C. Emergent C/S 紧急剖宫产

1. GA 全麻

a. Check airway, Bicitra 30mL, LUD, 4 vital capacity breaths, check fetal heart tones
检查气道, 口服枸橼酸合剂 30mL, 左子宫位(20º侧卧位), 四次深呼吸, 查胎心

b. Don't induce until surgeon ready!! (gowned, scalpel in hand)
产科医生没有准备好(一切就绪, 手术刀在手)前, 绝不全麻诱导！！

c. RSI with cricoids pressure: 1-1.5mg/kg Propofol; 1 mg/kg Succinylcholine Check BS, ET CO_2, tell OB to start.
环状软骨加压,1-1.5mg/kg 丙泊酚+1mg/kg 琥珀酰胆碱-快速诱导, 听呼吸音-测到 CO_2-让产科动刀

d. Before delivery 50% O_2-50% N_2O, Iso/Sevo 1MAC
胎儿产出前, 50%氧+50%笑气+异/七氟烷 1MAC

e. After delivery 30% O_2+70% N_2O+Iso/Sevo 0.5MAC (must decrease), Fentanyl 150-250 µg IV; non-depolarizing muscle relaxant if needed ($MgSO_4$ will potentiate!)
胎儿产出后, 30%氧+70%笑气+异/七氟烷 0.5MAC (必须减量)+静脉 150-250µg 芬太尼+去极化肌松剂(不一定需要, 硫酸镁静滴增加肌松剂的作用)

f. Consider Midazolam for amnesia
必要时考虑咪哒唑仑以防术中知晓

g. Empty stomach with OG, extubate awake.
胃管排空胃内容, 清醒拔管

2. Epidural in place 有硬膜外置管者

3% 2-Chloroprocaine 氯普鲁卡因 20-30 mL
(entire dose within 3-5 mins 3-5 分钟内全部给完)

Pharmacologic Approach To Post Partum Hemorrhage
产后出血的药物选择

a. Pitocin (Oxytocin)催产素 20-30 units/l000 mL

b. Methergine (ergotrate)麦角新碱: 0.2 mg IM
(**NOT IV 绝对不能**静脉注射, **高血压忌用**)

c. Hemabate (Prostaglandin F_{2a})欣母沛(前列腺素 F_{2a}): 0.25 mg IM (**NOT IV 绝对不能**静脉注射, **哮喘忌用**)

d. Misoprostol 米索前列醇: 0.5 – 1.0 mg per rectum 肛栓

a, b, c may be given intramyometrially by the obstetrician
以上 a, b, c 可由产科医生子宫肌内注射

D & C For Retained Products 胎盘滞留刮宫

Large bore IV access, T & S, consider T & C (minimum 2 units), Bicitra 30mL, volume resuscitate
大号静脉通道(16G 以上), 血型配血(至少 2 单位), 口服枸橼酸合剂 30mL, 输液扩容

Anesthetic options 麻醉选择

1. MAC/paracervical block (anticipate deep sedation)
麻醉监护+宫颈旁阻滞(可能需要较深的催眠深度)

2. Existing epidural 有硬膜外置管者:

10-15 mL 3% 2-Chloroprocaine(T_{10} level)
3% 2-氯普鲁卡因 10-15mL (胸 $_{10}$ 平面)

3. Spinal 腰麻: 5% Hyperbaric Lidocaine 40-50mg
5%高比重利多卡因 40-50 mg

4. GA (rarely done)全麻(很少用)

RSI as above. Etomidate 0.2mg/kg or Ketamine 2 mg/kg if patient hypovolemic. Maintenance 50% O_2-50%N_2O Iso/Sevo 1.5-2MAC till uterus evacuated then decrease to 0.25MAC.
快速诱导(C.1.c.): 低血压者,用 0.2mg/kg 依托咪酯或 2 mg/kg 氯胺酮诱导; 50%氧+50%笑气+异/七氟烷 1.5-2MAC 维持,刮宫干净后减至 0.25MAC

Uterine Relaxation (may need w/ C/S or retained placenta)
子宫肌松(剖宫产或胎盘滞留刮宫中可能需要)

a. IV Nitroglycerin, titrate to effect & maternal BP in 100µg increments usual dose 100-250 µg)
根据作用和孕妇血压, 静脉硝酸甘油 100µg 起步, 逐渐加量, 通常 100-250µg

b. Inhalational gases: Requires 3-4 MAC and ET intubation
全麻, 气管插管, 吸入麻醉至 3-4MAC

C-Cerclage 宫颈环扎术(T_{10} level 胸 $_{10}$ 平面)
Spinal 腰麻: *co-hydrate 1 L, 快速输液 1-1.5L 的同时*
5% Hyperbaric Lidocaine 40-50mg (1mL)
5%高比重利多卡因 40-50 mg (1mL)

Tubal Ligation 输卵管结扎术(T_4 level 胸 $_4$ 平面)

1. Existing epidural 有硬膜外置管者:

15-20 mL 2% Lidocaine 利多卡因

2. Spinal 腰麻: 5% Hyperbaric Lidocaine 75-100mg
5%高比重利多卡因 75-100 mg

No Pain Labor N' Delivery

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OBSTETRIC ANESTHESIOLOGY GUIDELINES
产科麻醉实施细则

Analgesia for Labor 分娩镇痛

A.Patient Preparation 产妇准备

Prehydrate with 500-1000 mL LR or NS, monitor BP, pulse ox, FHR (if possible) during procedure, ALWAYS left uterine displacement when supine.
操作前/中, 输林格氏液或生理盐水 500-1000mL, 血压, 脉搏氧饱和度, (有可能的话)胎心监护, 卧位时绝对保持子宫左倾(右侧腰背部垫高)。

B. Technique 操作

Patient sitting or lateral, LOR air/saline, ave. depth of epidural space 4 cm, catheter threaded and kept at 4-5 cm, adhesive spray and tape catheter, reposition patient LUD, test dose with 3 mL 1.5% Lidocaine with 1:200,000 epi (positive td: increase in HR by 15 beats/min within 45 sec), dose for analgesia
产妇座位或侧卧, 硬膜外推注空气(和/或盐水)试负压法, 平均深度 4cm, 置管 4-5cm, 去脂喷雾加贴保护导管, 产妇子宫左斜位, 试验剂 3mL(1.5%利多卡因+1:200,000 肾上腺素, 阳性者: 45 秒内心率增加 15 跳/分), 然后, 给局麻药镇痛(见"药物选择")。

C.Desired Analgesia 无痛的定义

Almost, BUT NOT COMPLETE pain relief (continues to feel pressure/aware of contraction), T_{10} sensory level for early labor; for late labor requires sacral level.
几乎不痛但不是完全不痛, 即, 能感受到压迫或宫缩. 早期(第一产程)应达到胸 $_{10}$ 平面, 晚期(第一产程末)需要骶部的镇痛。

Options 药物选择

A.First Stage of Labor (T_{10}-L_1 level)第一产程(胸 $_{10}$-腰 $_1$)

1. Epidural analgesia 硬膜外镇痛

Nulliparas and parous women in latent or early active phase of labor. Also women with suspected difficult airway, or with increased risk of cesarean delivery.
潜伏期或产程早期的初/经产妇、疑有困难气道或有可能剖宫产者

a. Initial bolus 初始量: 0.125% Bupivacaine 布比卡因 10-15 mL +Fentanyl 芬太尼 50-100 µg

b. Infusion 持续量: 0.06% Bupivacaine 布比卡因 + Fentanyl 芬太尼 2 µg/mL; 12-15 mL/hr

Expect analgesia in 10-12 min.10-12 分钟内起效

2. Combined Spinal/Epidural (CSE)腰硬联合

Can be used at all stages of labor, but particularly useful with opioid only for latent phase labor in nulliparous women, or late first stage or second stage of labor in all women. Use cautiously in patients at high risk for cesarean delivery as epidural catheter

placement not known to be correctly placed until spinal drugs wear off. USE 5 INCH WHITACRE SPINAL NEEDLE and epidural kit. Locate epidural space with Tuohy epidural needle, pass spinal needle through Tuohy (SPINAL NEEDLE PASSES DURA BEFORE THE NEEDLE HUBS MEET), inject spinal drugs, remove needle, thread epidural catheter, test catheter, start continuous infusion (same as epidural).

可以用于各期产程的产妇,但初产妇潜伏期的用药不一样(2.a.),有可能剖宫产者三思而行(因为不工作的硬膜外只有在椎管内局麻药过性后方才知道),用 5 吋的 Whitacre 腰穿针配硬膜外包(18G10cm Tuohy 硬膜外针)或腰硬联合包,硬膜外针到位后,通过硬膜外针孔进腰穿针,给腰麻药,退针,置硬膜外管,给试验剂,微泵硬膜外持续量(1.b.)

a. For pts in EARLY1st stage (1-3 cm) 初产妇宫口 3cm 以下
Spinal -25 µg (0.5 mL) Fentanyl
腰麻 25µg (0.5 mL)芬太尼

b. For pts nulliparous in active labor(5-10 cm) & all parous pts, or for 2nd stage 初产妇宫口>5 或经产妇(含第二产程)
Spinal: 15µg (0.3 mL) Fentanyl + 0. 5%Bupivacaine (preservative free) 0.5 mL
腰麻: 15µg(0.3 mL)芬太尼+0. 5%布比卡因 0.5mL(无防腐剂)

c. Infusion 持续量: see 见 A1.b.

Analgesia for Assisted Vaginal Delivery 器械助产的镇痛

1. Epidural in place 硬膜外置管者

Sit patient 60-90 degrees head up, desire dense S2-S4 level.
置产妇坐位或半卧位(60-90 度), 镇痛平面骶 2-4。

Bolus: 10-12 mL 3% Chloroprocaine (when quick onset needed, possibility of fetal distress), *Or* 10-12 mL 2% Lidocaine (have time for block onset of 5-8 min)
10-12mL 3%氯普鲁卡因(有胎儿窘迫可能的紧急情况),
或 10-12mL 2%利多卡因(5-8 分钟起效)

2. No analgesia in place 无镇痛者

Spinal: 40-50 mg hyperbaric Lidocaine (5%)
腰麻: 40-50mg 高比重 5%利多卡因

Troubleshooting 疑难排解

A. Inadequate analgesia 镇痛不全

1. Bilateral sensory level below T_{10} during first stage
第一产程中双侧感觉平面低于胸 $_{10}$

Bolus: 10-12 mL 0.125% Bupivacaine
追加 0.125%布比卡因 10-12 mL

Infusion: increase by 3-4 mL/hr 调高微泵 3-4 mL/hr

2. Inadequate analgesia despite bilateral T_{10} level after 1 bolus of 0.125% Bupivacaine
追加 0.125%布比卡因后, 双侧感觉平面在胸 $_{10}$, 镇痛仍不完全

Try 0.25% Bupivacaine 10 mL, and if this does not work, replace catheter.
追加 0.25%布比卡因 10mL 仍不满意者, 重新置管

Infusion: change to 0.11% Bupivacaine and Fentanyl 1.6 µg/mL
改成微泵 0.11%布比卡因+1.6 µg/mL 芬太尼

3. "Window" of inadequate analgesia"窗口型"镇痛不全

a. Place patient on side of window 卧于痛侧位
b. Bolus: 8-10 mL 0.125% Bupivacaine.
追加 0.125%布比卡因 8-10mL
c. Infusion: increase 2-3 mL/hr.调高微泵 2-3mL/hr

4. "Back labor" frequently occiput posterior position
"腰背痛"常见于胎枕后位

a. *Bolus: 50* µg (1mL) Fentanyl +10 mL Bupivacaine 0.125%*追加 50 µg (1mL)芬太尼+0.125%布比卡因 10mL*
b. *Infusion:* change to 0.11% Bupivacaine with 1.6 µg/mL Fentanyl at 15-18 mL/hr.
改成微泵 0.11%布比卡因+1.6µg/mL 芬太尼 15-18mL/hr

5. Inadequate second stage analgesia 第二产程镇痛不全

a. Bolus*:* sit patient head up; give 7-10 mL 0.125% Bupivacaine
产妇起坐((半)坐式分娩),追加 7-10 mL 0.125%布比卡因
b. Infusion: increase 3-4 mL/hr 调高微泵 3-4mL/hr

6. Persistent inadequate 2nd stage analgesia despite 5.ab
经 5.ab 处理后, 第二产程镇痛仍不满意

a. *Bolus:* 0.25% Bupivacaine; 5-8 mL
追加 5-8 mL 0.25%布比卡因
b. *Infusion:* increase 3-4 mL/hr 再上调微泵 3-4 mL/hr

B. Has catheter migrated? (pt's clinical/sensory exam unclear) 硬膜外导管移位?(产妇的感觉平面不清楚)

a. *Bolus:* 8-10 mL 2% Chloroprocaine Or 8-10 mL 1% Lidocaine: Both result in analgesia in 5 mins.,
DECIDE EARLY IF CATH NEEDS TO BE REPLACED
追加 8-10 mL 2%氯普鲁卡因或 8-10mL 1%利多卡因, 5 分钟内均应起效; 否则, 重新置管, 切忌拖延误事

C. Hypotension- systolic less than 100 or 20% below baseline 低血压-收缩压低于 100 或 20%的基础收缩压

a. Crystalloid bolus 快速输晶体
b. Ephedrine IV 5-10 mg or Phenylephrine 100 µg if crystalloid bolus not adequate
静注麻黄素 5-10mg 或新福林 100µg 争取时间

D. Fetal bradycardia within 15-30 minutes INITIATING labor analgesia 分娩镇痛后 15-30 分钟的胎心过缓

a. Check sensory level, rule out high- or total spinal anesthesia 查感觉平面排除高位或全脊柱麻醉
b. Rule out hypotension 排除低血压
c. Left lateral position 左侧卧位
d. Increase IV fluids 加快静脉输液
e. Supplemental oxygen 给氧
f. Administer Ephedrine 5-10 mg/dose IV EVEN IF MATERNAL BP NORMAL 静注麻黄素 5-10 mg(即使产妇血压正常)
g. Discontinue oxytocin infusion 暂仃催产素
h. Consider nitroglycerine 100 µg bolus, or Terbutaline 0.25 mg SQ 考虑硝酸甘油 100µg 静注, 或特布他林 (β_2肾上腺素受体激动剂)皮下注射, 以减缓宫缩

Cesarean Section 剖宫产

A. General Considerations 常规

1.Preop 术前: 30 mL Bicitra 枸橼酸合剂口服,
10 mg Metoclopramide IV 胃复安静注,
50 mg Raniditine 雷尼替汀静注

2. Intraop 术中:

a.T_4 sensory level, low pressure/N & V with delivery common
双侧胸 $_4$ 平面, 常见低血压和恶心/呕吐

b. Oxytocin infusion 20 units/L, Start after cord clamp until uterine tone improves then decrease rate.
催产素静滴, 20 单位/L, 始于夹断脐带, 宫缩满意后减量

c. LUO 产妇子宫左斜位

d.Total fluid: approximately 2 liters 总液体量约 2000 mL

e.Total blood loss = 800-1000 mL 总失血量 800-1000mL

3. Postop 术后: Postop pain options 术后镇痛选择:

a. Epidural PF Morpine (Duramorph): 3.5-4 mg (0.5 mg/mL, 7-8 mL) after cord clamp
夹断脐带后, 硬膜外置管内注射 3.5-4 mg (0.5 mg/mL, 7-8 mL) 无防腐剂吗啡

b. Intrathecal PF Morphine: 150mcg (0.5 mg/mL, 0.3 mL)
椎管内无防腐剂吗啡 150mcg (0.5 mg/mL, 0.3 mL)

a & b REQUIRE POSTOP DURAMORPH ORDERS
注意! a 和 b 都需专项术后医嘱, 以防合用其他吗啡类镇痛剂, 导致过度呼吸抑制

c. IV PCA 产妇自控静脉镇痛

B. Elective C/S 择期剖宫产

1.Spinal (also option in urgent c/s) *co-hydrate 1-1.5 L*
腰麻(也可用于急诊剖宫产),*快速输液 1-1.5L 的同时*
0.75%hyperbaric Bupivacaine1.6 mL+fentanyl15µg(0.3 mL)
0.75%高比重布比卡因 1.6mL+芬太尼 15 µg (0.3 mL)

2. Epidural: *co-hydrate 1-1.5 L.*
硬膜外*, 在快速输液 1-1.5L 的同时*

a. Most common: 2% Lidocaine20mL+8.4% $NaHCO_3$ 2 mL+100 µg Fentanyl (2mL) + 10µg Epinephrine=20-25 mL (using 30mL syringe)
最常用: 2% 利多卡因 20mL+8.4%碳酸氢钠 2mL+100µg 芬太尼(2mL)+10 mcg 肾上腺素=20-25mL(用 30mL 针筒)

b. 3% 2-Chloroprocaine 2-氯普鲁卡因 20-25 mL