

OBSTETRICAL BRACHIAL PLEXUS INJURY: A CANADIAN CLINICAL PRACTICE GUIDELINE

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OBJECTIVE

To establish an evidence based clinical practice guideline for the primary management of obstetrical brachial plexus injury (OBPI).

PROBLEM

- Distribution of expertise**
 - 10 Canadian specialized multidisciplinary centers
- Variation in practice**
 - Primary care: Timing of referral
 - Surgeons: Indications and timing of surgery
- Poor evidence base**
 - Historic attitudes remain in primary care
 - "Permanent sequelae are rare"
 - Operative repair is "unwarranted"
 - Existing reviews have not been optimized, do not inform decisions of clinical community



GUIDELINES

- "Systematically developed statements to assist practitioner and patient decisions about appropriate healthcare for specific clinical circumstances"
- Improve knowledge
 - Improve educated referral
 - Influence care processes
 - Minimize practice variation
 - Inform policy
 - Criteria for evaluation/quality review
 - Improve clinical outcomes



SYSTEMATIC REVIEW

ELIGIBILITY

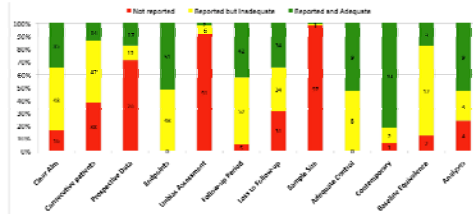
- Studies:** RCTs, observational studies, case series n > 9
- Participants:** All OBPI patients < 2 years old
- Interventions:** Primary nerve repair, non-operative

LITERATURE SEARCH

- Electronic:** MEDLINE, EMBASE, CINAHL, Cochrane CENTRAL

- 99 studies: 0 RCTs, 17 Cohort Studies, 82 Case Series
- 26 Operative, 60 Nonoperative, 13 Both Operative and Nonoperative

QUALITY



Cohort studies (performed by surgeons):

- Objective outcomes, adequate follow-up
- Small sample size, comparison group unequal at baseline

Operative series (performed by surgeons):

- Objective outcomes, adequate follow-up
- Retrospective review of cases, patients not consecutive

Nonoperative series (generally performed by primary care):

- Prospective study, consecutive patients, large samples
- Subjective outcomes, short follow-up

CANADIAN DEMOGRAPHICS

- NATIONAL PROSPECTIVE NEWBORN DISCHARGE DATABASE**
 - Identify OBPI diagnoses and all associated infant/maternal codes
 - 2004-2012

- 3023 OBPI cases
- 1.0/1000 live births

- 39% of cases are referred to a specialized multidisciplinary center

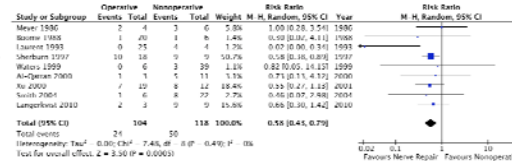
- 29% by 1 month
- 65% by 3 months (*including 1 month patients)

| DIAGNOSIS | ODDS RATIO |
|-------------------|------------|
| Humerus fracture | 133.3 |
| Dystocia | 79.8 |
| Clavicle fracture | 68.1 |
| Macrosomia | 14.8 |
| Heavy for Dates | 7.2 |
| Diabetes (Pre) | 6.5 |
| Vacuum/Forceps | 6.4 |
| Diabetes (Gest) | 2.6 |
| Breech | 2.3 |
| ... | ... |
| C-section | 0.1 |

FUNCTIONAL IMPAIRMENT

Cohort Studies (nerve repair versus nonoperative)

- 222 OBPI, 9 studies, patients with author-defined impairment
- RR 0.58, 95% CI 0.43-0.79, p<0.001, I²=0%



Case Series (Indirect comparison)

- 1128 Operative vs. 444 Nonoperative OBPIs
- RR 0.39, (95%CI 0.33-0.45)

ADVERSE EVENTS IN MICROSURGERY

- Death: 0; Major: 1.5% (0.6-2.7%); Minor: 5.0% (2.5-8.3%)

NONOPERATIVE OUTCOMES

- 1604 OBPIs from 27 studies with demographic samples
- Functional Impairment 18% (95%CI 14-23%, I²=81%)**
 - May underestimate impairment (Primary care lit, subjective outcomes)
- Uncharacterized residual impairment 27% (95%CI 19-36%)

CONCLUSIONS

- Low quality evidence suggests nerve repair reduces functional impairment in OBPI meeting author-defined indications versus nonoperative therapy
- Nonoperative therapy leads to a high proportion of impairment, underestimated in the literature

CLINICAL PRACTICE GUIDELINE

METHODS

- Working group established
 - 12 surgeons, representing all 10 Canadian specialized OBPI centers
- Steering committee
 - CJC, JRB (clinical expert), MCB (methodological expert)

- Literature review
- Working group meeting - June 2013
- Steering committee drafted recommendations

CONSENSUS

- Electronic modified Delphi approach
 - Structured, transparent
 - All members equal, avoids domination by few in working group
 - Diverse locations nationally

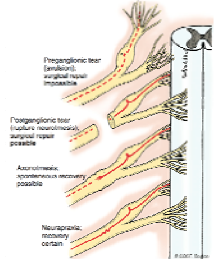
- Criteria for agreement following RAND criteria

FINAL RECOMMENDATIONS

- Physically examine newborns for OBPI if upper extremity movement is asymmetric or delivery was complicated by shoulder dystocia, humeral fracture or clavicular fracture
- Refer newborns with OBPI to a multidisciplinary center by 1 month of age
- With referral, provide complete pregnancy and birth history, and physical exam findings (including Horner's syndrome) at birth
- Teams at multidisciplinary centers should include:
 - A dedicated therapist experienced in the assessment and treatment of OBPI
 - A peripheral nerve surgeon experienced with microsurgical repair of OBPI
- Physical therapy delivered outside of a multidisciplinary center should be advised by a multidisciplinary team
- Offer microsurgical nerve repair:
 - For injuries clinically consistent with root avulsion injury
 - For all other injuries meeting operative criteria applied beginning at 3 months of age
- For objective outcome assessment, a common data set includes:
 - Narakas classification at initial multidisciplinary center assessment
 - Limb length, Active Movement Scale and Brachial Plexus Outcome Measure at 1, 3, 6, 12, 24 months of age, then annually

VISIT US AT BRACHIALPLEXUS.CA

The Canadian OBPI Working Group is:
 James Bain (McMaster), Michael Bazuhly (Dalhousie University), Sean Bristol (University of British Columbia), Kevin Cheung (University of Ottawa), Howard Clarke (University of Toronto), Kristen Davidge (University of Toronto), Robertson Harrop (University of Calgary), Jennifer Lin (Université de Montréal), Jaret Olson (University of Alberta), Douglas Ross (Western University), Constantin Stanciu (Université de Montréal), David Tang (Dalhousie), Susan Thompson (University of Winnipeg), Cynthia Verchere (University of British Columbia), Yvonne Ying (University of Ottawa)



OBPI INTERVENTIONS

Physical & Occupational Therapy Alone

- Neuropraxia

Nerve Repair

- Axotomy
- Postganglionic rupture

"Gray Zone" Uncertainty

- Axonotmesis
- Indication and timing of surgery