

Performing a Systematic Review- Example 1

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Steps

- Any similar articles out there ??
- Planning
- Registration
- Data Synthesis
- Discussion/ Conclusions

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REVIEW



Demographics, presentation, and clinical outcomes after traumatic bifrontal contusions: a systematic review

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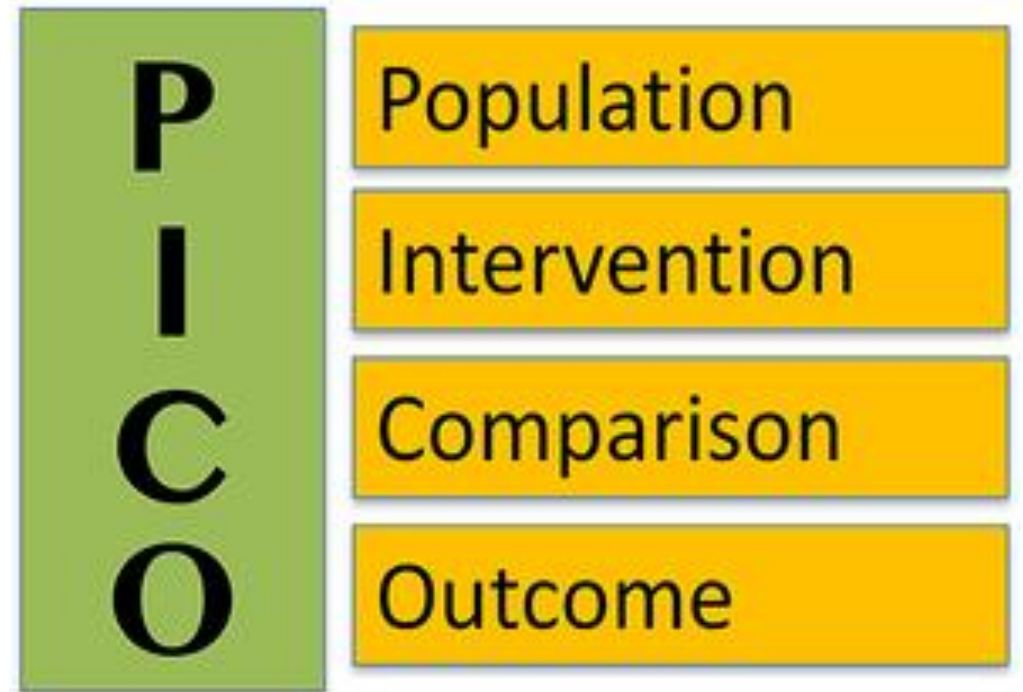
Abstract

Traumatic bifrontal contusions (TBC) form a recognised clinical entity among patients with traumatic brain injury (TBI). This study aims to systematically review current literature on demographics, management, and predictors of outcomes of patients with TBC. A multi-database literature search (PubMed, Cochrane, OVID Medline/Embase) was performed using PRISMA as a search strategy. Studies were selected by predefined selection criteria (PROSPERO: CRD42018055390), and risk of bias was assessed using an adapted form of ROBINS-I tool. Of the 275 studies yielded by the literature search, seven articles met the criteria for inclusion, all of which were level III evidence. Total cohort consisted of 468 patients; predominantly male ($n = 5$; 303/417 patients) with average age 44.3 years (range, 7–81). Falls (44.9%) and road traffic accidents (46.6%) were the commonest mechanisms of injury with an average presentation GCS of 9.2 ($n = 3$, 119 patients). GCS on admission of ≤ 13.1 and contusion volume at day 2 post-injury of $\geq 62.9\text{cm}^3$ were associated with increased risk of deterioration needing surgical interventions ($n = 1$, 7 patients). The majority of patients underwent surgery; the average GOS was 4, at an average follow-up duration of 11.7 months ($n = 6$, 356 patients). The currently available evidence on the management of TBC is scarce. Larger multicentre

Example 1

Step 1: Planning

- Research Question: **Predictors of outcome in traumatic bifrontal contusions ?**
- Inclusion criteria: **Patients aged >18 years; diagnosis of bifrontal contusions on CT imaging**
- Variables of interest: **demographics, injury, imaging findings, clinical status, management, outcome**



Example 1

Step 1: Planning

- Databases: **Pubmed, Cochrane, Embase**
- Search strategy: **“bifrontal contusions”, “bilateral frontal contusions”, “frontal contusions”**
- Timescale: **January 1947 – January 2018**

Example 1

Step 1: Planning

Assigning roles to team members- minimum 5 authors

2x authors- literature search

2x authors- assessment of risk of bias

1x author- senior author for supervision/ resolution of disagreement

Agree on a timescale

Example 1

Step 2: Registration

- Formalising the plan:
<https://www.crd.york.ac.uk/prospero/>
- Study registration (PROSPERO):
CRD42018055390

The screenshot shows the PROSPERO registration page for a systematic review. At the top left is the NIHR logo (National Institute for Health Research). At the top right is the PROSPERO logo (International prospective register of systematic reviews). Below the logos is a green button with 'Print' and 'PDF' icons. The main content area has a title 'Predictors of outcome in the management of Traumatic Bifrontal Contusions - a systematic review' and authors 'Nadine van de Zande, Malik Zaben, Mutwakil Abdulla, Dmitri Shastin'. It includes sections for Citation, Review question, Searches, Types of study to be included, Condition or domain being studied, and Participants/population.

NIHR | National Institute for Health Research

PROSPERO
International prospective register of systematic reviews

Print | PDF

Predictors of outcome in the management of Traumatic Bifrontal Contusions - a systematic review

Nadine van de Zande, Malik Zaben, Mutwakil Abdulla, Dmitri Shastin

Citation
Nadine van de Zande, Malik Zaben, Mutwakil Abdulla, Dmitri Shastin. Predictors of outcome in the management of Traumatic Bifrontal Contusions - a systematic review . PROSPERO 2018 CRD42018055390 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42018055390

Review question
What are the predictors of outcome in patients with traumatic bifrontal contusions?

Searches
Databases: PubMed, Cochrane, OVID MEDLINE/EMBASE.
Language: English.
Publication period: No restriction.

Types of study to be included
Randomised control trials - if present - and observational studies will be included. Case-report will not be included for further analysis.

Condition or domain being studied
Traumatic bifrontal contusions.

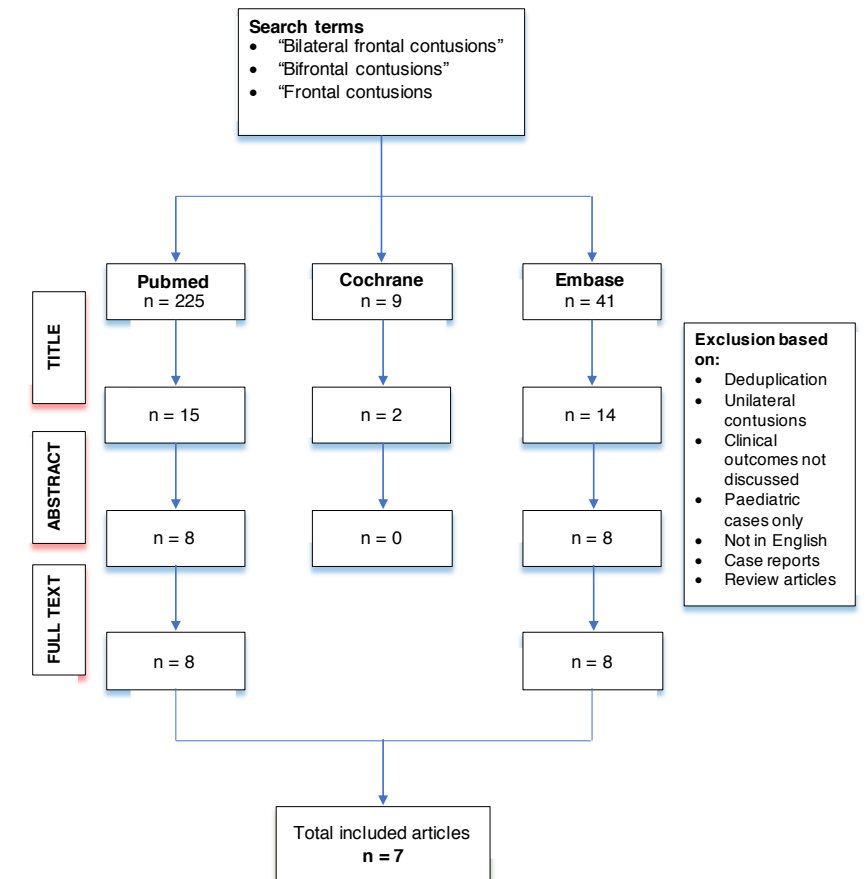
Participants/population

Example 1

Step 3: Literature Search

- Two authors search the literature and devise a **PRISMA flowchart**- <http://www.prisma-statement.org>
- Senior author mediates any differences of opinion
- Screen titles, then abstracts, then full texts
- Consider using **Rayyan**- <https://rayyan.qcri.org/welcome>

Figure 2- flowchart depicting multi-database literature search for predictors of outcome in the management of TBC



Example 1

Step 4: Data Synthesis

- Could not perform meta-analysis- **narrative synthesis only**
- Summarise data- **included studies, risk factors, outcomes**
- Assessing bias- **ROBINS-I tool** (other tools include STROBE checklist, Cochrane risk of bias)

Example 1

| | Author | Year | Location | Title | Design | N | Cohort | Outcome |
|---|-----------|-----------|----------|---|---------------|-----|---|--|
| 1 | Statham | 1989 | Scotland | Delayed deterioration in patients with traumatic frontal contusions | Retrospective | 8 | Patients with traumatic frontal contusions, without other major lesions or diffuse brain injury. | Assessed within 48 hours of admission, at discharge, and GOS at 6 months |
| 2 | Petersen | 2005-2010 | USA | Talk and die revisited: bifrontal contusions and late deterioration | Retrospective | 13 | Patients with severe TBC only, defined by clinical/imaging criteria. Group with acute neurological deterioration compared with group that did not. | Modified Rankin score at 1 year. |
| 3 | Liang Gao | 2003-2009 | China | Intensive management and prognosis of 127 cases with traumatic bilateral frontal contusions | Retrospective | 127 | Patients with TBC and no other major lesions, defined by strict imaging criteria. ICP monitored and non-ICP groups compared for multiple variables. | GCS at discharge, mortality, GOS at 6 months. |
| 4 | Dong | 2006-2009 | China | Endoscopy-assisted cerebral falx incision via unilateral approach for treatment of dissymmetric bilateral frontal contusion | Retrospective | 61 | Comparing two surgical approaches: traditional BDC and endoscope assisted unilateral cerebral falx incision. | GOS at 6 months post injury. |
| 5 | Wu | 2007-2012 | China | The diagnosis and surgical treatment of central brain herniations caused by traumatic bifrontal contusions | Retrospective | 63 | Patients with TBC that were managed with BDC | GOS at a mean of 22 months with a range of 6-52 months |
| 6 | Sarma | 2009-2014 | India | Bifrontal contusions: what is the best surgical treatment? | Retrospective | 98 | Patients with TBC alone that were managed surgically. | In-hospital mortality rate, GOS at varying follow-up time points. |
| 7 | Zhaofeng | 2000-2015 | China | Surgical treatment of traumatic bifrontal contusions: when and how? | Retrospective | 98 | Patients with TBC alone managed with bifrontal DC. | GOS at 3 months. |

Adapted from De Zande et al 2019

Example 1

| Study | Criteria | Medical | Surgical |
|---------------|---|---|--|
| Statham 1989 | CT evidence of TBC- no specific parameters | Not specified | ICH evacuation in one patient |
| Peterson 2011 | <ul style="list-style-type: none"> GCS \geq 10 on admission Total contusion volume $>$ 30cm³, and unilateral volume $>$10cm³ on CT day 2 post injury No other intracranial traumatic lesions | Mannitol or 3% saline aiming for Na ⁺ $>$ 150 and Osm $>$ 300 | Bifrontal decompressive craniectomy |
| Gao 2013 | <ul style="list-style-type: none"> CT evidence of TBC- no specific parameters Exclude patients with EDH $>$30cm³, SDH $>$10mm thick, midline shift $>$5mm, or any other mass lesions $>$20cm³ | Osmolar treatment- aiming for 300-320 Osm ICP monitoring in those with: <ul style="list-style-type: none"> GCS$<$8 GCS 9-12 and agitation requiring sedation CT signs of deterioration and GCS drop of $>$2 | Bifrontal decompressive craniectomy Bifrontal craniotomy Removal of contusion tissue in both |

| Study | Follow up (No., % of cohort) | Mean duration (months) | Scoring system | Average score | Deaths (No., % of cohort) |
|---------------|------------------------------|------------------------|------------------|---------------|---------------------------|
| Statham 1989 | 8, 100 | 6 | GOS | 2 | 1, 12.5 |
| Peterson 2011 | 12, 92.3 | 52 | Modified Rankins | 2.3 | 2, 15.4 |
| Gao 2013* | 48, 37.8 | 6 | GOS | 3.9 | - |
| Dong 2012 | 61, 100 | 6 | GOS | 4.2 | 2, 3.3 |
| Wu 2014 | 63, 100 | 22 | GOS | 4.2 | 2, 3.2 |
| Sarma 2015 | 78, 79.6 | 23 | GOS | 2.7 | 36, 36.7 |
| Zhaofeng 2016 | 98, 100 | 3 | GOS | 4.7 | 2, 2.0 |

Adapted from
De Zande et al
2019

Example 1

| | Study | Confounding | Selection | Intervention classification | Deviation from intervention | Missing data | Measurement of outcome | Selection of reported result | Overall |
|---|---------------|-------------|-----------|-----------------------------|-----------------------------|--------------|------------------------|------------------------------|----------|
| 1 | Statham 1989 | Low | Moderate | Low | Low | Moderate | Low | Low | Moderate |
| 2 | Peterson 2011 | Moderate | Moderate | Low | Moderate | Moderate | Low | Low | Moderate |
| 3 | Gao 2013 | Moderate | Moderate | Moderate | Low | Critical | Low | Critical | Critical |
| 4 | Dong 2012 | Moderate | Serious | Low | Low | Low | Low | Low | Serious |
| 5 | Wu 2014 | Critical | Serious | Low | Low | Low | Serious | Low | Critical |
| 6 | Sarma 2015 | Critical | Low | Serious | Low | Moderate | Serious | Critical | Critical |
| 7 | Zhaofeng 2016 | Critical | Moderate | Low | Low | Low | Low | Low | Critical |

| | Statham 1989 | Peterson 2011 | Liang Gao 2013 | Dong 2012 | Wu 2014 | Sarma 2015 | Zhaofeng 2016 |
|--------------------------------|--------------|---------------|----------------|-----------|---------|------------|---------------|
| Demographics | - | - | + | + | + | + | + |
| Mechanism of injury | - | + | + | + | + | + | + |
| Strict imaging criteria | - | + | - | - | - | - | + |
| GCS on admission | + | + | + | + | - | + | + |
| Clinical trajectories | + | + | + | - | - | - | - |
| Role of ICP monitoring | - | - | + | + | - | - | - |
| Role of operative intervention | + | + | + | + | + | + | + |
| Outcomes | + | + | + | + | + | + | + |

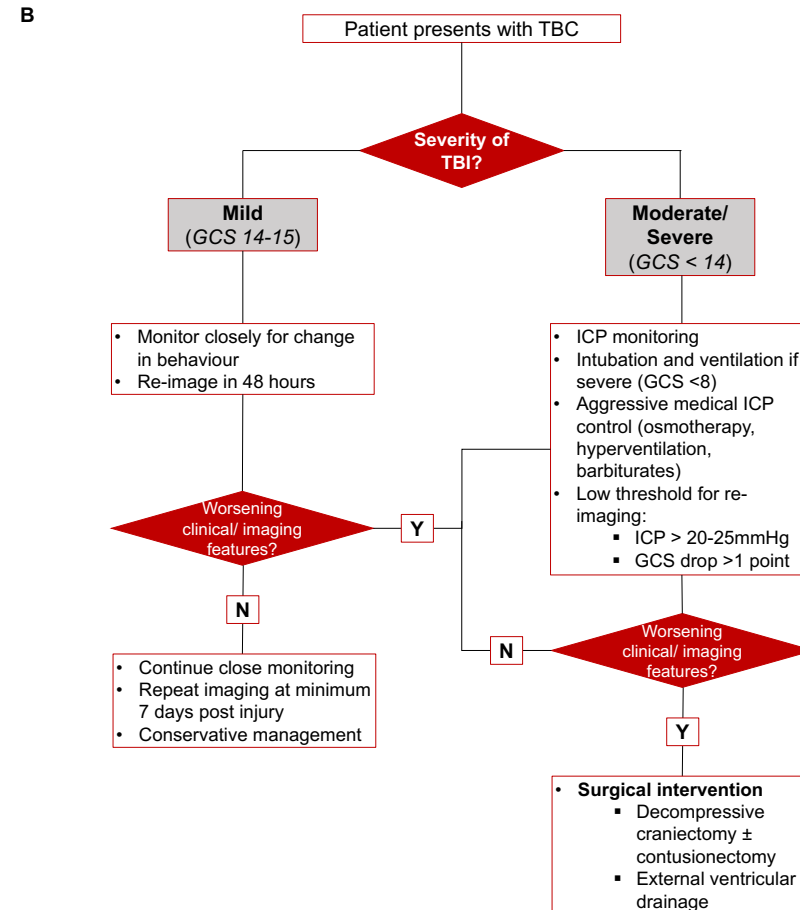
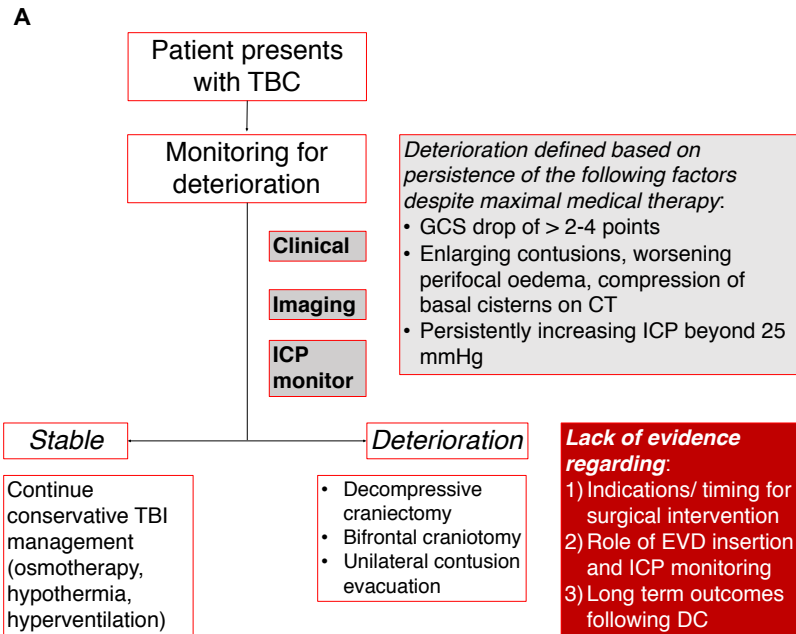
Adapted from De Zande et al 2019

Example 1

Step 5: Discussion

- Review your results and think critically about their implications
- Do they make sense ? Can they change practice ?
- What are the limitations of the included studies ?
- What are the unanswered questions ?
- How should future studies address these questions?

Example 1



References

Van de Zande N, Manivannan S, Sharouf F, Shastin D, Abdulla M, Chumas PD, Zaben M. Demographics, presentation, and clinical outcomes after traumatic bifrontal contusions: a systematic review. *Neurosurg Rev.* 2020 Jun;43(3):977-986. doi: 10.1007/s10143-019-01098-0. Epub 2019 May 16. PMID: 31098790; PMCID: PMC7231798.