte 7.0%
Eosinophil 0.0%
Basophil 1.0%
Atypical lymphocyte 1.0 %
Band
Metamyelocyte
Myelocyte
Promyelocyte
Blast
Nucleated RBC

Abdominal CT

Abdominal CT

- Impression:
  - Obstruction below SMA, vomiting with food, not bile
  - r/o duodenal atresia double bubble sign
  - r/o malrotation
  - r/o SMA syndrome



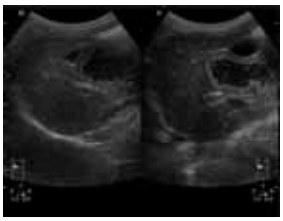
Admission course

- Detailed Hx:
  - Vomiting X3 in the morning: food content, 沒有blood or bile
  - 吃完早餐後，10:00 and 12:00吐，family述沒肚子痛或瀉
  - 17:00晚餐，20:00又吐
  - 最近有因為流鼻水去LMD，吃藥，那時沒有吐或腹痛。最後一次吃藥 10/08

Admission course 1

- Septic work-up and culture
- IVF hydration
- NPO
- ABD sonography

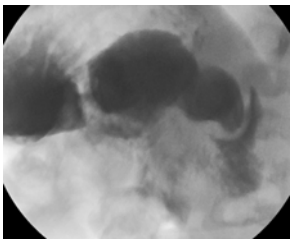
Abdominal sonography 2

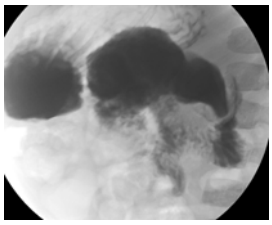


- Marked dilatation of the first portion of the duodenum after 80cc water infusion into the stomach via N-G tube. To and fro movement was detected
- Diagnosis: duodenal obstruction, cause?
- Recommend UGI series

UGI series

- Slow flow passage from antrum to duodenum; ileus
- A filling defect, band-like, cross-over junction of antrum and duodenum;
  - Level: post antrum or post duodenal bulb
  - No string signs→favor hypertrophic pyloric stenosis)





An upper GI series demonstrates an elongated and narrowed pyloric canal (P); a distended stomach, with a wavy appearance (arrows); and bulging at the base of the duodenum (D) and antrum (A).

Admission course 2

- Irritable mood due to hungry
- Impression: duodenal web
- Plan: arrange endoscopic dilatation, inform surgical intervension if endoscopic dilatation failure

Endoscopic finding

Discussion

Approach of pediatric patient

Table 164-4 -- Pediatric Assessment Triangle—Initial Assessment

APPEARANCE	WORK OF BREATHING	CIRCULATION TO THE SKI
Tone	Abnormal sounds: stridor, grunting, snoring, wheezing	Pallor
Irritable, interactive	Abnormal positioning: sniffing, tripoding, refusal to lie down	Mottling
Consolable	Retractions	Cyanosis
Look/gaze	Head bobbing	Petechiae
Speech/cry	Nasal flaring	

TABLE 109.1-1 Pediatric Vital Signs (Awake and Resting)

Age	Heart Rate, Upper Limit (beats/min)	Respiratory Rate, Upper Limit (breaths/min)	Blood Pressure,* Lower Limit (mm Hg)	Weight,† (kg)
0–1 mo	180	60	60/40	3–4
2–12 mo	160	50	70/45	5–10
12–24 mo	140	40	75/50	10–12
2–6 y	120	30	80/55	13–25
6–12 y	110	20	90/60	25–40
>12 y	100	20	90/60	40–60

*May be estimated by:
Systolic blood pressure (5th percentile) = 70 + [2 × (age in years)]

†May be estimated by:
12 mo: weight (kg) = 4 + (age in months/2)
1–12 y: weight (kg) = 10 + [2 × (age in years)]

Symptom	Degree of Dehydration		
	Mild (< 3% body weight lost)	Moderate (3-9% body weight lost)	Severe (>9% body weight lost)
Mental status	Normal, alert	Restless or fatigued, irritable	Apathetic, lethargic, unconscious
Heart rate	Normal	Normal to increased	Tachycardia or bradycardia
Quality of pulse	Normal	Normal to decreased	Weak, thready, impalpable
Breathing	Normal	Normal to increased	Tachypnea and hyperpnea
Eyes	Normal	Slightly sunken	Deeply sunken
Fontanelles	Normal	Slightly sunken	Deeply sunken
Tears	Normal	Normal to decreased	Absent
Mucous membranes	Moist	Dry	Parched
Skin turgor	Instant recoil	Recoil < 2 seconds	Recoil >2 seconds
Capillary refill	< 2 seconds	Prolonged	Minimal
Extremities	Warm	Cool	Mottled, cyanotic

Table 171-5 -- Types of Dehydration Reflected by Serum Sodium

PHYSICAL SIGN	DEHYDRATION TYPE BY SERUM SODIUM LEVEL		
	ISOTONIC: 130–150 MEQ/L	HYPOTONIC: <130 MEQ/L	HYPERTONIC: >150 MEQ/L
Skin			
Turgor	Poor	Very poor	Fair
Feel	Dry	Clammy	Thick, doughy
Mucous membranes	Dry	Dry	Parched
Sunken eyeballs	+	+	+
Depressed anterior fontanelle	+	+	+
Mental status	Lethargic	Coma/seizure	Irritable/seizure
Increased pulse rate	++	++	+
Decreased blood pressure	++	+++	+

From Barkin RM, Rosen P: Emergency Pediatrics, 5th ed. St Louis, Mosby, 1999.

- Isotonic

Fluid schedule	
	Fluids
Phase	Calculation
I (0–½ hr)	20 mL/kg
II (½ – 9 hr)	½ net deficit: 400 mL D5W with 28 mEq NaCl and 15 mEq KCl ⅓ maintenance: 333 mL D5W with 10 mEq NaCl and 7 mEq KCl TOTAL: 733 mL with 38 mEq NaCl and 22 mEq KCl
III (9–25 hr)	½ deficit ⅔ maintenance

- Hypotonic

Fluid schedule	
	Fluids
Phase	Calculation
I (0–½ hr)	20 mL/kg
II (½ – 9 hr)	½ net deficit: 400 mL D5W with 90 mEq NaCl and 15 mEq KCl ⅓ maintenance: 333 mL D5W with 10 mEq NaCl and 7 mEq KCl TOTAL: 733 mL with 100 mEq NaCl and 22 mEq KCl
III (9–25 hr)	½ deficit ⅔ maintenance

Treatment-dehydration

- Oral rehydration
  - 在拉肚子脫水要用oral rehydration
  - 越快補充越好
  - 若已無dehydration，恢復正常飲食
  - 不用稀釋配方奶
- IV rehydration
  - 中重度脫水患者fluid量: 20ml/kg 每5~10分鐘challenge, 直到hemodynamic穩定。前一小時至少給60ml/kg。

Treatment-Vomit

- NPO
  - 脫水狀況，禁食不可超過4小時，若沒有脫水則不該禁食
- Ondansetron(serotonin receptor antogonis)
  - 0.15mg/kg
- Dopamine receptor agonists不該用在小兒止吐
  - 如novamin, primperan
  - 可能發生respiratory depression或EPS
  - 效果未經證實

Approach of Vomit in Ped

- 先分年齡
  - Newborn
  - Infant(<12mo)
  - Child(>12mo)
- 再分system:
  - GI
  - Neurologic
  - Renal
  - Infectious
  - Metabolic

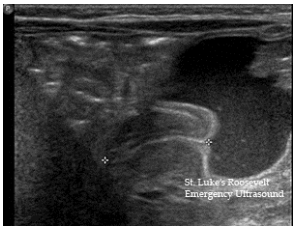
Etiologies-Newborn

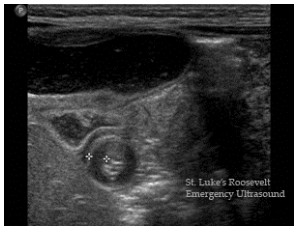
- Obstructive intestinal anomaly
  - **Esophageal/intestinal stenosis/atresia**
  - Bowel malrotation±midgut volvulus
  - Meconiumileus/plug
  - Hirschsprung dz
  - Imperforate anus
  - Enteric duplications
- Other GI disease
  - NEC
  - Perforation with 2nd peritonitis
- Neurologic
  - Mass lesion
  - Hydrocephalus
  - Cerebral edema
- Renal
  - Obstructive anomaly
  - uremia
- Infection
  - Sepsis
  - meningitis
- Metabolic
  - Inborn erros of metabolism
  - Congenital adrenal hyperplasia

Discussion-pyloric stenosis

- Etiology:
  - 男:女 2:1~ 5:1
  - 症狀常出現在3~4週大
  - 95%病人在3~12週大被診斷
  - 早產兒診斷時間會被延後
- History:
  - Projectile vomitus
  - 沒有bile, 有時略帶血色
- PE:
  - Olive sign:在RUQ摸到大大的pylorus
- Lab
  - Cl/K↓and代謝鹼
- Image:UGI series
  - 正常小朋友:
    muscle wall<3mm
    幽門長<14mm

Discussion-pyloric stenosis





Etiologies-Infant

- Acquired esophageal disorders
  - Foreign body
  - Retropharyngeal abscess
- GI obstruction
  - Bezoar
  - Foreign body
  - **Pyloric stenosis**
  - Malrotation ± volvulus
  - Enteric dulplications
  - Complications of Meckel diverticulum
  - Intususception
  - Incarcerated hernia
  - Hirschsprung disease
- Other GI dz
  - AGE with dehydration
  - peritonitis
- Neurologic
  - Mass lesion
  - hydrocephalus
- Renal
  - Obstructive
  - uremia
- Infectious
  - Sepsis
  - Meningitis
  - pertussis
- Metabolic
  - Inborn errors of metabolism

Etiologies-Child

- GI obstruction
  - Bezoar
  - Foreign body
  - Posttraumatic intramural hematoma
  - Malrotation ± volvulus
  - Complications of Meckel diverticulum
  - **Intususception**
  - **Incarcerated hernia**
  - Hirschsprung disease
- Other GI dz
  - Appendicitis
  - Peptic ulcer disease
  - Pancreatitis
  - peritonitis
- Neurologic
  - Mass lesion
- Renal
  - Uremia
- Infectious
  - Sepsis
  - Meningitis
- Metabolic
  - Diabetic ketoacidosis
  - Adrenal insufficiency
  - Inborn errors of metabolism
- Toxic ingestion

Vomitus in children

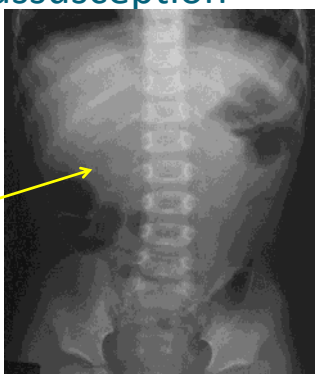
- 最常見還是AGE
  - Combine diarrhea, fever
- 其次是
  - food poisoning
  - GERD
  - Peptic ulcer disease
- Dx tool:
  - history &panendoscopy

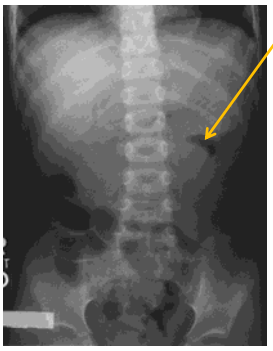
Discussion-Intussusception

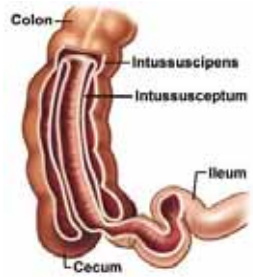
- Etiology:
  - M:F 約 2:1
  - 2m~2y(高峰在5~9個月大)
- History:
  - Intermittent colicky pain
  - 一小時痛兩三次，痛完全好
  - Currant jelly stool

Discussion-Intussusception

- Image:
  - Target sign
  - Crescent sign

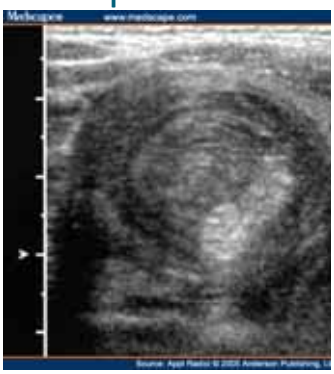


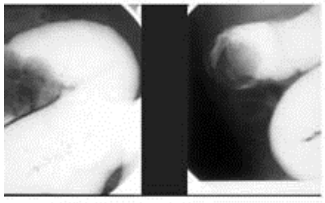


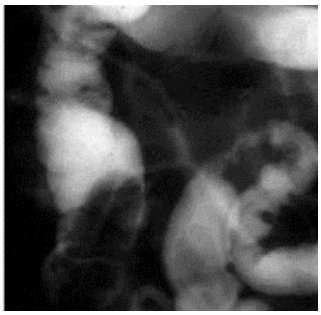


Discussion-Intussusception

- ECHO
  - Sandwich sign(pseudokidney sign)
  - Target sign
  - Hay-fork sign





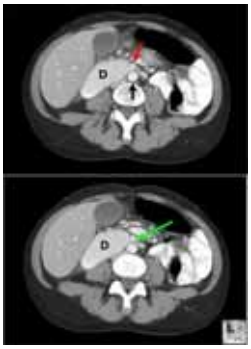


Discussion- SMA syndrome

- Etiology
  - 女性>男性
  - Age: 75% 10歲~30歲 (好發大小孩、青少年)
- History:
  - 瘦、年輕、女性
  - 上腹痛、噁心、含bile的噁吐
  - 左側躺、趴著、抱膝會減緩症狀
- 易跟很多duodenum total/partial obstruction混淆
- Hayes maneuver: 從肚臍往頭側推擠肚子→減緩不適

Discussion- SMA syndrome

- Criteria of SMA syndrome:
  - Duodenum通過 SMA/aorta那一段的距離 <8mm(100%sensitivity and specificity)
  - or 交角<22 degree(42.8% sensitivity, 100 % specificity)



Thanks for your attention!