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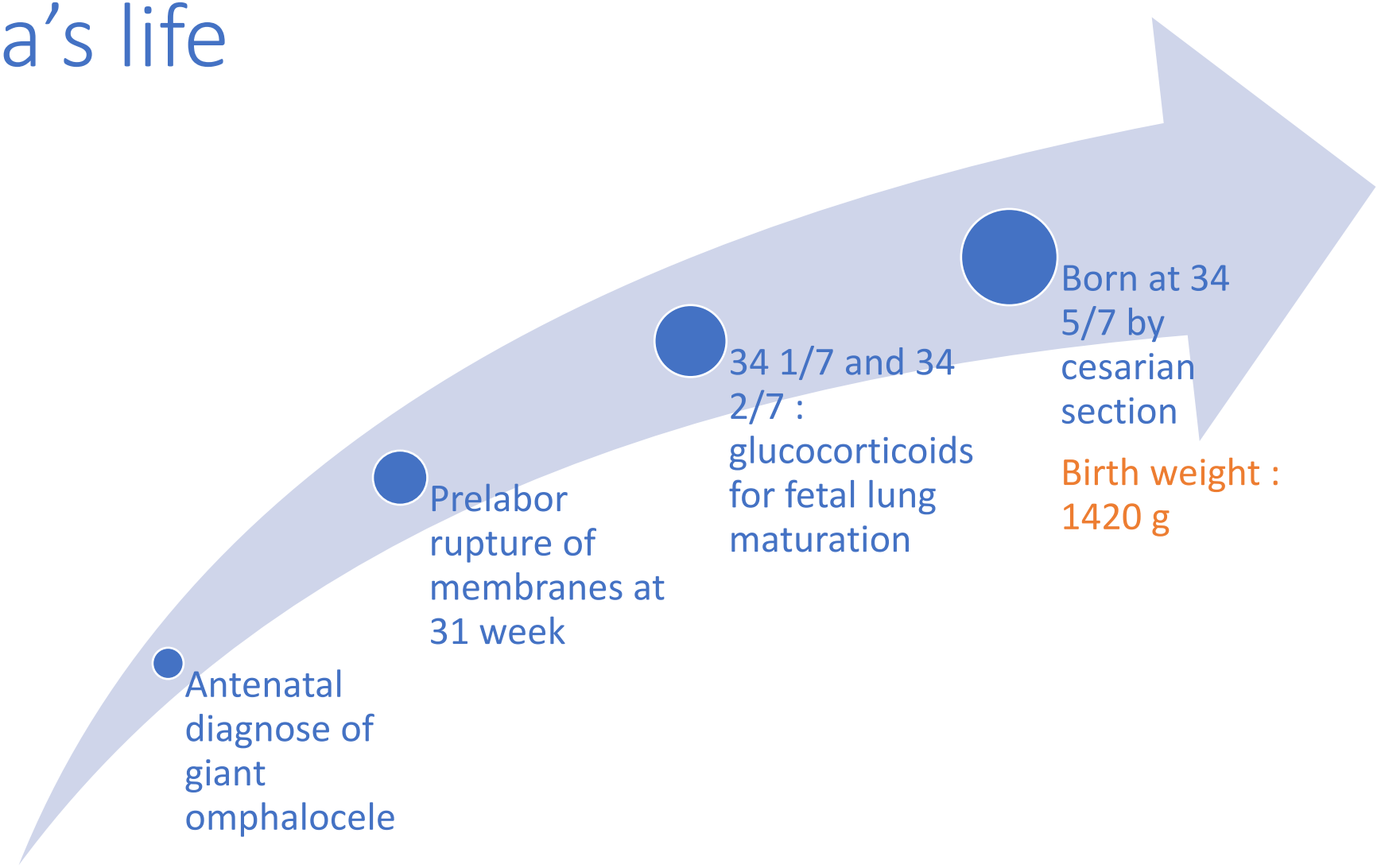
Management of procedural pain in a very low birth weight infant : Is it safe and effecient to avoid intravenous and oral routes of administration ?

Loïse Rockmans

Hôpital Universitaire Des Enfants de la Reine Fabiola

Supervision : Dr A Vuckovic et Dr D Avino

Olivia’s life



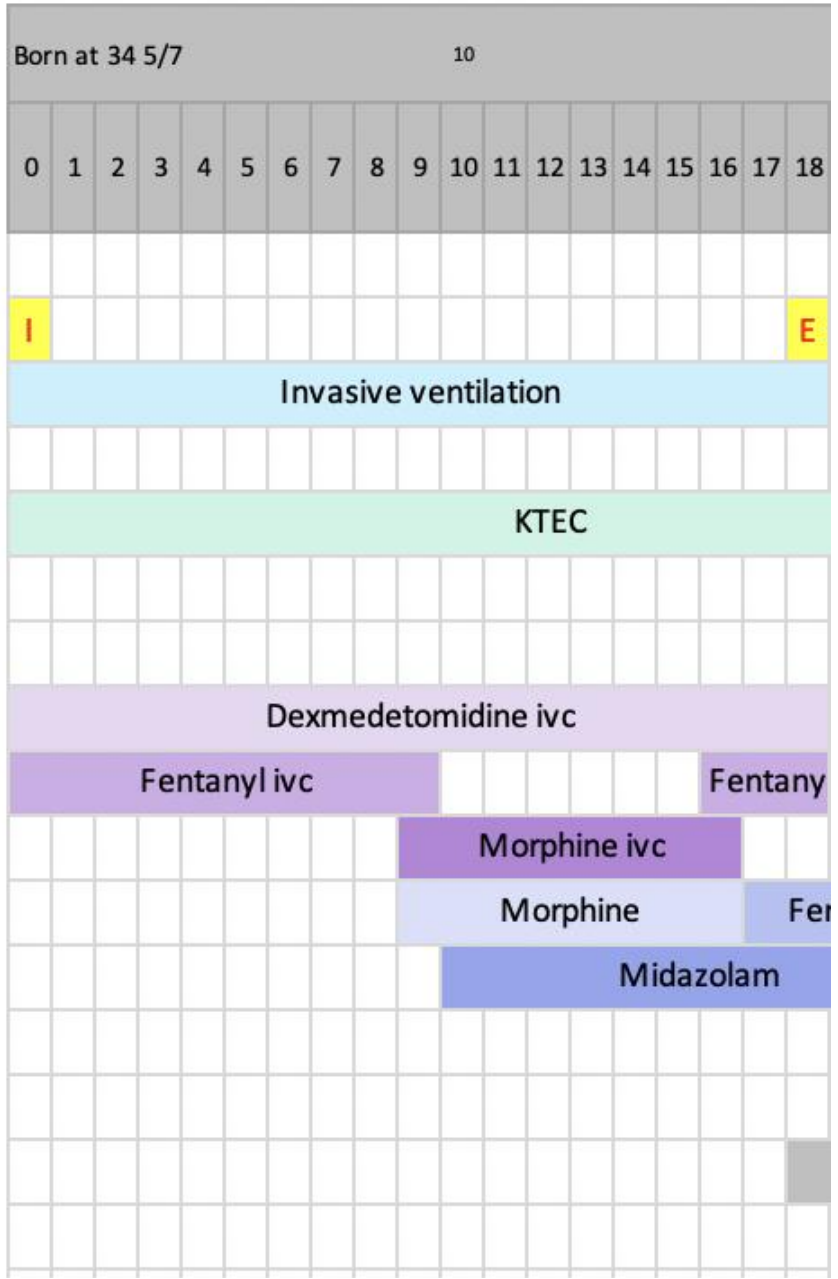

#2
4.3 - 8.0 cm

What would you do to manage the pain ?

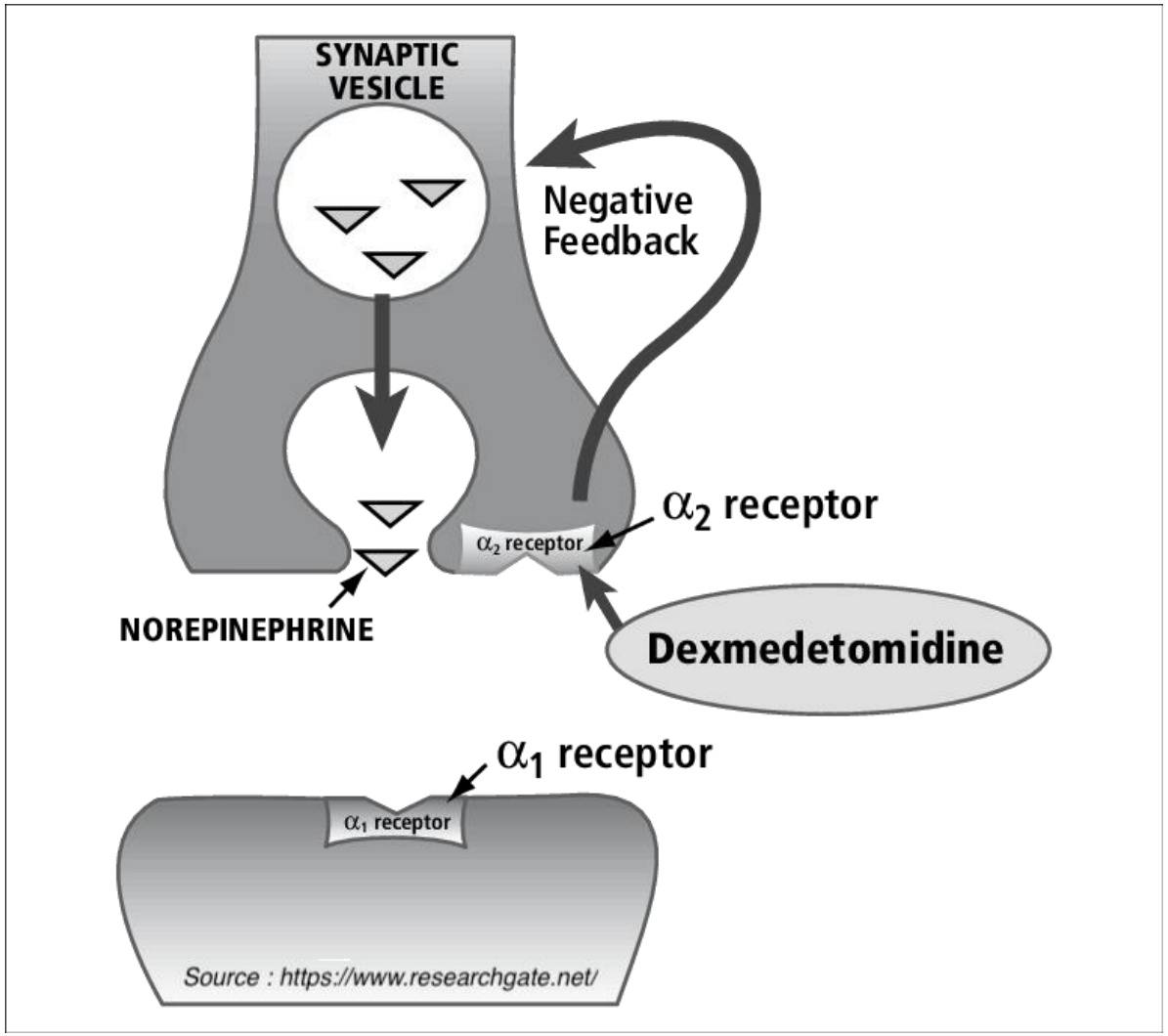
A. Nothing	B. Morphine ivc
C. Propofol ivc	D. Other ?

Olivia’s life

ANTENATAL DIAGNOSE OF GIANT OMPHALOCELE
34 1/7 and 34 2/7 : glucocorticoids for fetal lung maturation
BREATHING
Intubation
Ventilation
ACCES INTRAVENOUS
Epicutaneo-caval
Right internal jugular
ANALGO-SEDATION
Dexmedetomidine ivc
Fentanyl ivc
Morphine ivc
Bolus analgesia IV
Bolus sedation IV
Bolus intranasal
Incidents
Methadone
SURGERY



Dexmedetomidine



- Potent and highly selective α-2 adrenoreceptor agonist
- Very low affinity for α-1 receptors
- Reduce noradrenaline release in the sympathetic nerve endings centrally and peripherally

Sources :
- Lee S. Dexmedetomidine: present and future directions. Korean J Anesth [online]. 19 June 2019.
- Plambech MZ and Afshari A. Dexmedetomidine in the pediatric population: a review. Minerva Med. 2015 Mar;81(3):320-32.

Sources :
- Lee S. Dexmedetomidine: present and future directions. Korean J Anesth [online]. 19 June 2019.
- Cozzi G, Norbedo S and Barbi Egidio. Intranasal Dexmedetomidine for Procedural Sedation in Children, a Suitable Alternative to Chloral Hydrate. Pediatr Drugs [online]. 08 Mar 2017.

Dexmedetomidine

Sedative

Cooperative sedation

Similar to natural sleep (natural state of non-rapid eye movement sleep)

Analgesia

Controversial

Co-analgesia

Cardiovascular

Transient increase in BP followed by a decrease in BP

Reflex drop in HR (dose dependant)

Respiratory

No respiratory depression

Minimal even when higher doses are used

Renal

Diuretic effect

Gastro-intestinal

Antisialagogue effect

Contraindications :

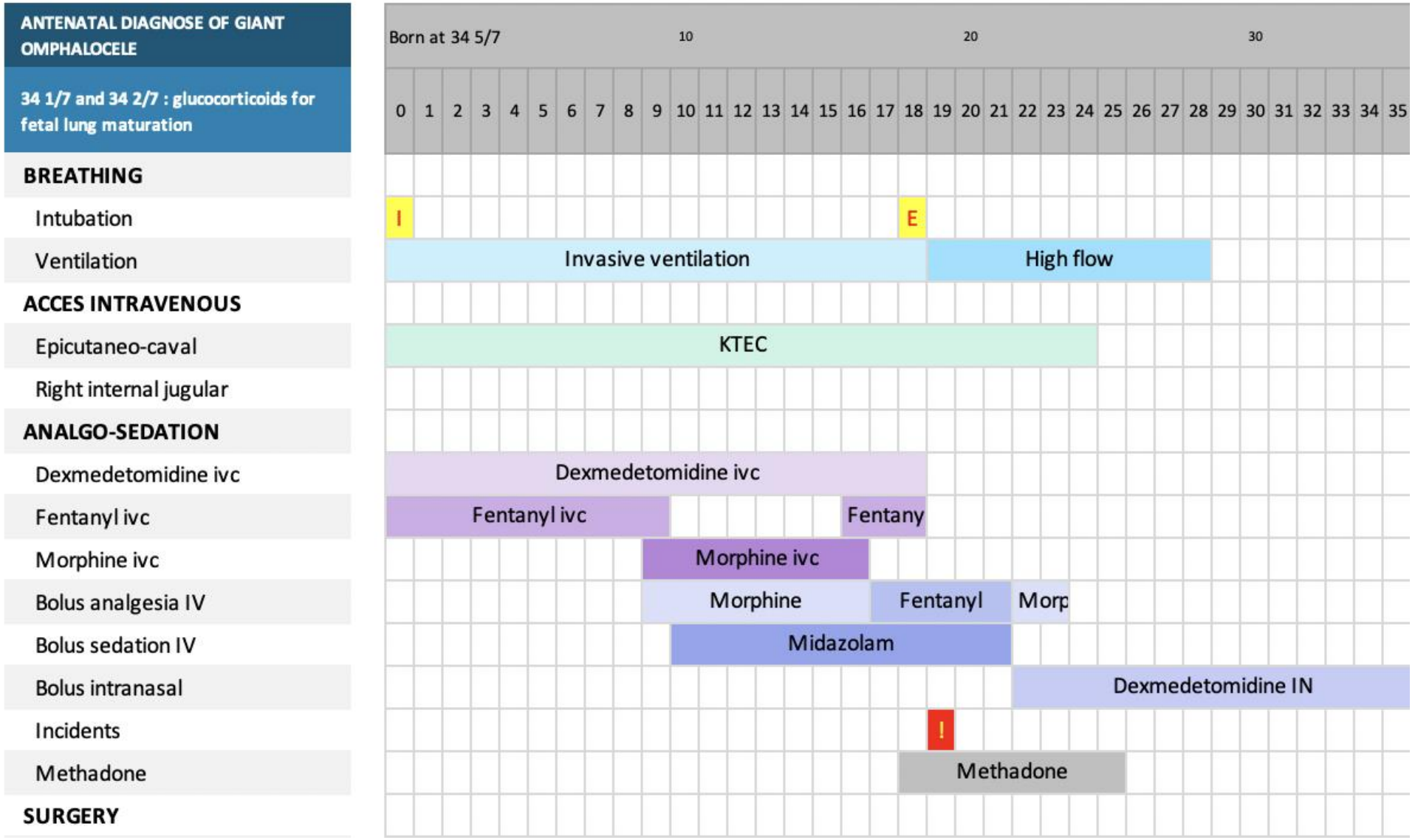
- Hypotension or hemodynamic instability
- Treated with drugs predisposing to bradycardia or hypotension

Olivia’s life

Wich drug without veinous access and extubated ?

A. Morphine po	B. Propofol po
C. Midazolam po	D. Other ?

Olivia's life



Olivia’s life

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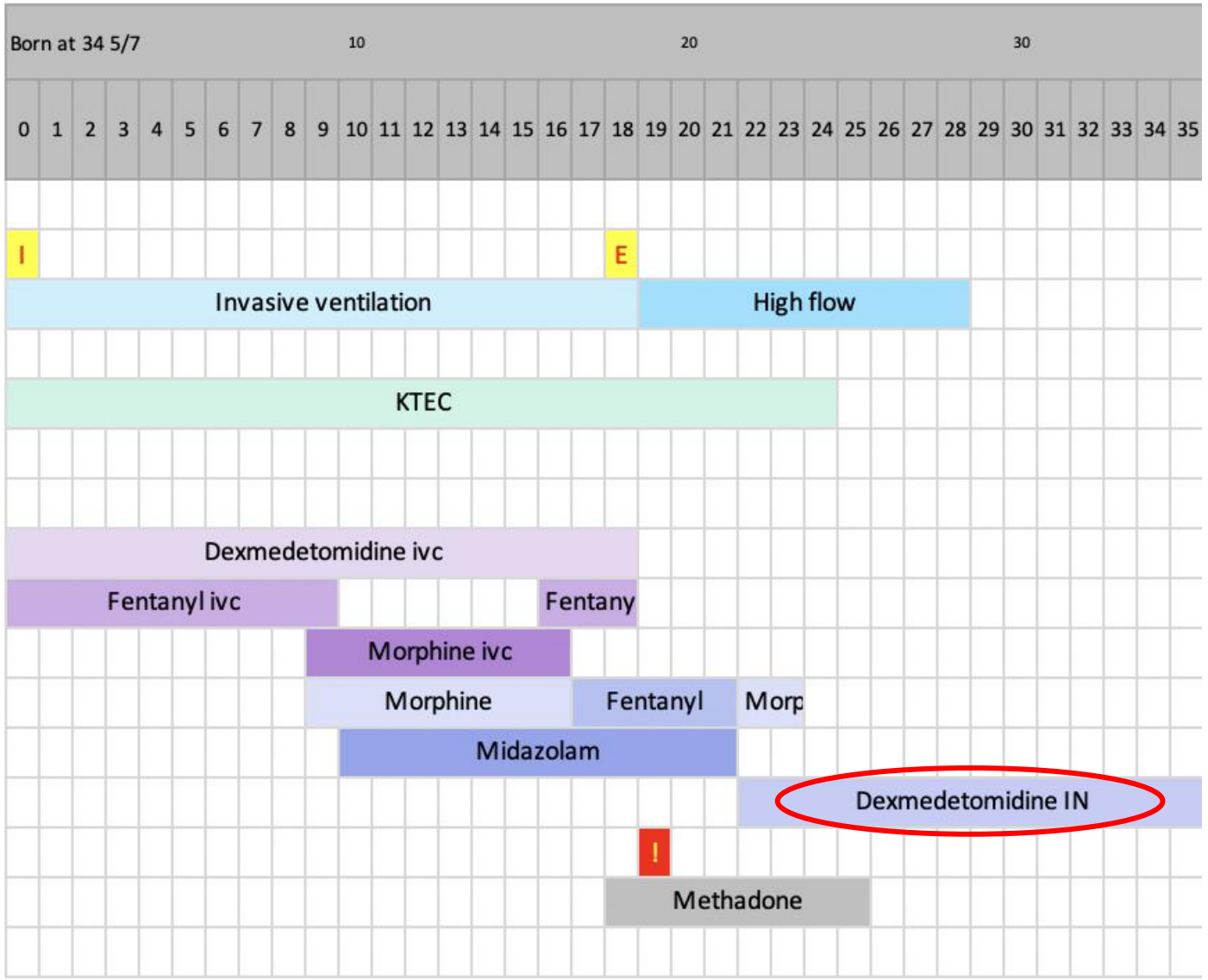


Intranasal drug administration

- Effective and comfortable alternative route
- Rich vascularization and good permeability -> direct systemic absorption bypassing hepatic first-pass metabolism
- Direct nose-to-brain delivery bypassing the blood brain barrier (through the olfactory mucosa)
- IV and IN : preserving bioavailability
- IN : delayed serum concentrations with lower plasma peaks –> reduced side effects

Sources :
- Mondardini MC, Amigoni A, Cortellazzi P et al. Intranasal dexmedetomidine in pediatrics: update of current knowledge. Minerva Anestesiol. 2019 Dec;85(12):1334-1345.
- Cozzi G, Norbedo S and Barbi Egidio. Intranasal Dexmedetomidine for Procedural Sedation in Children, a Suitable Alternative to Chloral Hydrate. Pediatr Drugs [online]. 08 Mar 2017.

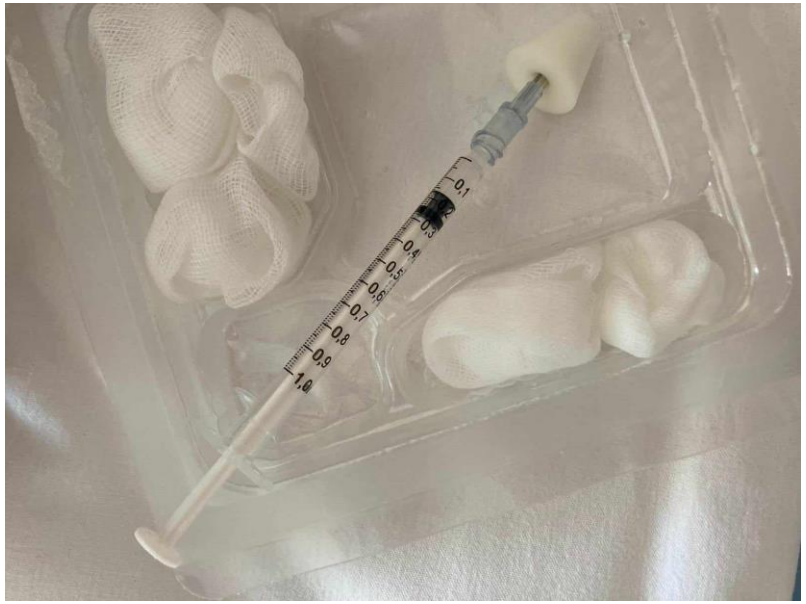
Dose of dexmedetomidine

Dosing for Olivia : 2 mcg/kg IN

TABLE II.—*Instructions for use of intranasal dexmedetomidine.* *Source : Mondardini et al. 2019.*

Parameter	Instructions
Low dose	1-2 µg/kg
High dose	2.5-3 µg/kg
Intranasal optimal volume	Do not exceed 0.15-0.2 mL per nostril
Onset time	25-30 min for low dose, 16.7-28 min for high dose
Offset time	85 (55-100) min
Cardiovascular effects	Hypotension and bradycardia

Intra nasal	*Source : Cozzi et al. 2017.*
Dose	1 to 4 mcg/kg
Onset of sedation	30 to 40 minutes
Average awaking time	90 min (max 2 hours)



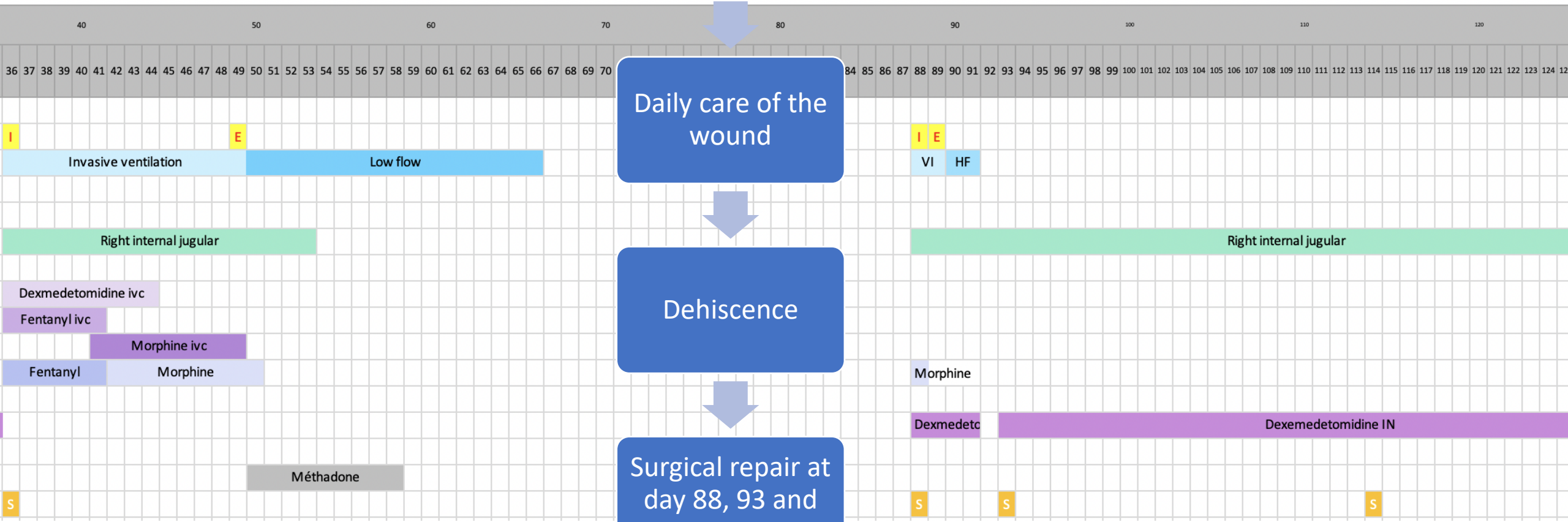
Olivia's life

Day 36 : Abdominal closure

Daily care of the wound

Dehiscence

Surgical repair at day 88, 93 and 114



40 80 90 100 110 120

36 37 38 39 40 41 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 12

I

Invasiv

R

Dexmedetomid

Fentanyl ivc

Fentanyl

I E

VI HF

Right internal jugular

Morphine

Dexmedeto

Dexemedetomidine IN

S S S


OK

Conclusion

Adapt to each patient

- Analgesic, sympatholytic and respiratory-preservating properties.
- More hemodynamically stable than many other drugs and less adverse effects.
- Intranasal dexmedetomidine had an excellent safety profile
- Dose : 1 to 4 mcg/kg ; onset time

Thank you for your attention !

Any questions ?

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EDITED BY
Olumayokun Olajide,
University of Huddersfield,
United Kingdom

REVIEWED BY
Jinn-Rung Kuo,
Department of Neurology, Chi Mei Medical Center, Taiwan
Ifeoluwa Oluleke Awogbindin,
University of Ibadan, Ibadan, Nigeria, Nigeria

The neuroprotective effect of dexmedetomidine and its mechanism

Yijun Hu[1,2], Hong Zhou[1], Huanxin Zhang[1], Yunlong Sui[1], Zhen Zhang[1], Yuntao Zou[1], Kunquan Li[1], Yunyi Zhao[1], Jiangbo Xie[1] and Lunzhong Zhang[1]*

[1]Neurology Department, Weifang Hospital of Traditional Chinese Medicine, Weifang, China, [2]Graduate School, Shandong University of Traditional Chinese Medicine, Jinan, China

Limitations :
- Rates and mices or in vitro
- Injury types : Traumatic brain onjury (TBI) ; Subarachnoid hemorrhage (SAH), cerebral ischemia and ischemia reperfusion

Neuroprotective effect of dexmedetomidine :
1. Reduce inflammation
2. Reduce cell apaptosis
3. Reduce autophagy
4. Protect the BBB and reducing cerebral edema
5. Protect Cellular Structure