

Intraoperative Hypertension: Differential and Treatment

Intraoperative Hypertension CA-1

THE QUESTION

Where the evidence disagrees

This topic was selected because an evidence synthesis beats a textbook on it: the trials disagree, or the guidance has moved recently.

THE EVIDENCE

What each source contributes, and how strong it is

Study design first — a cohort and a randomised trial do not carry the same weight.

Design	Year	Journal	What it found
Other	1977	Anesthesia and Analgesia	Start with the patient rather than the pressure
Other	1978	Archives of Surgery	Look at the capnograph and the saturation before you look at the drug drawer
Other	2017	Spinal Cord Series and Cases	A full bladder deserves a place on the list rather than a joke
Other	2017	Journal of Cardiothoracic and Vasc	Phaeochromocytoma is the rare cause worth naming out loud
Other	1992	Canadian Journal of Anaesthesia	Labetalol given as 5 mg intravenous increments lowered systolic and diastolic
Other	2022	Pregnancy Hypertension	Hydralazine 10 mg intravenously matched incremental labetalol for lowering mea

9 resolved citations behind this deck; every point above traces to one of them.

IN PRACTICE

What the cohorts and reviews add

6 findings, each on the slide that follows.

ANESTHESIA AND ANALGESIA 1977

Start with the patient rather than the pressure

Start with the patient rather than the pressure, because a noxious stimulus alone will do this: in unpremedicated control patients, laryngoscopy and...

ARCHIVES OF SURGERY 1978

Look at the capnograph and the saturation before you look at the drug drawer

Look at the capnograph and the saturation before you look at the drug drawer, because both derangements raise blood pressure through the sympathetic...

SPINAL CORD SERIES AND CASES 2017

A full bladder deserves a place on the list rather than a joke

A full bladder deserves a place on the list rather than a joke, because in a patient with a high spinal cord injury bladder distension is the classic...

JOURNAL OF CARDIOTHORACIC AND VASCULAR ANESTHESIA 2017

Phaeochromocytoma is the rare cause worth naming out loud

Phaeochromocytoma is the rare cause worth naming out loud, because in an unprepared patient the catecholamine surge provoked by induction or by the...

IN PRACTICE

Start with the patient rather than the pressure

Other · Anesthesia and Analgesia

Start with the patient rather than the pressure, because a noxious stimulus alone will do this: in unpremedicated control patients, laryngoscopy and intubation raised mean arterial pressure by an average of 39 mmHg and heart rate by about 20

beats per minute.

Stoelting, Anesthesia and Analgesia 1977 · PMID 562086

IN PRACTICE

Look at the capnograph and the saturation before you look at the drug drawer

Other · Archives of Surgery

Look at the capnograph and the saturation before you look at the drug drawer, because both derangements raise blood pressure through the sympathetic nervous system - allowing arterial carbon dioxide to reach 56 to 65 mmHg under anaesthesia raised systolic pressure, heart rate and cardiac output with a two- to threefold rise in plasma catecholamines, and hypoxia is a recognised driver of sympathoexcitation in its own right.

Rasmussen et al., Archives of Surgery 1978 · PMID 708241

IN PRACTICE

A full bladder deserves a place on the list rather than a joke

Other · Spinal Cord Series and Cases

A full bladder deserves a place on the list rather than a joke, because in a patient with a high spinal cord injury bladder distension is the classic trigger for autonomic dysreflexia and suprapubic pressure alone has been documented driving systolic pressure to 230 mmHg in a woman whose resting pressure was 100/64.

Lee et al., Spinal Cord Series and Cases 2017 · PMID 29423304

IN PRACTICE

Phaeochromocytoma is the rare cause worth naming out loud

Other · Journal of Cardiothoracic and Vasc

Phaeochromocytoma is the rare cause worth naming out loud, because in an unprepared patient the catecholamine surge provoked by induction or by the surgeon's hand on the tumour produces cardiovascular complications that are life-threatening rather than merely inconvenient.

Naranjo et al., Journal of Cardiothoracic and Vascular Anesthesia 2017 · PMID 28392094

IN PRACTICE

Labetalol given as 5 mg intravenous increments lowered systolic and diastolic

Other · Canadian Journal of Anaesthesia

Labetalol given as 5 mg intravenous increments lowered systolic and diastolic pressure within ten minutes and held the effect for at least two hours with only a moderate fall in heart rate, whereas esmolol in the same elderly patients produced bradycardia severe enough that the infusion had to be stopped in two of them - so labetalol is the easier choice when the pressure is high and the heart rate is not.

Singh et al., Canadian Journal of Anaesthesia 1992 · PMID 1353708

IN PRACTICE

Hydralazine 10 mg intravenously matched incremental labetalol for lowering mea

Other · Pregnancy Hypertension

Hydralazine 10 mg intravenously matched incremental labetalol for lowering mean arterial pressure in a randomised trial of severe hypertension in pregnancy, but hypertensive-crisis reviews still place nicardipine, labetalol and esmolol ahead of both hydralazine and nitroglycerine, because the agents you want in an operating room are the short-acting titratable ones you can stop when the stimulus stops.

Muhammad et al., Pregnancy Hypertension 2022 · PMID 35605426

IN THE ROOM

What this changes about the next case

Colour is the strength of the evidence behind each step, not the urgency.

- 1**
Start with the patient rather than the pressure, because a noxious stimulus alone will do this: in unpremedicated control patients, laryngoscopy and intubation raised mean arterial pressure by an average of 39 mmHg and heart rate by about 20 beats per minute.
- 2**
Look at the capnograph and the saturation before you look at the drug drawer, because both derangements raise blood pressure through the sympathetic nervous system - allowing arterial carbon dioxide to reach 56 to 65 mmHg under anaesthesia raised systolic pressure, heart rate and cardiac output with a two- to threefold rise in plasma catecholamines, and hypoxia is a recognised driver of sympathoexcitation in its own right.

- 3 A full bladder deserves a place on the list rather than a joke, because in a patient with a high spinal cord injury bladder distension is the classic trigger for autonomic dysreflexia and suprapubic pressure alone has been documented driving systolic pressure to 230 mmHg in a woman whose resting pressure was 100/64.
- 4 Pheochromocytoma is the rare cause worth naming out loud, because in an unprepared patient the catecholamine surge provoked by induction or by the surgeon's hand on the tumour produces cardiovascular complications that are life-threatening rather than merely inconvenient.
- 5 Labetalol given as 5 mg intravenous increments lowered systolic and diastolic pressure within ten minutes and held the effect for at least two hours with only a moderate fall in heart rate, whereas esmolol in the same elderly patients produced bradycardia severe enough that the infusion had to be stopped in two of them - so labetalol is the easier choice when the pressure is high and the heart rate is not.

KEY TAKEAWAYS

What to carry into the next case

Start with the patient rather than the pressure

Anesthesia and Analgesia 1977

Look at the capnograph and the saturation before you look at the drug drawer

Archives of Surgery 1978

A full bladder deserves a place on the list rather than a joke

Spinal Cord Series and Cases 2017

Pheochromocytoma is the rare cause worth naming out loud

Journal of Cardiothoracic and Vascular Anesthesia 2017

Intraoperative hypertension is a symptom, and the two commonest causes - a patient who is too light and a patient who is in pain - are both treated with anaesthesia and analgesia rather than an antihypertensive, so the drug comes after you have deepened, checked the gas exchange and looked at the bladder.

QUESTIONS I'LL ASK YOU IN THE ROOM

1. Before you give anything: what are the three things on this monitor that could be causing this number?
2. How would you tell light anaesthesia from inadequate analgesia here, and would your treatment differ?
3. Why might I be reluctant to give hydralazine to this patient in the middle of a case?
4. The pressure comes down and then, ten minutes later, it is 200 systolic again with a temperature of 38.4 - what has changed in your differential?

ORAL BOARDS STEM

A 62-year-old man with treated hypertension is having an open hemicolectomy. Forty minutes in, as the surgeon retracts hard on the mesentery, the arterial line reads 195/104 and the heart rate climbs from 62 to 94. The end-tidal sevoflurane is 0.6 MAC, the last opioid was 100 micrograms of fentanyl at induction, and the end-tidal carbon dioxide has crept from 34 to 47 mmHg over the last ten minutes. Your attending asks what you are going to do. Tell me your differential in the order you would work through it, and then tell me what you would give and why.

Intraoperative hypertension is a symptom, and the two commonest causes - a patient who is too light and a patient who is in pain - are both treated with anaesthesia and analgesia rather than an antihypertensive, so the drug comes after you have deepened, checked the gas exchange and looked at the bladder.

SOURCES

- [1] Stoelting, Anesthesia and Analgesia 1977 · PMID 562086
- [2] Rasmussen et al., Archives of Surgery 1978 · PMID 708241
- [3] Simpson et al., The Journal of Physiology 2024 · PMID 38533641
- [4] Lee et al., Spinal Cord Series and Cases 2017 · PMID 29423304
- [5] Naranjo et al., Journal of Cardiothoracic and Vascular Anesthesia 2017 · PMID 28392094
- [6] Singh et al., Canadian Journal of Anaesthesia 1992 · PMID 1353708
- [7] Muhammad et al., Pregnancy Hypertension 2022 · PMID 35605426
- [8] Varon and Marik, Drugs 2008 · PMID 18257607
- [9] Rodriguez et al., Cardiology in Review 2010 · PMID 20160537