PDPH – what works & what doesn’t

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Disclosures

Personal: Nil

Presentation caveats:

*Cause & severity of PDPH are relevant*

1. what works (a bit) for mild/mod post-spinal headache may not work at all for mod/severe post-epidural PDPH

2. what works in a 80 yr old post-spinal may not work in a recently pregnant woman post-epidural

Evidence is often of low quality or equivocal
Objectives

- Briefly review strategies for prevention of PDPH after dural tap
- Review evidence for management of PDPH
  - ie. what works (if anything, including epidural blood patch)
- Summarise how to get the best from an EBP
What I will not go into detail about

- Preventing post-spinal PDPH with small gauge, non-cutting needles
- Preventing accidental ("unintentional") dural puncture with an epidural
  - CSE vs Epi
  - Epidural needle bevel orientation during insertion
  - Loss-of-resistance saline vs air
  - Ultrasound-guided insertion
  - Type of epidural needle
Levels of Evidence

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level Ia
systematic review (with homogeneity)* of all relevant randomised controlled trials (RCTs)

level Ib
at least one RCT (with narrow confidence intervals)

level IIa & IIb
cohort studies or low quality RCT

level IIIb
case control studies

level IV
case series

level V expert opinion or physiology / bench research

Jadad score 0-5 for trial quality
Deterrants:

Can we prevent PDPH?

"DON'T EAT THE HARD BIT ON IT'S BACK. THEY MAKE YOU FART!"
What do **YOU** recommend after a dural tap to **prevent** a PDPH?

Straw poll: how many

- suggest high fluid intake?
- recommend bed rest?
- prescribe regular analgesics?
- **give epidural saline?**
- limit second stage or avoid pushing?
- suggest or prescribe caffeine?
- inject intrathecal saline?
- do a prophylactic blood patch?
- place catheter intrathecal?
- give steroidal analogues eg. cosyntropin?
- give epidural morphine?
- give IV aminophylline?
Do these strategies help?

Good evidence they don't (level 1)

- high fluid intake
- regular analgesics
- bed rest
- epidural saline
Do these strategies help?

Uncertain but not recommended anyway

- limit second stage or avoid pushing
- caffeine
- prophylactic blood patch
- leave spinal catheter in situ 24 h+
- inject intrathecal saline
Do these strategies help?

Best supporting evidence (level IIb) but still uncertain

- insert epidural catheter intrathecally & remove when clinically indicated
- give IV cosyntropin
- give EPI morphine
- give IV aminophylline
Why prophylactic epidural blood patch has gone

1. Not all patients have an epidural re-inserted these days

2. Meta-analysis 4 RCTs, n=173
   - low quality (Jadad 2)
   - no significant difference in incidence of PDPH

3. Best RCT

No difference in:
- PDPH
- maximum severity of PDPH
- need for therapeutic EBP
Why we are still uncertain about intrathecal (spinal) catheter placement

1. Meta-analysis 9 non-randomised studies, n=963

RR PDPH 0.82 (CI 0.67-1.01)
RR EBP 0.64 (CI 0.49-0.84)

1 quasi-RCT, n=97
PDPH 72% spinal catheter vs 62% epidural catheter

Possible reduction in severity of PDPH

Level IIa
Why I don’t do these (yet?)

1. IV cosyntropin 1 mg
   1 RCT, n = 90
   PDPH 33% vs 69%
   EBP 11% vs 29%

2. Epidural morphine 3 mg x 2 post-delivery
   1 RCT, n = 50
   PDPH 12% vs 48%
   EBP 0% vs 24%

3. IV aminophylline
   1 RCT, post-spinal

Require confirmation (level IIa): not practical
1. Judiciously & sympathetically do nothing
2. Provide analgesia for headache
3. Seek relief by epidural blood patch (EBP)
Option 1: Judiciously & sympathetically do very little!

What is the natural history of PDPH? We aren’t sure, esp. after dural tap!

- post-spinal PDPH resolve in 1-12 days (mean 4) but for younger patients or larger needles, 80% DO NOT RESOLVE by 1 week
Option 1: Judiciously & sympathetically do very little!

Be careful -

• after obstetric ‘dural tap’ 10% PDPHs are still present after 1 month
• these women may be at risk of chronic headache
• does this increase the risk of a serious complication?
So what are the consequences of symptomatic treatment and waiting?

1. Greater suffering & increased length of hospital stay

2. Increased anaesthetic workload due to visits for evaluation & treatment

3. A higher risk of serious complications??
What are the (rare) serious complications associated with PDPH?

- subdural hematoma
- nerve palsies
- cortical vein thrombosis
- neuraxial infection
- seizures
- stroke & cerebral haemorrhage
- unmasking CNS pathology
- brain herniation
- all the above
How do YOU treat PDPH, other than a blood patch?

Straw poll: how many

- recommend bed rest?
- suggest high fluid intake?
- prescribe regular analgesics?
- suggest or prescribe caffeine?
- try a triptan?
- infuse epidural saline?
- give ACTH or similar?
- give IV hydrocortisone?
- give IV aminophylline?
- prescribe oral gabapentinoids?
Option 2: Treat symptoms

Problems

- The majority of PDPHs after ‘dural tap’ are moderate or severe in intensity & DO NOT RESPOND WELL to pharmacological treatment
- bed rest is effective but impractical
- drug side effects are an issue eg. caffeine at best modest benefit [level Ia] but agitation, insomnia, arrhythmias & seizures
Treatments that are proven useless, have no evidence to support them or are just not worth it (level 1a-IIb)

- non-opioids & opioids
- extra hydration
- sumatriptan etc.
- ACTH
- EPI saline
- EPI opioids
- acupuncture
Some weak evidence (level IIb) - worth a thought?

- **IV hydrocortisone 100 mg tds x 48 h**
  - 2 RCTs, post-spinal

- **PO gabapentin or pregabalin**
  - 2 RCTs, post-spinal + case series post-epidural

- **IV aminophylline 200 mg**
  - 1 RCT, small

- occipital nerve blocks
Oral gabapentin or pregabalin

gabapentin 300 mg tds
- 2 RCTs, n=62, post-spinal

pregabalin 75-150 mg bd
- 1 RCT, n=40, post-spinal

Case series post ‘dural tap’ support benefit & better relief than caffeine.

Requires confirmation (& discussion of safety during lactation)
Option 3: Epidural blood patch (EBP)
Does it work?


“Therapeutic EBP showed a benefit over conservative treatment, based on limited evidence” level Ib

Popular in UK/USA/Australia
Not in many European national guidelines
Does it work?

POORLY if within 24-48 h of puncture
[need for second EBP also predicted by short time from dural tap to onset of headache]

MODERATELY if delayed at least 1 day post-onset
PDPH

- permanent or partial relief 75-90%
- complete & permanent relief 30-60%
Works better for spinal PDPH

N=151
Works better if > 48 h from puncture

N=151
What do I tell the patient about EBP?

- It is very likely to provide some or complete relief initially.

- The headache may return but can be treated in the same way again (second EBP in ~10-15% & similar success rates).

- The procedure has some common risks (procedural and post-procedural back pain); some uncommon risks (failure; repeat dural puncture) and some very rare risks (serious pathologies: but chicken or egg?)
How do I do it?

Aseptic (2 operators ideal or double glove)
Lateral positioning if possible for comfort
Near the dural puncture if possible
Recumbent 2 h post-procedure
How much blood?

20 ml (or as much as the patient tolerates)

Why?

Table 4. Incidence of Headache Relief After Epidural Blood Patch

<table>
<thead>
<tr>
<th></th>
<th>&lt;48 hours</th>
<th>≥48 hours</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent or partial relief</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 mL</td>
<td>33.3 (9.0–65.1)</td>
<td>72.4 (52.8–87.3)</td>
<td>61.0 (44.5–75.8)</td>
</tr>
<tr>
<td>20 mL</td>
<td>61.5 (31.6–86.1)</td>
<td>78.6 (59.1–91.7)</td>
<td>73.2 (57.1–85.8)</td>
</tr>
<tr>
<td>30 mL</td>
<td>56.3 (29.9–80.3)</td>
<td>73.9 (51.6–89.9)</td>
<td>66.7 (49.8–80.9)</td>
</tr>
<tr>
<td>Permanent relief*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 mL</td>
<td>0.0 (0–26.5)</td>
<td>13.8 (3.9–31.7)</td>
<td>9.8 (2.7–23.1)</td>
</tr>
<tr>
<td>20 mL</td>
<td>15.4 (1.9–45.5)</td>
<td>39.3 (21.5–59.4)</td>
<td>32.3 (18.1–48.1)</td>
</tr>
<tr>
<td>30 mL</td>
<td>25.0 (7.3–52.4)</td>
<td>26.1 (10.2–48.4)</td>
<td>25.6 (13.0–42.1)</td>
</tr>
</tbody>
</table>

Values are percentages (Clopper–Pearson binomial 95% confidence intervals). Summaries are shown for both strata and overall.

* Statistically significant differences in the rates of permanent relief were found between the groups on chi-square test ($P = 0.048$), with the less-than-expected number of permanent responses seen in the 15-mL group. Further comparisons using logistic regression analysis showed that the response achieved in the 20-mL group was significantly higher than that achieved in the 15-mL group (odds ratio OR = 4.49, confidence interval CI = 1.31–15.42; $P = 0.017$), while the higher response in the 30-mL group was not significantly different from that in the 15-mL group (OR = 3.56, CI = 0.99–12.73; $P = 0.051$).

Suggested correlation between high volumes and compressive neurological complications....
Indications for EBP

1. moderate or severe PDPH for at least 24 h & interferes significantly with function

2. unresolved PDPH after several days & patient keen

3. no relative contraindications
   - fever / sepsis
   - vertebral canal bleeding risk
   - high-risk of repeat dural tap
   - concurrent CNS pathology (raised ICP)
   - autologous blood an unsuitable medium
   - atypical headache not yet investigated by neurologist & imaging
   - two recently failed EBPs
Other “patches’

Second EBP
• yes if diagnosis remains certain
• > 24 h since recurrence

Other media
• Saline
• Colloid
• Fibrin glue
• Non-autologous blood
• Surgical closure

Very limited data: special cases only
Can dural tap / PDPH post-tap be prevented?

- Use an 18 gauge epidural needle
- Avoid injecting intrathecal air
- Consider epidural morphine 3 mg if clinically indicated
- Consider cosyntropin 1 mg IV if available
When is ‘expectant’ treatment recommended?

• For the first few days if the PDPH is mild and not debilitating (not confined to bed most of the day)

• In the first 24 - 48 h after PDPH commences, even if it is moderate or severe

• When an epidural blood patch isn’t!
What ‘expectant’ treatment is recommended?

- Reassurance, explanation & review (beware mis-diagnosis)
- Patient recumbency as much as practical
- Ignoring what most books and reviews tell you about fluids & analgesics!
- Consider oral gabapentin / pregabalin?
When is an epidural blood patch recommended?

1. PDPH that is moderate to severe, interferes significantly with function & has been present for 24-48 h

2. PDPH that has not resolved (at any time from several days to years)

3. No contraindications
How should you do the blood patch?

- Aseptically & skilfully
- Any way you like?
  - lateral position (the patient!)
  - near the puncture site
  - with at least 20 mL of blood if tolerated (inject slowly)
  - with colloid, saline or fibrin glue if blood unsuitable
  - keep flat for 2 h
The home of headaches: visitors welcome!