Child Physical Abuse: A Multidisciplinary Approach

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Nationwide Children's Hospital

Goals and Objectives

- Child abuse – what is it?
- Which children get abused and why?
- Medical diagnosis of child abuse
- The multidisciplinary team – communication & coordination
  - Pattern recognition
  - Documentation
  - Scene Investigation
  - Interviews
- Know where to go for good medical evaluations

2008 Child Maltreatment: National Statistics

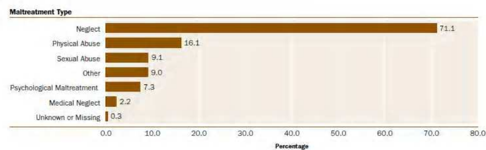
- 3.3 million children referred to CPS
  - ~ 800,000 cases substantiated
- Children in the age group of birth to 1 year had the highest rate of victimization
- Over 1700 children dead
  - 80% of the children were less than 4 years of age

– Spring 2010 CDC Report

2008 Child Maltreatment: Mississippi Statistics

- > 30,000 reported cases
  - ~64% screened in for further investigation
  - ~30% substantiated
- Ranked 25th in the nation for rate of child abuse
  - 10.4 victims/1000 children
  - National average 10.3
- Increase in number of children abused from 5600 in 2004 to almost 8000 in 2008

2008 Child Maltreatment



- ~60% of referrals are made by professionals
  - Teachers represent the largest referral source at 17%
- If no intervention
  - 50% chance of repeated abuse
  - 10% chance of mortality

2008 Child Maltreatment

- Abuse is seen in ALL cultural and socioeconomic groups
- Seen almost equally between boys and girls
  - 45% Caucasian
  - 21% Hispanic
  - 16% African-American

Identifying Risk Factors

- Parent
  - Substance abuse
  - Mental illness
  - Poor coping ability
  - Unreasonable expectations for the child
- Child
  - Disability?
  - Chronic illness?
  - "Difficult" temperament

Identifying Risk Factors

- Family
  - Domestic violence
  - Poverty
  - Single parent
  - Multiple children
  - Stress
  - Isolation
- Community
  - Poverty
  - Crime
  - Violence
  - Substance abuse
  - Social isolation
  - Lack of supports

Topics To Discuss Today

- Bruises
- Burns
- Abusive Head Trauma
- Failure-to-Thrive
- Benefits of a Child Advocacy Center

Bruising

Bruising

- Cutaneous injuries are the single most common presentation of physical child abuse

Reece & Christian 2009

- Bruises are the most common type of injury in abused children

Ellerstein Am J Dis Child 1979

Definitions

- Bruise (contusion): Bleeding beneath the intact skin at the site of blunt impact trauma
  - Loop mark
  - Slap mark
- Ecchymosis: Blood that has dissected through tissue planes to become visible externally
  - Battle's sign
- Hematoma: Blood that has extravasated from the vascular system into the body
  - Subdural hematoma

Kaczor 2006 Clin Ped Emerg Med

Bruising: The Medical Evaluation

- Are we sure this is a bruise?
- Can we date bruises?
- How old is the child?
- What does the child do?
- Where on the body is the bruising?

Can Bruises be Dated?

- Stephenson *Arch Dis Child* 1996
  - 23 children evaluated with bruising
  - Blinded observer estimated age of injury as fresh (<48 hours), intermediate (48 hours – 7 days), or old (>7 days)
  - Accuracy of estimation was 54.5%
- Munang *J Clin Forens Med* 2002
  - 44 children identified in ED setting with bruising
  - 3 described same bruises in vivo and later by photograph
  - Only 31% of descriptions completely agreed with the later description of the photograph of the same bruise
- Bariciak *Pediatrics* 2003
  - 50 children presented to ED with accidental bruising
  - Emergency physicians estimated age
  - Accuracy of estimation within 24 hours was 47.6%
  - Poor interobserver reliability

Can Bruises be Dated?

- Importance of color:
  - Above papers would suggest:
    - Red/blue/purple is associated with recent bruising
    - Yellow/brown and green is associated with older healing bruising
  - BUT – *any* of these colors can be observed in a bruise at *any* time before it fully resolves
- Assessment of the age of a bruise in children is inaccurate and has no scientific basis

Maguire Arch Dis Child 2005

How Old Is the Child?

Studies defining prevalence according to age

	Infants 0-6 months	Infants 6-12 months	Preschool	School Age
Carpenter	N/A	12.4%	N/A	N/A
Martimer	1%		N/A	N/A
Tush	N/A	N/A	36-48 months: **90%**	N/A
Sugar	0.5%	10.6%	12-24 months: **42%** 24-35 months: **61%**	N/A
Labbe	1.2%	N/A	9 mos–4 yrs: **60.3%**	5-9 years: **80.3%**

Adapted from *Maguire Arch Dis Child 2005*

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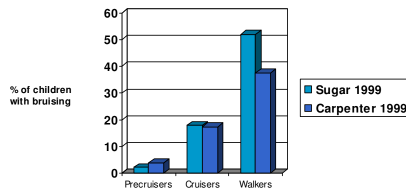
What Does the Child Do?

- Sugar 1999
  - Precruisers: 2.2%
  - Cruisers: 17.8%
  - Walkers: 51.9%
- Carpenter 1999
  - Sits: 3.9%
  - Crawls: 17.3%
  - Walkers: 37.5%



Bruising and Age/Development

- Bruising is rare in infants/precruisers and becomes increasingly more common as children age and develop
- If bruising is seen in a non-ambulatory child, consideration should be given to abuse or some other underlying condition

Where is the Bruise?

Non-Intentional	Abuse
Shins	Upper anterior thighs
Elbows	Trunk (torso, chest, back)
Lower arms	Upper arms
Forehead	Face and ears
Vertex of chin	Neck and cheeks
Ankles	Hands and feet
Hips	Buttocks/genitalia

- Bony prominences tend to be bruised unintentionally in mobile cruisers or ambulatory children
- Soft tissue areas tend to be bruised from abusive mechanisms

Bruising: Investigative Recommendations

1. Recognize patterns.
2. Examine the entire body.
3. Photodocument everything.
4. Keep an open mind.
5. Scene investigations are critical.

Conclusions - Bruising

- Given the complexities of skin anatomy and variability in healing, accurate dating of bruises is rarely possible
- If bruising is seen in a young, or non-ambulatory child, or in certain locations - consideration should be given to abuse or some other underlying condition
- Be able to recognize patterns of injury based on appearance and location

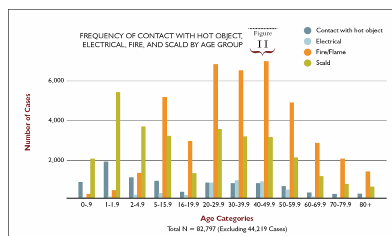
Burns

Epidemiology of Burns

- Pediatric burns cause:
  - Over 250,000 injuries per year necessitating medical attention
  - Over 15,000 hospitalizations per year
  - Over 10,000 cases of severe disability per year
  - 1100 deaths per year
  - Third leading cause of mortality in children < 5 years of age

Children's Burn Foundation 2008

Epidemiology of Burns



National Burn Repository Data

1999-2008

Burns Caused by Abuse/Neglect

- In the U.S., scald burns from tap water are the most common abusive burn
- Multiple studies reporting the proportion of burns in children due to abuse/neglect
  - Range from 1% - 30%
  - More common in:
    - Lower socioeconomic status
    - Children from single-parent families
- Abuse-related burns carry higher morbidity than accidental burns

Burns Caused by Abuse/Neglect

- Boys 2-3 times as likely to sustain abusive burns
- Mean age between 2 and 4 years
  - Corresponds with times of high ‘demand’
    - Toilet training*
    - Temper tantrums/Excessive crying
- Children with inflicted burns 2.4-4.8 times more likely to have burns to hands, arms or legs bilaterally than children with accidental burns

  Andronicus Burns 1998
- Child abuse was found in nearly half of children < 2 years with scald burns to perineum and/or genitalia

  Angel J Pediatr Surg 2002

Burns: The Medical Investigation

- Any red flags in the history?
- How severe is the burn?
- Is this really a burn?
- Does the burn have a pattern?
- Does the pattern match the history we have been provided?

Any red flags?

- History, history, history!
  - Who, what, when, where, and how
    - Who was caring for the child?
    - What events preceded the injury?
    - What was the child's reaction?
    - What did the caregiver do?
    - When did the injury occur?
    - Where did it occur?
  - Developmental assessment of the child
  - What does the child say happened?
  - What does the caregiver say happened?

Common Red Flags

- Injury incompatible with child's developmental abilities
- Absent, changing, or evolving history
- Injury blamed on young sibling
- Delay in seeking medical care
- Triggering event that precipitates loss of control in caregiver
- Family crisis or stress
- Prior history of abuse in caregiver

How Severe is the Burn?

- Severity of a burn is based on:
  - Time of exposure
  - Temperature of agent
  - Type of agent
  - Amount of blood flow to that part of the body

How Severe is the Burn?

- Severity of a burn is based on:
  - Thickness of the skin
    - Varies by age, gender, and location on body
      - Thick – palms/soles
      - Thin – eyelid/genitals
    - Infant skin is often ½ as thick as adult skin
    - Reaches adult thickness by ~ 5 years of age
- Classifications:
  - Superficial
  - Partial Thickness
  - Full Thickness

Liquid Burns and Patterns

- Scalding is the most frequent form of burn abuse
- More than 80% of abusive scald burns are from tap water
- Observed patterns:
  - Immersion pattern
    - "Stocking" and "glove" distribution
    - "Doughnut"
  - Skin-sparing patterns
  - Viscous vs. non-viscous substances

Liquid Burns and Patterns

- How does a child respond to immersion?
  - Theory 1: Reflex is to withdraw from the burn
    - Child would struggle, kick, flail
    - Splash marks would be evident if burn is accidental
  - Theory 2: Child panics and 'freezes'
    - Child holds perfectly still
    - Splash marks would be absent and child would have a symmetrical distribution of burn
- The reality is there likely exists a wide range of behavioral and pain response to burn injuries
- Because of this, patterns may *influence* the concern for inflicted injury – but should not be the sole basis for making a diagnosis

Liquid Burns and Patterns

- More than 80% of abusive scald burns are from tap water
- Patterns are important…
  - Stocking-glove-doughnut = immersion
  - Sparing of skin = protection, either from other skin or from a cooler surface

  …but should *always* be analyzed in the context of the provided history and should not be the sole basis for making a diagnosis of abuse!

Cigarette Burns

- Intentional:
  - Firm contact typically produces a sharply-defined, circular, third-degree burn
  - Approximately 5-10mm diameter
  - Often on 'exposed' areas, such as hands, feet, head, and neck
- Accidental:
  - Typically causes only superficial "brush" burns
    - Short duration of exposure
    - Glowing coals insulated by layer of ash

Faller-Marquardt Foren Sci Intl 2007

Burns: Investigative Recommendations

1. Get to the scene.
2. Interview everyone.
3. Corroborate everything.

Diagnostic Evaluation for Abuse

- Role of social workers
  - Often the first to perform an in-depth interview of the child victim and the alleged perpetrator
    - Emotions run high
    - Little time to construct an alternate story
    - Story may evolve over time
    - Event reconstruction
      - How, where, when, what, and who
      - Consider use of props (dolls, sinks, bathrooms)

Diagnostic Evaluation for Abuse

- Role of social workers
  - Psychosocial Assessment
    - Risk factors associated with child abuse?
      - Single-parent family
      - Relationship discord
      - Financial stress
      - Social isolation
      - Employment difficulties
      - Substance abuse
      - Domestic violence
      - CPS history

Diagnostic Evaluation for Abuse

- Role of social workers
  - Psychosocial Assessment
    - Risk factors associated with child abuse?
      - Role reversal in childcare responsibilities
      - Disabled child
      - Inappropriate expectations of the child
      - Poor bonding
      - Chaotic, erratic lifestyle
      - Delay in seeking medical care

Diagnostic Evaluation for Abuse

- Role of law enforcement
  - Interviews of the alleged perpetrator
  - Corroboration of the history
    - Cell phone records
    - Witness accounts
    - Security camera footage
    - Receipts/Credit card usage
  - Scene investigation

Diagnostic Evaluation for Abuse

- Scene Investigation
  - Evaluation of site where burn reportedly occurred
    - Contact burns:
      - Object to match the pattern
    - Chemical burns:
      - Empty bottle or container
      - Evidence of a spill
    - Electrical burns:
      - Downed wires
      - Singe marks on carpet/furniture

Diagnostic Evaluation for Abuse

- Bathtub burns:
  - Layout of bathroom
    - Proximity to caregivers if not present at time of injury
  - Surface of the tub
  - Evidence of injury?
    - Sloughed skin
    - Wet towels/rugs/clothes

Diagnostic Evaluation for Abuse

- What type of knob?
  - Can child reach?
  - Can child turn?
  - Separate hot/cold?
- Water temperature?
  - Water heater settings
  - Temperature when water turned on
  - Temperature x seconds later

Diagnostic Evaluation for Abuse

- What is the height of the tub?
  - Can child enter tub alone?
    - 35% of children 10-18 months old can

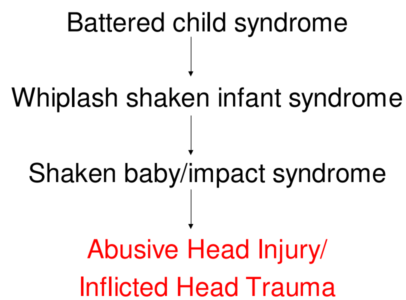
      Allasio Pediatrics 2005
  - How deep is internal tub?
- Rate of filling/drainage?

Conclusions

- Up to 30% of pediatric burns may be due to abuse/neglect and tap water is the most frequent etiology of these burns
- Know the mechanism and recognize the clinical presentations of the many etiologies of pediatric burns (thermal, radiant, chemical, electrical)
- Specific patterns of burn injury may influence the concern for inflicted injury, but should rarely, if ever, be used as the sole basis for diagnosing abuse
- A detailed history, including a scene investigation, is critical when evaluating a burned child for possible abuse/neglect

Abusive Head Trauma

Are We All on the Same Page?



Scope of the Problem

- A leading cause of morbidity and mortality in infants and children
- Abuse is the most common cause of head injury in children less than 1 year of age
- The most common cause of death in children who are abused

Risk Factors

- Unrealistic parental expectations
  - Crying baby
  - Toilet training
- Family stressors
  - Financial or job stress
- Intimate partner violence
- Children with disabilities

Mechanism of Injury

- Most often involves children less than 1 year of age
- Why is this?

Clinical Presentations

- "Serious":
  - Apnea
  - Lethargy
  - Seizures
  - Increased or decreased tone
  - Impaired consciousness
- "Less serious":
  - Poor feeding
  - Irritability
  - Vomiting

Classic Injuries

1) Cranial injuries

- Injury may occur at multiple levels
- Most often subdural hemorrhage - seen in approximately 90% of cases of abusive head injury
- Swelling of the brain (cerebral edema)

Classic Injuries

2) Retinal hemorrhage

- Bleeding in one or multiple layers of the eye
- Seen in 65-95% of cases of abusive head injury
- Often asymmetric or present in only one eye
- Requires a trained pediatric ophthalmologist to assess and document

Classic Injuries

3) Skeletal injury

- Rib fractures
- Classic metaphyseal lesions
- Skull fractures

The Multidisciplinary Team

- Healthcare provider
- Hospital social worker
- Child protective services
- Law enforcement

Role of The Multidisciplinary Team

- Information from the healthcare provider:
  - Whether or not there is a medical explanation for the findings
  - An opinion as to whether the provided history could account for the injuries seen
  - An estimation of when the injuries occurred based on the provided history

Role of The Multidisciplinary Team

- Information from the hospital social worker:
  - Family profile?
  - Mental health issues?
  - Substance abuse issues?
  - Intimate partner violence?
  - Past legal/children's services involvement?

Role of The Multidisciplinary Team

- Information from child protective services:
  - Past involvement – concerns of abuse/neglect?
  - Scene investigation
  - Interview of siblings/neighbors/relatives

Role of The Multidisciplinary Team

- Information from law enforcement:
  - Scene investigation
  - Interview of siblings/neighbors/relatives
  - Review of phone records/credit card receipts/security camera images
  - Additional interviews of possible perpetrators

Conclusion

- Abuse is the most common cause of head injury in children less than 1 year of age
- The presentation of abusive head injuries may vary, and healthcare providers should always consider this in the list of potential diagnoses

Conclusion

- There is critical information to be gleaned from each member of the multidisciplinary team in the assessment of abusive head injury, and each member of the team plays a role in the diagnosis.

Neglect: Failure-to-Thrive

Definition of Failure-to-Thrive

- Varying definitions:
  - Weight-for-age decreasing across 2 major percentile channels from a previously established growth pattern
  - Weight-for-length < 80% of ideal weight
  - Weight (or weight-for-length) < 2 standard deviations below the mean for sex and age

  * Recognize that these definitions must be applied with caution!

Definition of Failure-to-Thrive

- From the AAP 2005:

  "A significantly prolonged cessation of appropriate weight gain compared with recognized norms for age and gender after having achieved a stable pattern."

Definition of Failure-to-Thrive

- From the AAP 2005:

  "A significantly prolonged cessation of appropriate weight gain compared with recognized norms for age and gender after having achieved a stable pattern."

  Allows for the unique aspects of each case

Incidence of Failure-to-Thrive

- Starvation affects > 3 million children worldwide, predominately in developing countries with food shortages.
- While neglect is the most common form of child maltreatment, it is unclear what percentage of these cases represent nutritional neglect.
- Up to 10% of low-income American children have failure to thrive.

Causes of Failure-to-Thrive

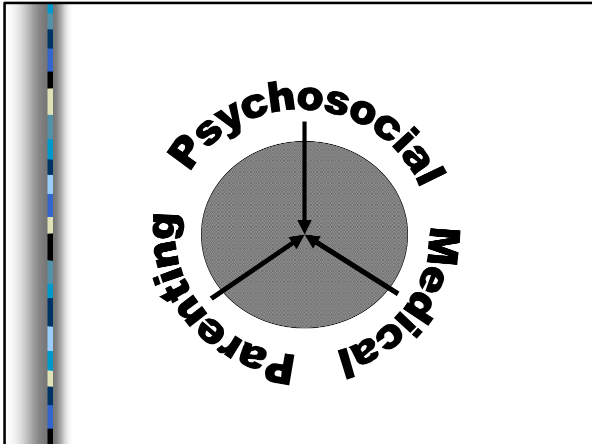
- Organic (medical causes):
  - Inadequate intake
    - Swallow dysfunction, nervous system depression, anorexia
  - Increased metabolic rate
    - Chronic lung disease, congenital heart disease, fever, thyroid disease
  - Maldigestion or malabsorption
    - AIDS, cystic fibrosis, short gut syndrome, inflammatory bowel disease, celiac disease

Causes of Failure-to-Thrive

- Organic (medical causes):
  - Complications of prematurity
  - Developmental delays
  - Congenital anomalies
  - Intrauterine toxin exposure (e.g. alcohol, lead)

Causes of Failure-to-Thrive

- Non-Organic ("social" causes):
  - Food being withheld from the child
  - Child not being given appropriate types of food
  - Food not being prepared correctly



Assessment and Intervention

- A multidisciplinary team is the best approach:
  - Healthcare Providers
  - Social Services
  - Child Protective Services
  - Legal Community
  - Caregivers (a critical part of the team)

Risk Factors for Failure to Thrive

- Poverty*
- Unusual health and nutrition beliefs
- Social isolation
  - Single parent
  - Rural communities
- Substance abuse

Risk Factors for Failure to Thrive

- Violence or abuse
- Mental health issues
  - Depression
- Parenting skills
  - Young parents
  - Parents out of home frequently
  - Disordered feeding techniques

Risk Factors for Failure to Thrive

- Infant-caregiver attachment
  - The child's temperament plays a role in the interactions with the parent. Many FTT children are perceived as "difficult" by the caregiver.
  - Caregivers often have maladaptive reactions to the behaviors of children leading to struggle with feeding, excess anger and hostility associated with food intake.

Evaluation of the Child

- Role of the healthcare provider:
  - History taking
  - Examination
  - Feeding observation
    - Allows physician to observe the parent/child interaction
    - Allows physician to observe how food is prepared
    - Allows physician to observe how the child eats
  - Testing

Evaluation of the Child

- Hospitalization is indicated for:
  - Physical abuse or risk of abuse
  - Previous history of abuse
  - Violent, angry caretaker, disturbed caretaker
  - Severe malnutrition
  - Outpatient treatment failure
- Child protective services/legal involvement

AAP Recommendations

- In communities with no specialized CPS centers, children requiring evaluation/treatment for abuse or neglect be hospitalized for the initial management until medically stable and safe placement is available
- Hospitalization of children requiring evaluation and treatment for abuse or neglect should be viewed by third-party payors as medically necessary

Evaluation of Home Environment

- Is appropriate food present and stored safely?
- Is there water/electricity?
- Other evidence of neglect?
- Safe environment for the child?
- Photograph the home environment
- Photograph other siblings if necessary

Corroboration of History

- Role of child protective services and/or law enforcement:
  - Obtain statements from siblings, relatives or neighbors
  - Concerns raised by the school?
  - Verify access (or lack of access) to appropriate medical care

Failure-to-Thrive: Investigative Recommendations

1. Seek a medical evaluation if one hasn't yet been done.
2. An evaluation of the child's home environment is critical.
3. Never underestimate what a caregiver is capable of doing.
4. Sometimes the obese child needs as much attention as the skinny child.

SPECIAL ARTICLE

Childhood Obesity and Medical Neglect

Todd Varness, MD, MPH[a], David B. Allen, MD[a], Aaron L. Carrel, MD[a], Norman Fost, MD, MPH[a,b]

Pediatrics 2009;123;399-406

TABLE 1 Childhood Obesity Categories

Category	Description
1	Obese children who have no comorbid conditions
2	Obese children who have comorbid conditions that predict serious harm but are reversible in adulthood
3	Obese children who have comorbid conditions that predict serious harm and are not reversible in adulthood
4	Obese children who have comorbid conditions that constitute serious imminent harm in childhood

When is Obesity Neglect?

- When all 3 conditions are present:
  1. There is a high likelihood that serious harm will occur
  2. A reasonable likelihood that state intervention will result in effective treatment
  3. There are no other alternatives to address the issue

How Best to Respond?

- First response should be to pursue less invasive alternatives
- Multidisciplinary approaches may be used, involving home health nurses, social workers, school nurses, and community-based social service agencies
- Mandated behavioral interventions and “weigh-ins” also should be considered
- Consider removal from the home

Conclusion

- Specific definitions of failure to thrive vary, but all share the concept that a child who should be and has been growing is now not growing
- There are a multitude of medical and psychosocial risk factors for a child failing to thrive
- Failure to thrive is rarely due to a specific disease, but is more often the result of complex interactions between the caregiver and child, environment, and family unit
- A multidisciplinary team is critical to the successful evaluation, diagnosis and treatment of failure to thrive

The Child Advocacy Center

A National Model

- The Center for Child and Family Advocacy at Nationwide Children's Hospital is the first facility in the country to bring together, under one roof, comprehensive intervention and prevention services, with long-term treatment and support for abused children and victims of domestic violence.

Center for Child and Family Advocacy

- Our Mission - To foster a safe community by breaking the cycle of violence through coordinated, comprehensive services in treatment and prevention of child abuse and domestic violence
  - Therapeutic Model
    - Hospital-based CAC primary focus is treatment
    - Cooperation and collaboration with investigative agencies creates child-focused system care
  - Comprehensive
    - Assessment, treatment, prevention for victims of violence (child and adult)
    - Education and outreach
    - Research

Child Advocacy Centers

- Began in 1985; over 300 centers nationally
- Coordination of investigation and intervention services for child abuse victims
- Multidisciplinary team: child-focused
- Goal: ensure children are not revictimized by the systems designed to protect them

Multidisciplinary Team Reviews

- Criteria: complex, multiple victim, high profile
- Reviews status of investigation, treatment
- Provides communication and accountability of action plans established at assessment
- Provides additional information to staff that may not be known over time

Challenges to the “Promised Land” of Multidisciplinary, Family Focused Care

- Turfism
- Financial disparities among partners
  - changes over time
- Leadership disparities among partners
  - changes over time
- “My way or no way”
- “We’ve always done it this way…”

Partnership Strategies

- "No silos allowed"
- Demonstrate value added
- Use strong arm approach as last resort
- Develop group consensus on main process; allow individual practice on smaller processes
- Utilize peer pressure to your advantage
- Develop a strategic planning process
- Stay on message: Mission, Vision, Values

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