**Systematic Reviews**

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**Objectives**

- Systematic Review Defined
- Need for Systematic Reviews
- Types of Systematic Reviews
- Elements of a Systematic Review
- Systematic Reviews
  - Effectiveness of intravenous Tranexamic Acid (TXA) administration in managing perioperative blood loss in patients undergoing spine surgery: a systematic review
  - Effectiveness of positive end-expiratory pressure, decreased fraction of inspired oxygen (FiO2) and vital capacity recruitment maneuver on prevention of pulmonary atelectasis in patients undergoing general anesthesia: A systematic review
  - Experiences of Parents of Children Diagnosed With A Congenital Anomaly At Birth: A Systematic Review

**Systematic Reviews**

- A systematic review is a high-level overview of primary research on a particular research question that tries to identify, select, synthesize and appraise all high quality research evidence relevant to that question in order to answer it.

**Why systematic reviews?**

- Systematic reviews seek to collate all evidence that fits pre-specified eligibility criteria in order to address a specific research question

**Systematic reviews can be disappointing....**

- because they often come up with the conclusion that the research isn’t sufficient to come to a conclusion. But that in itself can be useful, especially if there’s one published study that has gotten a lot of attention in the media, but isn’t supported by other research.
Types of Systematic Reviews

- Integrative Research Review
- Reasoned analysis & synthesis
- Meta-analysis
- Statistical combination & analysis
- Meta-synthesis
- Reasoned combination of qualitative findings

The importance of research synthesis

- We need evidence for clinical practice
- Where does evidence come from?
- A good review is a state-of-the-science synthesis of current evidence on a given research question.
- Given the explosion of medical literature, and the fact that time is always scarce, review articles play a big role in decision-making

The importance of research synthesis

Given that most clinicians do not have the time to track down all the original articles, critically read them, and obtain the evidence they need for their questions, systematic reviews and clinical practice guidelines may be their best source of evidence. Several “pre-digested” (pre-appraised) sources of evidence are currently available

The EBP movement is heavily dependent on these pre-appraised evidence sources

Systematic Reviews

- Pre-planned & systematic methods
  - The methods limit bias and error
  - Tables are often used
- Assembly of original studies
- Comprehensive search for relevant research
- Each piece of evidence must be appraised
- Studies that survive the quality screen are analyzed as “bodies of studies”

Elements of a SR

- Formulate the review question & write a protocol
- Search for and include primary studies
- Assess study quality
- Extract data
- Analyze data
- Interpret results & write a report
Effectiveness of intravenous Tranexamic Acid (TXA) administration in managing perioperative blood loss in patients undergoing spine surgery: a systematic review

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Problem

• Spine surgery and perioperative blood loss
• Clotting cascade
• Antifibrinolytics

Background

• The antifibrinolytic TXA, has been shown to decrease blood loss associated with spine surgeries
• Spine surgery, particularly procedures performed for deformity correction multi-level constructs, can be associated with a large amount of blood loss which may result in devastating patient outcomes if not controlled
• The purpose of the present study was to determine the effectiveness of IV TXA administration in managing perioperative blood loss in all patients undergoing spine surgery

PICO

• P- patients undergoing spine surgery with no age restrictions
• I- IV administration of TXA
• C- no IV administration of TXA or placebo of 0.9% Saline
• O- amount of intraoperative, postoperative, perioperative blood loss

Objective

• The objective of this review was to identify the effectiveness of IV TXA administration in managing perioperative blood loss in all patients undergoing spine surgery.

Inclusion criteria

• Types of participants
  ❖ patients with comorbidities undergoing any type of spine surgery
• Types of intervention(s)/phenomena of interest
  ❖ TXA administration on perioperative blood loss
• Types of studies
  ❖ randomized controlled trials, non-randomized controlled trials, quasi-experimental, before and after, prospective and retrospective cohort, case control and analytical cross sectional studies.
• Types of outcomes
  ❖ outcomes measured: intraoperative and postoperative blood loss and the amount collectively referred to as perioperative blood loss.
**Included Studies/Excluded Study**

**Included studies**
- 12 studies - 934 participants
- All ages included
- Comorbidities with the exclusion of anticoagulated participants
- Participants recruitment: from hospitals in the United States, China, Germany and Canada.
- Outcome measures reviewed:
  - Intraoperative blood loss
  - Postoperative blood loss
  - Perioperative blood loss

**Excluded Study**
  - Reason for exclusion: The reported data on intraoperative blood loss did not include a standard deviation for the outcome measure. The author was contacted in order to retrieve this data. We received no response from the author.

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**Methodological quality**
- High
- 6 RCTs and 6 retrospective reviews
  - Randomization: 4 studies
  - Blinded to treatment allocation
  - Comparable at entry
  - Treated identically other than the named intervention
  - Blood loss was collected and reported in standard and reliable ways

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**Appraisal & Data collection**
- Appraisal
  - Critical appraisal instruments from the JBI-MAStARI
  - Assessed by two independent reviewers
  - Disagreement resolved through discussion
- Data Collection
  - Data extraction tool from JBI-MAStARI
  - Double data entry

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**Data synthesis**
- JBI MASTARI and the DerSimonian and Laird
  - Calculated the weighted mean difference for random effects models
  - Random effects - Blood loss measured various ways
  - Heterogeneity - Chi squared test

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**Metasynthesis**
Results of metasynthesis of quantitative research findings

- **Meta-Analysis Data on Intraoperative blood loss**
  - Six randomized controlled trials
  - Six retrospective reviewers
- **Meta-Analysis Data on Postoperative blood loss**
  - One randomized controlled trial
  - One retrospective, observational study
- **Meta-Analysis Data on Perioperative blood loss**
  - Three randomized controlled trials
  - One retrospective observational study

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**Discussion**
- Statistically significant: Intraoperative and postoperative blood loss for the control group
- Approaching significance: Perioperative blood loss
- TXA recommendations
  - IV TXA dose for spine surgery to manage intraoperative, postoperative and perioperative blood loss
  - Surgeons and anesthesia providers should be aware of the significance of TXA administration to spine surgery patients
  - TXA should be administered to patients undergoing spine surgery when significant blood loss is anticipated
Limitation of the Review

- Blood collection and estimation
- IV TXA doses and infusion time
- Surgeon’s techniques
- Study types
- English Only Reviews

Conclusions

- TXA is effective in the reduction of intraoperative and postoperative blood loss for patients undergoing spine surgery
- A reduction in intraoperative and postoperative blood loss for patients undergoing spine surgery would benefit the patient overall

Implications for practice

- Evidence is supported in literature for administration of TXA in managing perioperative blood loss on patients undergoing spine surgery
- Safety and need for routine use of TXA remains uncertain

Implications for research

- A large pragmatic RCT should be conducted to collect data on the IV dose at which TXA is most effective in managing blood loss on patients undergoing spine surgery
- Investigate the safety with routine use
- Cost-benefit analysis to determine the actual financial advantage of utilizing TXA

Why this Project? So what??

- Practice
- Affordable Health Care Act
- Anesthesia does a GREAT job....
- Healthcare $§ tied to outcomes
- Use existing research

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Effectiveness of Positive End-Expiratory Pressure, Decreased Fraction of Inspired Oxygen (FiO2) and Vital Capacity Recruitment Maneuver on Prevention of Pulmonary Atelectasis in Patients Undergoing General Anesthesia: A Systematic Review
Objectives

- In patients undergoing general anesthesia, what is the effect of positive end expiratory pressure (PEEP), vital capacity recruitment maneuver and/or a decreased fraction of inspired oxygen (FiO₂) delivery on the development of post-operative atelectasis?

Background & Etiology

- Definition of atelectasis (Duggan & Kavanagh, 2005)
- 3 sets of mechanisms for the development of atelectasis (Hedenstierna & Edmark, 2010)
  1. Compression of lung tissue
  2. Impairment of surfactant function
  3. Absorption of alveolar air

General Anesthesia & Atelectasis

- Type of anesthesia
- Impact of time
- Position
- FiO₂
- Age
- Body Habitus
  (Duggan & Kavanagh, 2005)

Inclusion Criteria

1. Mean age between 18-65
2. ASA classification I, II, III
3. General anesthesia
4. Gender, race, or nationality

Exclusion Criteria

1. Patients hospitalized for greater than 24 hours before surgery
2. Patients with significant heart or lung disease
3. ASA IV or V classification

Types of Interventions

- Positive end expiratory pressure (PEEP)
- Vital capacity recruitment maneuver (VCM)
- Decreased FiO₂
Types of Studies
• Randomized controlled trials
• Non-randomized controlled trials
• Quasi-experimental
• Before and after
• Prospective and retrospective cohort
• Case control

Types of Outcomes
Categorical
  ➢ Post-operative pulmonary atelectasis
Continuous
  ➢ Computed tomography (CT) scan
  ➢ PaO2
  ➢ Functional vital capacity (FVC)
  ➢ Forced expiratory volume at one second (FEV1)

Results and Discussion
• Interpret findings with thoughtfulness
• Heterogeneity
  ➢ FiO2: 80% (control) to 30% (treatment) FiO2
  ➢ PEEP: use of +10 cm H2O as significantly reducing the incidence of postoperative atelectasis
  ➢ VCM: use of VCM as significantly reducing the incidence of postoperative atelectasis
  ➢ Multiple Interventions:
    – decreased FiO2 with VCM totally eliminated formation of atelectasis
    – decreased FiO2 with PEEP (+10 cm H2O) significantly reduced the incidence of postoperative atelectasis

Implications for practice
• The use of vital capacity recruitment maneuver in combination with PEEP was most effective in preventing the formation of atelectasis during general anesthesia.
• The vital capacity recruitment maneuver can virtually eliminate the formation of atelectasis and restore normal gas exchange.
• The use of PEEP immediately following the VCM is required to maximize the benefits.
• The effectiveness of a VCM and PEEP were shown to be significant even in the presence of a high inspired oxygen content.

Implications for practice (cont’d.)
• Studies included in this review revealed a decrease from 100% to 80% FiO2 may be beneficial to provide adequate oxygenation with less pulmonary complications.
• The majority of atelectasis occurs within five to ten minutes of induction, and the use of VCM and PEEP immediately after intubation may prevent this incidence.

Implications for Research
• Development of “bundle” or “standard of care” protocol
• Additional research
  – Larger samples
  – Multiple interventions
  – Induction & intubation
• VCM & PEEP on cardiovascular effects
• Length of stay (cost) & Patient satisfaction
Experiences of Parents of Children Diagnosed With A Congenital Anomaly At Birth: A Systematic Review

Andrew Pitt CRNA, DNP

Qualitative Objective

• To identify the experience of parents who are informed that their newborn infant has a congenital anomaly at birth.

Background

• Birth of a child is typically a joyous event and an important opportunity for parental bonding (Frost, 1981).
• When a child is born with a congenital anomaly, the event can take on a very different meaning.
• This is complicated by the fact that the delivery room is a busy and demanding time for all involved healthcare personnel.

Background

• Congenital Anomaly is defined as a structural or functional anomaly including metabolic disorders that are present at the time of birth.
• Congenital anomalies affect approximately 1 in 33 infants and result in 3.2 million birth-related disabilities worldwide per annum (Parker et al, 2010).
• The most common congenital anomalies include: heart defects, neural tube defects and Down syndrome.
• A survey of 1126 mothers who have children with Down syndrome found that as many as 87.5% still receive the news in the immediate postnatal period (Skorka, 2005)

Methodology

• Types of Studies Included:
  – Qualitative studies that reported or focused on qualitative data describing the experiences of parents being informed that their newborn baby has a congenital anomaly.
  – The reviewers considered research consisting of but not limited to, designs such as:
    • Grounded Theory
    • Phenomenology
    • Ethnography
    • Action research
    • Interpretive
    • Observational
    • Descriptive-exploratory
    • Feminism

Inclusion criteria

• This review considered publications that included lived experiences of parents of newborn infants who were diagnosed with a congenital anomaly at birth regardless of race, gender, nationality or religious affiliation.
Exclusion Criteria

• Studies not in English

• Birth of non-viable infants

• Studies in which the diagnosis was made either prenatally or greater the twenty-four hours after birth

Phenomenon Of Interest

• Experiences of parents who are told by healthcare providers that their newborn infant has a congenital anomaly at birth

Method of Review

• Papers selected for retrieval were assessed by two independent reviewers for methodological validity prior to inclusion in the review using standardized critical appraisal instruments from the Joanna Briggs Institute Qualitative Assessment and Review Instrument (JBI-QARI)

• Any disagreements that arose between the reviewers were resolved through discussion therefore, a third reviewer was not necessary.

Results

• Three articles met inclusion and methodological criteria

Data Synthesis

• Qualitative research findings were pooled using JBI-QARI. This involved the aggregation or synthesis of the findings to generate a set of statements or themes that represented that aggregation.

• The validity of each study report was considered as a source for guidance to practice

Article One - Overview

• Going down a different road: First support and information needs of families with a baby with Down syndrome.

The phenomenon of interest in this study was the experiences of women who gave birth to infants with unanticipated genetic anomalies. An exploratory design using selected qualitative methods was used. Seven women were interviewed and data was collected by means of in-depth audiotaped interview.
**Article Two - Overview**

- *Newborns with an impairment: Discourses of hospital staff*

  This study was based on interview data of 19 members of a hospital staff who were in closest contact with the parent(s) and related what was told to them by parents. The purpose of the study was to explore the flow of information between parents and hospital staff when a baby with an impairment is born.

**Article Three - Overview**

- *Going down a different road: First support and information needs of families with a baby with Down syndrome*

  Interviews were conducted with seven couples and eleven individual mothers of children born with an unanticipated congenital anomaly for the purpose of allowing parents to describe their experience, while reflecting on issues that were important to them at the time of diagnosis.

**Synthesis**

- 38 Findings were extracted from the 3 studies. Each finding was evaluated using JBI levels of credibility.

  - The findings were examined to identify common themes. The 38 findings were analyzed to produce 12 categories.
  
  - The final synthesis produced 4 major themes.

**JBI-QARI Levels of Credibility**

- Unequivocal (U) = evidence beyond reasonable doubt which may include findings that are matter of fact, directly reported or observed and not open to challenge;

- Credible (C) = those findings that despite interpretations, are plausible in light of data and theoretical framework. They can be logically inferred form the data. Because findings are interpretive, they can be challenged; and

- Unsupported (NS) = when neither Unequivocal nor Credible apply, and most notably, findings are not supported.

- Unsupported (NS) findings are not reported in this synthesis.
Four Major Themes

- Delivery of the News
- Suspended Family Life
- Impeded Coping
- Reclaiming Family Life

Delivery of the News

The birth of a child with an unanticipated congenital anomaly is often viewed as a tragic event by hospital staff and this perspective influences how the news is delivered to the parents.

- "Parents’ reactions were strongly influenced by how physicians and midwives communicated with them."
- "All parents responded favourably to, and remembered, health professionals who sat down by their bed, listened to them, or made a special effort to follow up on their questions. Many parents were able to quote remarks made by health professionals that marked a turning point for them."
- "It’s very clear that this kind of thing always brings some degree of sadness for parents, this is obvious.”
- "I know it’s hard because they have to be in there and not so involved emotionally. But it’s important that they be sensitive to the parents and to the tragedy the family is feeling."

Suspended Family Life

Parents of children diagnosed with a congenital anomaly at birth experience a wide range of emotions and require both emotional and informational support regarding the condition of their infant.

- "If she asked for consent, I don’t remember …it was just, we are going to do this…What are you going to say…say no to a doctor?"
- "Participants not only felt overshadowed as caregivers to their infants but felt that staff were insensitive to or failed to recognize their role as mothers.”
- "The participants believed that they were not included in the decision making because the staff did not value their input."

Impeded Coping

Parents of children diagnosed with a congenital anomaly at birth experience difficulty bonding and relating to their baby, as well as feelings of fear and helplessness.

- "Parents generally expected to have a relatively uneventful delivery, and they received the news that their baby had Down syndrome with great distress. Many experienced difficulties in relating to their newborn, while grieving for the child they did not have."
- "I didn’t have any kind of bond with my child…it was so painful….I just wanted to relate to my child.”
- "Parents felt that their baby was taken away from them before they had the chance to bond or experience the sense that they had become parents."

Reclaiming Family Life

Parents of children diagnosed with a congenital anomaly at birth experience the need to assert their parental roles and participate in as much of the infant’s care as possible.

- "Parents often spoke about how long it took to realize that their infant was “their baby” first and “a child with Down syndrome” second."
- "Some mothers also said that they experienced difficulties with breastfeeding but wanted to persist because they saw this as one of the few things they could actively do for their baby.”
- "Reasons that parents gave for speaking to another family [with a child with Down syndrome] were to hear about how life can return to normal, what the capabilities of a child with Down syndrome are, how to deal with specialist surgery, and how to help siblings cope.”

Discussion

• Parents that go through the delivery of a child that has a congenital anomaly diagnosed at birth experience a myriad of emotions that accompany an unanticipated misfortune.
• The communication style of healthcare professionals influenced the parental reaction to the news.
• Parents expressed a desire for the news to given in a manner that recognizes the unavoidable shock that they experience and a desire to be provided straight forward and honest information regarding their child’s condition.
Discussion

• Focus of the event was taken off the baby as a loved human and replaced with medical terms, numeric values, procedures and body parts.
• Parents experienced feelings of diminished parenting because they felt that they were not adequately included in the decisions made regarding the medical interventions that took place immediately following the birth.
• Emotional support and encouragement from hospital personnel facilitated adaptive coping among parents by reassuring and reaffirming their role as parents and emphasizing the futility of placing blame on themselves or anyone else for the child's condition.

Overarching Commonality

• Most parents were not satisfied with the first news breaking.

Implications For Practice

• Effective news breaking should be planned.
• Parents should be informed, then be provided with emotional support.
• News should not be delivered in a “matter of fact manner.”
• Mothers should be reassured that they bear no blame.
• Fathers need emotional support.

Implications For Practice

• Education for healthcare personnel
  - Obstetricians
  - Midwives
  - CRNA’s
  - Delivery suite nurses
  - Neonatologists

Implications For Practice

• Informational materials developed for distribution to parents.
• Training for clergy and social workers to provide emotional/spiritual support.
• A network of parents with children with congenital anomalies who could be called to visit parents in hospital.
• Hospitals should have a plan in place with identified personnel to handle these events.

Implications for Research

• Quantitative and/or mixed method studies.
• Follow up qualitative study to see how parents are coping 6-12 months later.
• A Systematic Review on the experiences of healthcare personnel in the same situation.