ASA Practice Guidelines for the Prevention, Detection, and Management of Respiratory Depression Associated with Neuraxial Opioid Administration

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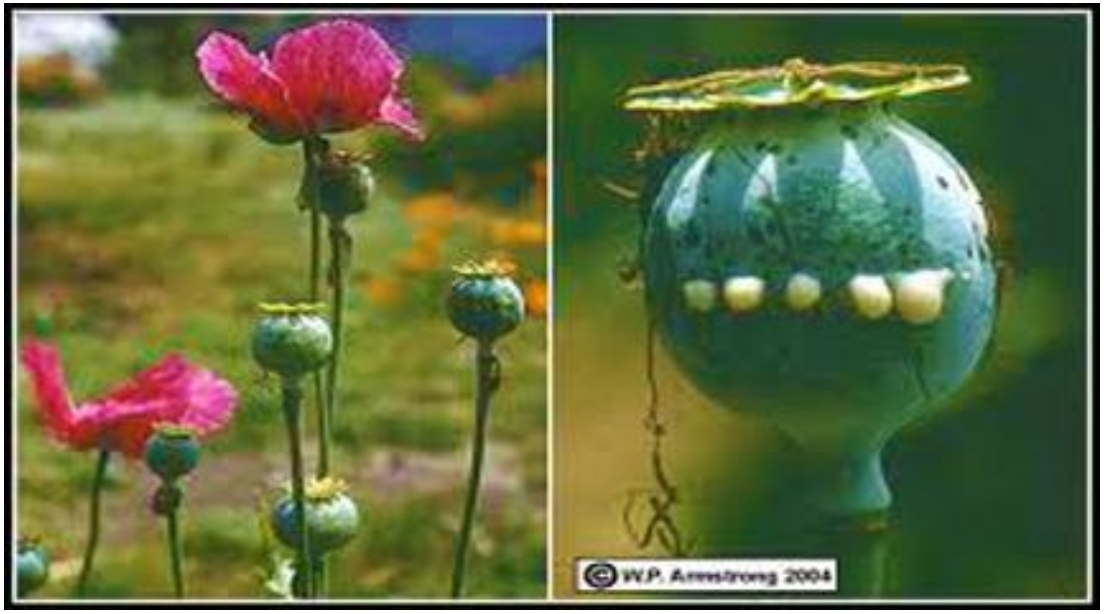
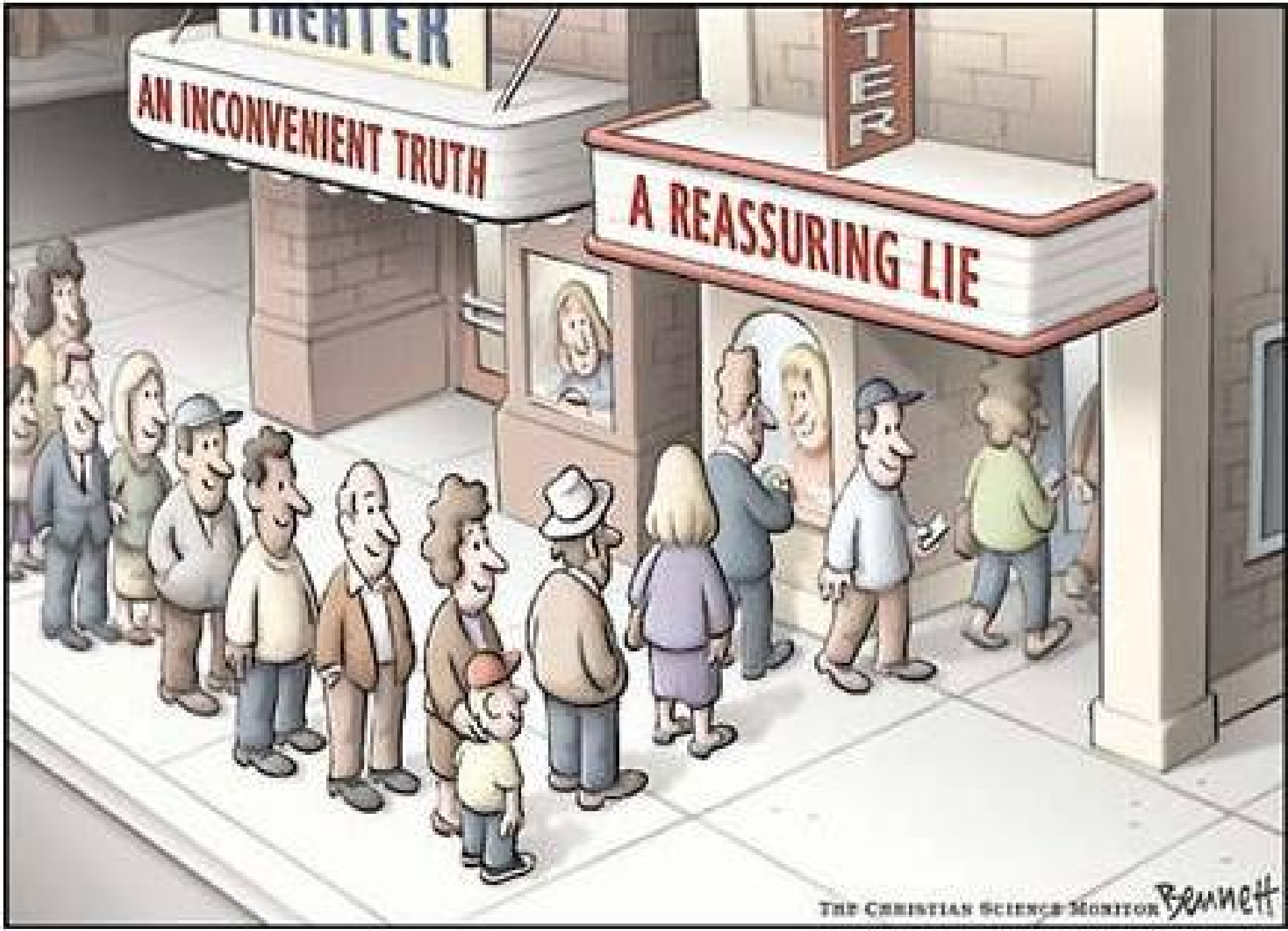


Definition:

Respiratory depression may be indicated by

1.reduced respiratory rate (<10/min)
2.SaO_2 < 90%
3.hypercapnia/hypercarbia ($PaCO_2$>50 mmHg)
4.TV, drowsiness, sedation, periodic apnea, cyanosis may also provide indications of respiratory depression.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BENNETT

Availability and Strength of Evidence

Category A.

Randomized controlled trials. Statistically significant (P< 0.01).
Outcomes are designated as either beneficial (B) or harmful (H) for the patient;
Statistically nonsignificant findings are designated as equivocal (E).

Level 1:
The literature contains a sufficient number of RCTs to conduct meta-analysis
Level 2:
The literature contains multiple RCTs, but the number of RCTs is not sufficient to conduct a viable meta-analysis
Level 3:
The literature contains a single RCT, and findings are reported as evidence.

Category B.

Observational studies or RCTs without pertinent comparison groups may permit inference of beneficial or harmful relations among clinical interventions and clinical outcomes.

Level 1:
The literature contains observational comparisons (e.g., cohort and case-control research designs) with comparative statistics.

Level 2:
The literature contains noncomparative observational studies with associative statistics.

Level 3:
The literature contains noncomparative observational studies with descriptive statistics.

Level 4:
The literature contains case reports.

Identification of Patients at Increased Risk of Respiratory Depression

Recommendations:
1.Conduct a focused history and physical examination before administering neuraxial opioids.
2.Direct particular attention should be directed toward OSA, diabetes, obesity; current medications (including preoperative opioids); and adverse effects after opioid administration.
3.A physical examination should include, but is not limited to, baseline vital signs, airway, heart, lung, and cognitive function.

Literature Findings for Single-injection Neuraxial Opioids vs. Parenteral Opioids

RCTs indicates no significant difference in the frequency of respiratory depression and less somnolence or sedation for single injection epidural opioids compared with IM opioids (Category A1-E)

RCTs comparing patient-controlled epidural opioids (PCEAs) with IV PCA opioids are equivocal regarding respiratory depression and hypoxemia (Category A2-E)

An RCT comparing intrathecal sufentanil with IV sufentanil reports equivocal findings for respiratory depression and hypoxemia (Category A1-E).

RCTs comparing single-injection epidural opioids with IV opioids report inconsistent findings regarding respiratory depression, respiratory failure, somnolence, or sedation (Category A2-E).

Literature Findings for Continuous Infusion Epidural Opioids Compared with Parenteral Opioids:

RCTs indicate less respiratory depression when continuous infusion of epidural opioids are compared with IV infusion of opioids (Category A1-B).

RCTs evaluating differences in hypercarbia somnolence and sedation are equivocal (Category A2-E).

RCT reports no difference in the frequency of respiratory depression when ***extended release epidural morphine*** is compared with IV PCA morphine (Category C2-E)

RCTs report no significant differences in respiratory depression, hypoxia, and sedation or somnolence when extended-release epidural morphine is compared with conventional (immediate-release) epidural morphine (Category C2-E)

ASA consultants agree that extended-release epidural morphine may be used in place of IV or conventional epidural morphine, although extended monitoring may be required.

Recommendations:

Single-injection neuraxial opioids may be safely used in place of parenteral opioids without altering the risk of respiratory depression or hypoxemia.

Single-injection neuraxial fentanyl or sufentanil may be safe alternatives to single-injection neuraxial morphine.

When clinically suitable, ***extended-release*** epidural morphine may be used in place of IV or conventional epidural morphine, although extended monitoring may be required.

Continuous epidural opioids are preferred to parenteral opioids for anesthesia and analgesia for reducing the risk of respiratory depression.

Literature Findings: Hydrophilic or Lipophilic Opioids

RCTs report no differences in the frequency of respiratory depression, somnolence or sedation when ***single-injection*** morphine is compared with ***single-injection*** fentanyl or sufentanil, administered by either an epidural or an intrathecal route (Category A2-E).

RCT findings for respiratory depression are inconsistent when comparing ***continuous*** epidural administration of morphine with fentanyl or sufentanil (Category A2-E evidence).

RCT findings for hypoxemia, hypercarbia sedation and somnolence are equivocal (Category A2-E).

Recommendations:

When clinically suitable, appropriate doses of continuous epidural infusion of fentanyl or sufentanil may be used in place of continuous infusion of morphine or hydromorphone without increasing the risk of respiratory depression.

Given the unique pharmacokinetic effect of the various neuraxially administered opioids, match the appropriate duration of monitoring with the drug.

Do not administer neuraxial morphine or hydromorphone to outpatient surgical patients.

Literature Findings:
Dose Selection (Low-dose Compared vs. High-dose Neuraxial Opioids)

Frequency of respiratory depression is reduced when lower doses of ***single-injection*** epidural morphine or sufentanil are compared with higher doses (Category A1-B).

Respiratory depression and sedation are equal when higher doses of ***continuous infusion*** of epidural fentanyl are compared with lower doses (Category A3-E).

Recommendation:

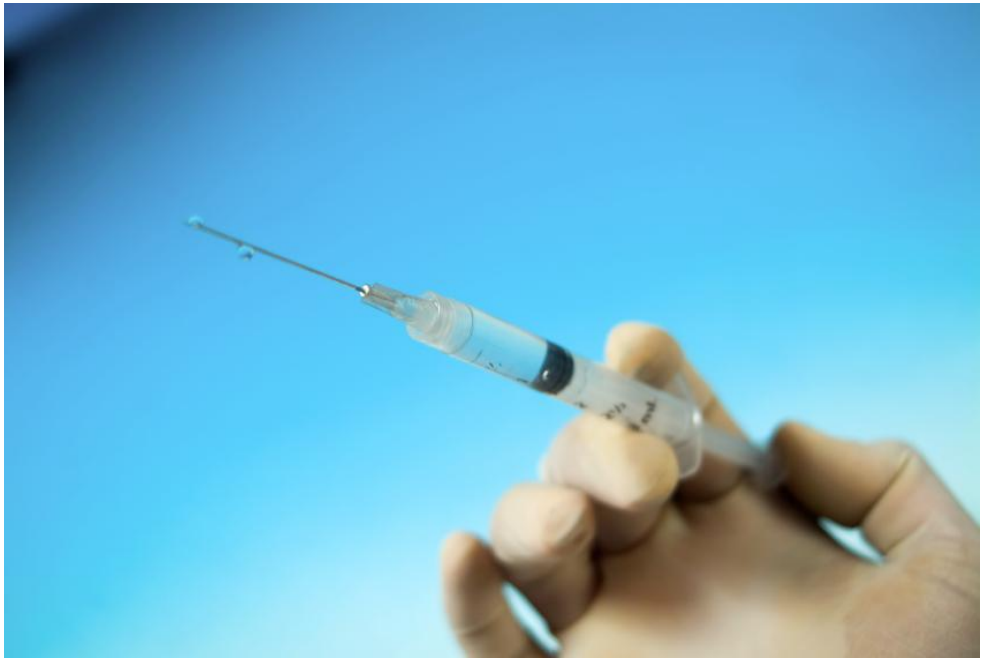
Administer the lowest efficacious dose of neuraxial opioids to minimize the risk of respiratory depression.

Drug Combinations.

Recommendations:

Administer parenteral opioids or hypnotics cautiously in the presence of neuraxial opioids.

The concomitant administration of neuraxial opioids and parenteral opioids, sedatives, hypnotics, or magnesium requires increased monitoring (intensity, duration, or additional methods of monitoring).



Recommendations for Detection and Monitoring for Respiratory Depression

Monitor all patients receiving neuraxial opioids for respiratory rate, SpO2, and level of consciousness.

Intense monitoring of prolonged duration may be warranted for patients at increased risk of respiratory depression (unstable medical condition, obesity, OSA, extremes of age,concomitant administration of opioids /hypnotics by other routes)

Recommendations for monitoring after Single-injection Neuraxial Lipophilic Opioids (Fentanyl)

Monitor for a minimum of 2 h after administration.

Monitor continually for the first 20 min after administration, followed by monitoring at least once per hour until 2 h have passed.

After 2 h, frequency of monitoring should be dictated by the patient's overall clinical condition and concurrent medications.

Recommendations for monitoring after Continuous Infusion or PCEA with Neuraxial Lipophilic Opioids.

Monitor during the entire time the infusion is in use.

Monitor continually for the first 20 min after initiation, followed by monitoring at least once per hour until 12 h have passed.

From 12 to 24 h, monitor at least once every 2 h, and after 24 h, monitor at least once every 4 h.

After discontinuation of continuous infusion or PCEA with neuraxial lipophilic opioids, frequency of monitoring should be dictated by the patient's overall clinical condition and concurrent medications.

Recommendations for monitoring after Single-injection Neuraxial Hydrophilic Opioids (Morphine, not Including Sustained or Extended-release Epidural Morphine).

Monitor for a minimum of 24 h after administration.

Monitor at least once per hour for the first 12 h after administration, followed by monitoring at least once every 2 h between 12 and 24h

After 24 h, frequency of monitoring should be dictated by the patient's overall clinical condition and concurrent medications.

Recommendations for monitoring after Continuous Infusion or PCEA with Neuraxial Hydrophilic Opioids.

Monitor during the entire time the infusion is in use.

Monitor at least once every hour for the first 12 h after initiation, followed by monitoring at least once every 2 h between 12 and 24h.

After 24 h, monitor at least once every 4 h.

After discontinuation of continuous infusion or PCEA, frequency of monitoring should be dictated by the patient's overall clinical condition and concurrent medications.

Recommendations for monitoring after Sustained or Extended-release Epidural Morphine.

Monitor at least once every hour during the first 12 h after administration and at least once every 2 h between 12 and 24h.

After 24 h, monitor at least once every 4 h for a minimum of 48 h.

Management and Treatment of Respiratory Depression

Supplemental Oxygen.

Recommendations:

For patients receiving neuraxial opioids, supplemental oxygen should be available.

Administer supplemental oxygen to patients with altered level of consciousness, respiratory depression, or hypoxemia and continue until the patient is alert and no respiratory depression or hypoxemia is present.

Reversal Agents. Literature Findings:

Although there are insufficient comparative studies to assess the efficacy of naloxone to treat respiratory depression after neuraxial opioids, case reports suggest efficacy of naloxone in reversal of opioid-induced respiratory depression (Category B3-B).

Recommendation:

Naloxon should be available for administration to all patients with significant respiratory depression after neuraxial opioid administration.

Thank you for your time!