

Supplemental Online Content

Uppal V, Russell R, Sondekoppam R, et al. Consensus practice guidelines on postdural puncture headache from a multisociety, international working group: a summary report. *JAMA Netw Open*. 2023;6(8):e2325387. doi:10.1001/jamanetworkopen.2023.25387

eAppendix 1. Search Summary

eAppendix 2. Full Reference List Supporting the Recommendations and Statements

eAppendix 3. The Final Level of Agreement for Each Recommendation

This supplemental material has been provided by the authors to give readers additional information about their work.

eAppendix 1: Search Summary

Date:	March 2, 2022
Requestor:	Vishal Uppal
Research Question:	PDPH guideline

Search strategy was based on the following eight questions. Question 4 (a & b) and Q 6 (a & b) were split for presentation in the manuscript which led to a total of 10 questions. Question 3 (When should one suspect the patient to have PDPH?) was moved up to question 1 to improve the flow of the manuscript.

1. What are patient factors associated with the incidence of PDPH?
2. What are the performer and procedural characteristics that are associated with the risk for PDPH?
3. When should one suspect the patient to have PDPH?
4. Conservative and pharmacological measures
 - a. Is there any evidence regarding prophylactic treatment of ADP?
 - b. What are conservative and pharmacological measures shown to be of benefit in the management of PDPH?
5. What procedural interventions have shown to be of benefits in the management of PDPH, and when to choose them over conservative and pharmacological measures?
6.
 - a. Is preprocedural advanced imaging needed before an epidural blood patch for PDPH?
 - b. What are contraindications or considerations before proceeding with an epidural blood patch for PDPH?
7. Epidural Blood Patch: What is the ideal imaging guidance, volume, level, approach (e.g., transforaminal or interlaminar), and timing for the performance of EBP, and how soon can they be repeated?
8. What follow-up should a patient with PDPH receive (including communication with primary health care providers)? What are the long-term complications of PDPH.

Results Summary:

Database: MEDLINE (Ovid)

Search date: March 2, 2022.

Question #	Total search results	Duplicates removed	De-duplicated total
Question 1	1715	4	1711
Question 2	1626	3	1623
Question 3	1056	3	1053
Question 4	371	1	370
Question 5	490	0	490
Question 6	270	1	269
Question 7	617	1	616
Question 8	312	0	312

PRISMA-S Checklist Items

Citation for PRISMA-S:

Rethlefsen, M.L., Kirtley, S., Waffenschmidt, S. et al. PRISMA-S: an extension to the PRISMA Statement for Reporting Literature Searches in Systematic Reviews. *Syst Rev* 10, 39 (2021).

<https://doi.org/10.1186/s13643-020-01542-z>

Information Sources and Methods

Checklist item	Corresponding information
Name each individual database searched, stating the platform for each.	MEDLINE All (Ovid)
If databases were searched simultaneously on a single platform, state the name of the platform, listing all of the databases searched.	
List any study registries searched.	
Describe any online or print source purposefully searched or browsed (e.g., tables of contents, print conference proceedings, web sites), and how this was done.	
Indicate whether cited references or citing references were examined, and describe any methods used for locating cited/citing references (e.g., browsing reference lists, using a citation index, setting up email alerts for references citing included studies).	
Indicate whether additional studies or data were sought by contacting authors, experts, manufacturers, or others.	
Describe any additional information sources or search methods used.	

Search Strategies

Checklist item	Corresponding information
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Include the search strategies for each database and information source, copied and pasted exactly as run.	Provided below
Specify that no limits were used, or describe any limits or restrictions applied to a search (e.g., date or time period, language, study design) and provide justification for their use.	A publication date limit of 1960-present was applied. Animal studies were removed. The results were also limited to English language.
Indicate whether published search filters were used (as originally designed or modified), and if so, cite the filter(s) used.	
Indicate when search strategies from other literature reviews were adapted or reused for a substantive part or all of the search, citing the previous review(s).	
Report the methods used to update the search(es) (e.g., rerunning searches, email alerts).	
For each search strategy, provide the date when the last search occurred.	The search was run on March 2, 2022

Peer Review and Managing Records

Checklist item	Corresponding information
Describe any search peer review process.	
Document the total number of records identified from each database and other information sources.	See table above
Describe the processes and any software used to deduplicate records from multiple database searches and other information sources.	Results were deduplicated using 8 different Covidence projects – 1 project per question.

Search Strategies

Database: MEDLINE (Ovid)

Search date: March 2, 2022.

Ovid MEDLINE(R) ALL <1946 to March 01, 2022>#

Line	Search terms	Results	Notes
1	(Post dural puncture headache* or postdural puncture headache* or PDPH* or PLPH* or spinal headache*).ti,ab,kw,kf.	1663	
2	("Post lumbar puncture" adj2 headache*).ti,ab,kw,kf.	200	
3	Post-Dural Puncture Headache/	703	
4	or/1-3	1988	
5	exp animals/ not humans.sh.	4965507	
6	4 not 5	1972	
7	limit 6 to yr="1960 -Current"	1931	
8	limit 7 to english language	1715	PDPH concept
9	(risk or risks or epidural or spinal* or dural puncture or trainee* or learner* or student* or needle* or lumbar or thoracic or attempt* or traumatic or atraumatic or diagnostic tap or anesthesia or analgesia or accidental or unintended or inadvertent).ti,ab,kw,kf.	4141065	
10	Risk/	127451	
11	exp Injections, Spinal/	16938	
12	Epidural Space/	4753	
13	Spinal Puncture/	6566	
14	Needles/	16679	
15	exp Analgesia/	47065	
16	exp Anesthesia/	200224	
17	exp Students, Health Occupations/	80126	
18	or/9-17	4296437	
19	((clinical or laboratory) adj4 (feature* or sign or signs)).ti,ab,kw,kf.	254010	
20	(diagnos* or symptom*).ti,ab,kw,kf.	3722920	
21	exp Diagnosis/	9029577	
22	or/19-21	11052079	
23	(prophylactic or prophylaxis or bed rest or abdominal binder* or hydrat* or caffeine or theophylline* or acetaminophen or paracetamol or NSAID* or anti-inflammatory or antiinflammatory or ibuprofen or diclofenac or celecoxib or triptan* or tryptamine or gabapentinoid or gabapentin or pregabalin or neostigmine or opioid* or steroid* or codeine or tramadol or morphine or oxycodone or hydrocodone or hydromorphone or aminophylline or synacthen or cosyntropin or hydrocortisone or dexamethasone or sumatriptan or methylergometrin* or methylergonovine or	1012026	

	DDAVP or desmopressin or ondansetron or mannitol).ti,ab,kw,kf.		
24	Bed Rest/	4039	
25	Caffeine/	24360	
26	Theophylline/	19772	
27	Acetaminophen/	19592	
28	anti-inflammatory agents, non-steroidal/ or celecoxib/ or diclofenac/ or ibuprofen/	83648	
29	Tryptamines/	5473	
30	exp gamma-Aminobutyric Acid/	46256	
31	Neostigmine/	4887	
32	gabapentin/ or pregabalin/	5905	
33	analgesics, opioid/ or morphine/ or tramadol/ or exp codeine/ or hydromorphone/	86410	
34	steroids/ or exp hydrocortisone/ or exp dexamethasone/	160917	
35	Aminophylline/	4231	
36	Cosyntropin/	1632	
37	Sumatriptan/	2272	
38	Methylergonovine/	499	
39	exp Vasopressins/	36542	
40	Ondansetron/	3229	
41	exp Mannitol/	12955	
42	or/23-41	1221953	
43	(saline or intrathecal or sphenopalatine ganglion block or SPGB or occipital nerve block* or acupuncture or fibrin glue or dextran* or gelatin* or starch* or morphine or infusion* or injection*).ti,ab,kw,kf.	1166350	
44	exp Isotonic Solutions/	9743	
45	Sphenopalatine Ganglion Block/	94	
46	exp Nerve Block/	24725	
47	exp Acupuncture Therapy/	27100	
48	Fibrin Tissue Adhesive/	4988	
49	Dextrans/	24837	
50	Gelatin/	13596	
51	Starch/ or morphine/	59041	
52	or/43-51	1220137	
53	(radiography or radiolog* or x-ray* or computed tomography or CT or magnetic resonance imaging or MRI or myelography or ultrasound).ti,ab,kw,kf.	1729824	
54	((brain or head or cranial or diagnostic) adj1 imaging).ti,ab,kw,kf.	35724	
55	exp Diagnostic Imaging/	2817892	
56	or/53-55	3650117	
57	blood patch*.ti,ab,kw,kf.	1590	
58	Blood Patch, Epidural/	984	
59	or/57-58	1811	
60	(chronic headache* or back pain or subdural hematoma or cerebral venous	211168	

	sinus thrombosis or CVST or nerve palsy or seizure* or hard of hearing).ti,ab,kw,kf.		
61	((intracerebral or cerebral or stroke) adj1 (hemorrhag* or haemorrhag*)).ti,ab,kw,kf.	32126	
62	((hearing or visual*) adj impair*).ti,ab,kw,kf.	29737	
63	exp Back Pain/	42421	
64	exp Intracranial Hemorrhages/	76419	
65	exp Sinus Thrombosis, Intracranial/	4000	
66	Paralysis/	21253	
67	Seizures/	58545	
68	exp Cerebral Hemorrhage/	36094	
69	exp Hearing Loss/	74231	
70	exp Vision Disorders/	75874	
71	or/60-70	508093	
72	8 and 18	1626	Question 2 results
73	8 and 22	1056	Question 3 results
74	8 and 42	371	Question 4 results
75	8 and 52	490	Question 5 results
76	8 and 56	270	Question 6 results
77	8 and 59	617	Question 7 results
78	8 and 71	312	Question 8 results

eAppendix 2. Full Reference List Supporting the Recommendations and Statements

INTRODUCTION

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METHODS

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RESULTS

Question 1: When should PDPH be suspected?

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Question 2: What patient factors are associated with the incidence of PDPH?

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Question 3: What procedural characteristics are associated with PDPH?

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Question 10: What are the long-term complications of PDPH and how should patients be followed-up?

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eAppendix 3: The Final Level of Agreement for Each Statement and Recommendation

Statement/Recommendation	Approve	Disapprove	Abstain
Question 1: When should post-dural puncture headache be suspected?			
Statement: PDPH should be suspected if headache, often relieved when laying flat, or any neurological symptom occurs within five days after a neuraxial puncture. (Moderate Level of Certainty).	90%	5%	5%
Recommendation: Inpatients who have received a neuraxial block should be reviewed and asked for symptoms of PDPH. Outpatients should be instructed to report symptoms of PDPH to their physicians, should they occur (Grade A; High Level of Certainty).	100%	0%	0%
Question 2: What patient factors are associated with the incidence of post-dural headache?			
Statement: The preponderance of evidence suggests that in the adult population, younger age may be associated with an increased risk of PDPH (High Level of Certainty).	100%	0%	0%
Statement: Some evidence suggests that adolescents have more susceptibility to PDPH than young or middle-aged adults (Low Level of Certainty).	90%	5%	5%
Statement: The preponderance of evidence suggests that female sex is associated with an increased risk of PDPH (High Level of Certainty).	100%	0%	0%
Statement: The studies reviewed do not suggest that BMI has consistent correlation with the risk of PDPH (Moderate Level of Certainty).	95%	5%	0%
Statement: The preponderance of evidence suggests that headache (chronic, contemporaneous, or prior PDPH) may be associated with an increased risk of PDPH. The association specifically with migraine is less clear (Moderate Level of Certainty).	90%	0%	10%

Statement: Cigarette smoking might be associated with a lower risk of PDPH (Low Level of Certainty).	95%	0%	5%
Statement: There is insufficient evidence to conclude that depression is a risk for PDPH (Low Level of Certainty).	90%	5%	5%
Statement: The preponderance of evidence suggests that pushing during labor after a witnessed dural puncture with a large gauge (e.g. 17-18G Tuohy) increases the risk of PDPH (Low Level of Certainty).	90%	5%	5%
Question 3: What are the performer and procedural characteristics associated with the risk for post-dural puncture headache (PDPH)?			
Statement: Compared to cutting needles, non-cutting spinal needles are associated with lower PDPH risk. However, there is limited evidence regarding the choice of non-cutting spinal needle (High Level of Certainty).	85%	10%	5%
Recommendation: Routine use of non-cutting spinal needles for LP for all populations is recommended (Grade A; High Level of Certainty).	Accepted in first round with 100% agreement		
Statement: When using cutting needles, the risk of PDPH is significantly reduced with narrower gauge needles. (High level of certainty)	100%	0%	0%
Statement: For non-cutting needles, limited evidence suggests a protective role for narrower gauge needles to reduce the risk of PDPH. (Moderate level of certainty)	100%	0%	0%

Recommendation: If using a cutting needle for LP, the use of a small-gauge needle is recommended (Grade A; High Level of Certainty).	95%	0%	5%
Recommendation: Limited evidence supports the preferential use of narrow gauge non-cutting needles over wider-gauge needles for LP (Grade C; Moderate Level of Certainty).	100%	0%	0%
Statement: Evidence does not support the paramedian approach over the standard midline approach to reduce the incidence of PDPH when performing LP. (Moderate Level of Certainty)	100%	0%	0%
Recommendation: If using a cutting needle, insertion with the bevel parallel to the long axis of the spine is preferred as it may reduce PDPH risk. (Grade B; Moderate Level of Certainty)	90%	5%	5%
Statement: Evidence is insufficient to confirm benefit of any technique used to identify the epidural space on reduction of the incidence of PDPH (Low Level of Certainty).	Added during the manuscript review process. All authors' approval obtained		
Statement: Evidence suggests an association between the number of attempts and PDPH risk (Moderate Level of Certainty).	100%	0%	0%
Statement: Evidence suggests that operator experience level reduces the incidence of PDPH, but the net benefit may be small (Moderate Level of Certainty).	100%	0%	0%
Statement: Evidence suggests that all neuraxial techniques (i.e., spinal, epidural, and CSE) have similar PDPH risk profiles (Moderate Level of Certainty).	95%	0%	5%

Statement: Evidence does not suggest an association of PDPH with the level of epidural insertion (Moderate Level of Certainty).	100%	0%	0%
Statement: Evidence suggests a lower risk of PDPH with lateral decubitus position. (Moderate Level of Certainty)	80%	10%	10%
Statement: Limited evidence suggests that the choice of needle in spinal anesthesia does not alter the risk of traumatic tap (Moderate Level of Certainty).	95%	0%	5%
Question 4: What prophylactic measures may be used to prevent post-dural puncture headache?			
Statement: Following inadvertent dural puncture during attempted epidural catheter insertion, current evidence is insufficient to confirm that placement of an intrathecal catheter reduces the incidence of PDPH and EBP (Low Level of Certainty).	100%	0%	0%
Recommendation: After inadvertent dural puncture during epidural catheter placement, an intrathecal catheter may be considered to provide anesthesia/analgesia. This decision must also consider the potential risks associated with intrathecal catheters. (Grade B; Low Level of Certainty)	100%	0%	0%
Statement: Prophylactic EBPs via an existing epidural catheter or as a stand-alone procedure have been performed following inadvertent dural punctures in both obstetric and non-obstetric populations with variable success. Not every patient who experiences a dural puncture develops a PDPH. Therefore, a policy of routine prophylactic blood patching exposes some patients to unnecessary potential risks.	Converted from summary to statement during the manuscript review process. All authors' approval obtained		
Recommendation: While there appears to be some benefit in reduction in incidence, duration and severity of PDPH, a prophylactic EBP cannot be recommended as a routine as there is insufficient evidence to support its effectiveness in preventing PDPH (Grade C; Low Level of Certainty).	100%	0%	0%

Statement: Evidence of a reduction in severity of PDPH with prophylactic bed rest is mixed (Moderate Level of Certainty).	95%	5%	0%
Recommendation: Bed rest has not been shown to be beneficial in reducing the incidence of PDPH and is not routinely recommended as prophylaxis against PDPH. (Grade D, Moderate Level of Certainty).	Accepted in the first round with 100% agreement		
Recommendation: The routine use of injection of any substance intrathecally or epidurally to prevent PDPH is not recommended (Grade I; Low Level of Certainty).	Accepted in the first round with 100% agreement		
Recommendation: There is insufficient evidence to recommend routine systemic drug administration for PDPH prophylaxis (Grade I; Low Level of Certainty).	Accepted in the first round with 100% agreement		
Question 5: What conservative measures may be used to treat of post-dural puncture headache?			
Recommendation: Current evidence does not support the routine use of bed rest to treat PDPH but it may be used as temporizing measure for symptomatic relief (Grade C; Low Level of Certainty).	100%	0%	0%
Recommendation: Adequate hydration should be maintained with oral fluids; intravenous fluid should be used only when oral hydration cannot be maintained (Grade D; Low Level of Certainty)	100%	0%	0%
Recommendation: Current evidence does not support the routine use of abdominal binders to treat PDPH (Grade D; Low Level of Certainty).	95%	0%	5%
Recommendation: Current evidence does not support the routine use of aromatherapy to treat PDPH (Grade D; Low Level of Certainty).	95%	0%	5%
Recommendation: Regular multimodal analgesia including acetaminophen and NSAIDs should be offered to all patients with PDPH (Grade B; Low Level of Certainty).	100%	0%	0%
Recommendation: Short-term use of opioids may be considered in the treatment of PDPH, but long-term use is not recommended(Grade D, Moderate Level of Certainty).	80%	15%	5%

Recommendation: Caffeine may be offered in the first 24 h of symptom onset with a maximum dose of 900 mg per day (200-300 mg if breastfeeding) and avoiding multiple sources to prevent untoward side effects (Grade B; Low Level of Certainty).	100%	0%	0%
Recommendation: Current evidence does not support the routine use of hydrocortisone, theophylline and gabapentin in the management of PDPH (Grade D; Low Level of Certainty).	Accepted in the first round with 100% agreement		
Question 6: What procedural interventions have been shown to be of benefit in the management of post-dural puncture headache, and when should they be chosen over conservative and pharmacological measures?			
Recommendation: Current evidence does not support the routine use of acupuncture in the treatment of PDPH (Grade I; Low Level of Certainty).	Accepted in the first round with 100% agreement		
Recommendation: Current evidence does not support the routine use of SPGBs in the treatment of PDPH (Grade I; Low Level of Certainty).	90%	5%	5%
Statement: The efficacy of GONB for PDPH following dural puncture with larger gauge needles is unclear (Low Level of Certainty).	95%	0%	5%
Recommendation: GONBs may be offered to patients with PDPH following spinal anesthesia with a smaller gauge (22G or less) needle, although headache may recur in a significant proportion with more severe headache requiring an EBP. (Grade C; Moderate Level of Certainty).	90%	5%	5%
Recommendation: Current evidence does not support the use of spinal and epidural morphine to treat PDPH (Grade D, Low Level of Certainty).	Accepted in the first round with 100% agreement		
Recommendation: Epidural saline may be of temporary benefit but should not be expected to provide long lasting headache relief in the treatment of PDPH (Grade C; Low Level of Certainty).	95%	5%	0%

Recommendation: Current evidence does not support the routine use of epidural dextran in the treatment of PDPH (Grade I; Low Level of Certainty).	Accepted in the first round with 100% agreement		
Recommendation: Current evidence does not support the routine use of epidural gelatin in the treatment of PDPH (Grade I; Low Level of Certainty).	Accepted in the first round with 100% agreement		
Recommendation: Current evidence does not support the routine use of epidural HES in the treatment of PDPH (Grade I; Low Level of Certainty).	Accepted in the first round with 100% agreement		
Statement: The use of fibrin glue may be associated with anaphylaxis and aseptic meningitis, although it not possible to quantify the risk (Low Level of Certainty).	84%	11%	5%
Recommendation: Current evidence does not support the routine use of fibrin glue in the treatment of PDPH. (Grade I, Low Level of Certainty).	Accepted in the first round with 100% agreement		
Recommendation: Fibrin glue should be reserved for the management of PDPH refractory to EBP or when autologous blood injection is contraindicated. (Grade I; Low Level of Certainty)	Accepted in the first round with 100% agreement		
Question 7: Is imaging required in the management of post-dural puncture headache?			
Statement: Current evidence is insufficient to assess the balance of risk versus benefit routine cranial imaging prior to EBP for PDPH (Low Level of Certainty).	100%	0%	0%
Recommendation: Brain imaging is not likely to be contributory in most cases of typical PDPH but may be considered when non-orthostatic headache is present or develops subsequent to initial orthostatic headache. Imaging may also be appropriate when headache onset is more than five days after suspected dural puncture (Grade C; Low Level of Certainty).	Accepted in the first round with 100% agreement		

Recommendation: The presence of focal neurological deficits, visual changes, alterations to the level of consciousness, or seizures, especially in the postpartum period, should prompt neuroimaging to evaluate for alternative diagnoses (Grade A; Moderate Level of Certainty).	Accepted in the first round with 100% agreement		
Question 8: What are the contraindications to an epidural blood patch for PDPH?			
Statement: The risk of an epidural hematoma is low when performing neuraxial procedures on obstetric patients with a platelet count greater than or equal to 70,000 x 10 ⁶ /L providing there is no defect in platelet function(Moderate Level of Certainty).	95%	0%	5%
Statement: There is insufficient evidence for recommending prophylactic antibiotics prior to EBP (Low Level of Certainty).	Accepted in the first round with 100% agreement		
Recommendation: Clinicians should follow appropriate guidelines (such as ASRA Pain Medicine and SOAP) regarding neuraxial injection in patients on antithrombotics or with low platelet counts (Grade A; Moderate Level of certainty).	Accepted in the first round with 100% agreement		
Recommendation: Caution should be exercised when considering EBP in febrile patients or patients presenting with other systemic signs of infection. Deferring the procedure may be appropriate if there is risk of hematogenous infection. (Grade C; Moderate Level of Evidence)	100%	0%	0%
Q9: Epidural Blood Patch: When and how should an epidural blood patch be used in the treatment of PDPH?			
Recommendation: When PDPH is refractory to conservative therapy, and impairs activities of daily living an EBP should be considered a therapeutic option to treat headache and other neurological sequelae of intracranial hypotension (Grade: B; Moderate Level of Certainty).	95%	5%	0%

Recommendation: In patients with PDPH with severe neurological symptoms (e.g., hearing loss, cranial neuropathies), EBP should be considered as a therapeutic option (Grade: C; Moderate Level of Certainty).	100%	0%	0%
Statement: High success rates for EBP reported in early studies have not been reproduced in more recent publications with complete headache remission varying between 33% and 91% (Low Level of Certainty).	90%	10%	0%
Recommendation: If an EBP performed within 48 h of dural puncture patients should be counseled about potentially more likely need for repeat EBP to achieve symptom resolution (Grade B; Moderate Level of Certainty).	95%	0%	5%
Recommendation: Regular patient follow-up should be undertaken for the potential need for repeat EBP in cases of suspected persistent or severe CSF leak, until symptom resolution (Grade C; Low Level of Certainty).	Accepted in the first round with 100% agreement		
Recommendation: When the site of dural puncture is known, an EBP should be performed at or one space below the level of the original dural puncture. If that is not possible, the injection can be administered at other vertebral levels (Grade B; moderate Level of Certainty).	90%	5%	5%
Recommendation: Unilateral or bilateral transforaminal approach can be considered in cases of prior laminectomies near site of dural puncture or after unsuccessful interlaminar EBP (Grade: C; Moderate Level of Certainty).	90%	5%	5%
Statement: The optimal EBP volume is unknown and likely varies between patients due to patient factors such as size, age, degree of spondylotic spine changes and relative size of the dural hole.	100%	0%	0%
Statement: Despite lack of correlation between EBP volume and success rates, most recommended volumes are between 15-20mL	100%	0%	0%
Statement: Injection of >30 mL blood does not appear to increase the success rate of an EBP.	95%	0%	5%
Recommendation: The decision to perform EBP under radiological guidance (i.e., fluoroscopy, CT) should be individualized based on patient factors including age, degree of spondylotic change, context of dural puncture, and prior lumbar spine surgeries. (Grade I; Low Level of Certainty)	95%	5%	0%

Recommendation: Risk and benefit analyses, available resources and follow-up capabilities, and in cases where the provider determines that EBP cannot be safely performed with landmarks alone should also be considered. (Grade I; Low Level of Certainty)	100%	0%	0%
Recommendation: Ultrasound guided EBP has the utility for landmark clarification prior to EBP or for image guidance in patients unable to receive fluoroscopy or CT (Grade I; Low Level of Certainty).	95%	5%	0%
Recommendation: Current evidence does not support the routine use of blood cultures prior to an EBP (Grade D; Low Level of Certainty).	95%	0%	5%
Recommendation: Informed consent for an EBP should include the potential for repeat dural puncture, backache and neurological complications. (Grade A, High Level of Certainty).	100%	0%	0%
Recommendation: To minimize complications, blood should be injected slowly and incrementally while performing EBP. If the patient develops backache or headache (e.g., pressure paresthesia) while performing EBP, injection of blood should be stopped immediately, and resumed only if symptoms resolve (Grade A; Moderate Level of Certainty).	95%	5%	0%
Recommendation: After an EBP, if backache persists, increases in severity, or evolves, then other diagnoses should be investigated (Grade C; Low Level of Certainty).	95%	5%	0%
Recommendation: Patients with severe headache within the first 24 h of dural puncture, older patients, and those with a history of headaches or hypertension should be counseled that repeat EBP may be needed to alleviate severe symptoms or to treat breakthrough symptoms (Grade C; Moderate Level of Certainty).	95%	5%	0%
Recommendation: Evidence to guide timing of repeating EBP is insufficient and should be individualized based on risk benefit analyses. (Grade I, Low Level of Certainty).	100%	0%	0%
Statement: Timing of neuraxial blocks following EBP may impact clinical outcomes. Patients presenting for repeat neuraxial blocks ≤2 years following EBP may be counseled on the potential for decreased rates of success, although the evidence is very weak (Low Level of Certainty).	89%	11%	0%

Recommendation: Epidural analgesia and anesthesia can be effective and should not be withheld following EBP (Grade C; Low Level of Certainty).	100%	0%	0%
Question 10: What are the long-term complications of post-dural puncture headache and how should patients be followed-up?			
Statement: Current evidence shows an association between inadvertent dural puncture and/or PDPH with chronic headache, backache, neckache, depression, cranial nerve palsy, SDH or CVST (Moderate Level of Certainty).	Accepted in the first round with 100% agreement		
Statement: Evidence is insufficient to determine whether EBP mitigates, prevents, or treats these sequelae (Low Level of Certainty).	Accepted in the first round with 100% agreement		
Statement: PDPH is an independent predictor for the development of chronic headache (Moderate Level of Certainty).	85%	0%	15%
Recommendation: Prior to discharge, information regarding PDPH sequelae of PDPH needs to be conveyed to the patient along with appropriate follow-up and contact information with their anesthesia provider and other health care providers (Grade B, Moderate Level of Certainty).	100%	0%	0%
Recommendation: Patients, their obstetricians, and their primary care physicians should be counseled regarding the long-term potential for chronic headache so that appropriate referrals and care may take place (Grade B; Moderate Level of Certainty).	85%	5%	10%
Recommendation: Follow-up with patients who experience PDPH should be continued until the headache resolves to exclude severe complications such as SDH and CVST (Grade B; Moderate Level of Certainty).	95%	5%	0%
Recommendation: Following discharge from hospital, follow-up may be continued by the patient's primary care physician. Information regarding the diagnosis of a PDPH and/or inadvertent dural puncture should also be communicated to the patient's primary care physician and specialists and referrals to a pain or neurology specialist if indicated (Grade C; Low Level of Certainty).	Accepted in the first round with 100% agreement		

Recommendation: Urgent neuroimaging should be performed for any PDPH patient with worsening symptoms despite an EBP, new focal neurologic symptoms, or change in the nature of headache (Grade B; Moderate Level of Certainty).

95%

5%

0%