Implementing the General Movements Assessment into Practice: Steps to Success

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Disclosures

We have nothing to disclose and no conflicts of interest
Objectives

- Provide an overview of the General Movements Assessment (GMA) as designed by Prechtl, including review of psychometric properties as compared to other common neurologic assessments used in early infancy.

- Describe how the GMA can be utilized clinically for accurate identification of neurological impairments and subsequent provision of early, targeted interventions.

- Delineate steps for how to effectively integrate the GMA into the NICU and following NICU discharge.

Case Example at 2 weeks PTA

- Normal Writhing GMs
- Cramped Synchronized GMs
Step 1: Understanding GMs

- General movements (GMs) are part of the spontaneous movement repertoire and are among the earliest, most prevalent and complex patterns of movement.
- GMs are characterized by a variable sequence of arm, neck and trunk movements with an intensity that waxes and wanes with a gradual beginning and end.
- Categorization of GMs can be used to determine the integrity of nervous system from 26 weeks postmenstrual age (PMA) to ~20 weeks post-term age (PTA).

Categories for GMs

[Diagram showing categories for GMs:] Voluntary and Antigravity GM, Withholding GM, PR, GS, or CH, etc.

Postmenstrual Age, wk

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70

Term, wk

5 10 15 20 25 30

Postterm Age, wk
Case Example at 16 weeks PTA

<table>
<thead>
<tr>
<th>Normal Fidgety GMs</th>
<th>Absent Fidgety GMs</th>
</tr>
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<tbody>
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</table>

Step 2: Comparing GMs to Other Common Assessment Tools\(^{2-6,8-10}\)

<table>
<thead>
<tr>
<th>Assessment Tool</th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The General Movements Assessment</td>
<td>93-100</td>
<td>82-100</td>
</tr>
<tr>
<td>Magnetic Resonance Imaging</td>
<td>60-100</td>
<td>89-99</td>
</tr>
<tr>
<td>Cranial Ultrasound</td>
<td>74-80</td>
<td>83-97</td>
</tr>
<tr>
<td>Test of Infant Motor Performance</td>
<td>62.5</td>
<td>77.4</td>
</tr>
<tr>
<td>Neurological Examination (preterm/postterm age)</td>
<td>57-86/68-96</td>
<td>45-83/52-97</td>
</tr>
</tbody>
</table>
Administrative Differences of the GMA

- Non-invasive, global-visual Gestalt perspective minimizes the need for handling\textsuperscript{3-5}
- One of the only assessments to categorize the quality of movement patterns observed\textsuperscript{2,11}
- Prediction improves with longitudinal series of GM assessments\textsuperscript{2}

The GMA stands out as one of the most cost-effective and sensitive tools available for prediction of long-term neurobehavioral impairments that allows for early implementation of targeted interventions.

Individual Developmental Trajectory

|                  | F- | AF | CS | CS | Ch | PR | H | N | 40 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|------------------|----|----|----|----|----|----|---|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Writhing Movements|     |    |    |    |    |    |   |   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|                  | FMs + or +/- | FMs ++ or + |
Potential Implications of Abnormal GMs

Step 3: Rationalizing the Clinical Decision to Use the GMA

- The central nervous system endogenously generates a variety of movement patterns which continue after birth, irrespective of when birth occurs.

- The rate of occurrence of GMs is no different in infants with brain damage, however the quality is different.

- A strong correlation exists between the GMA and the Bayley Scales of Infant and Toddler Development- 3rd edition.
Early Identification → Early Intervention =

Making a Difference in the Baby’s Brain

24 weeks post-conception

40 weeks post-conception

Step 4: Finding Training Opportunities

General Movements Trust
- Course runs ~3.5 day
- Basic Certification
  - Registration: ~$895
- Advanced Certification
  - Registration: ~$950

For more information:
http://general-movements-trust.info/47/dates

Hadders-Algra
- Course runs ~2 days
- General Movements Assessment Certification
  - Registration: ~$700
- Infant Motor Profile Course
  - Registration: ~$425

For more information:
www.developmentalneurology.com
Step 5: Getting Buy In From Your NICU

- Introducing the GMA to NICU leadership:
  - Presentation of evidence to the Medical Director of Neonatology
  - Presentation to the entire Neonatology Enterprise
    - 3 NICUs in the Cleveland Clinic Health System
  - Organization of regional presentation by Colleen Peyton PT, DPT, PCS University of Chicago Medicine, Comers Children’s Hospital
  - Over 50 therapists, physicians, nurse practitioners and nurses attended this event

Creating a Protocol with the NICU Team

- Review of protocol during NICU Operations Meeting:
  - Process for obtaining video consent
  - Developmental time frame
  - Family Education
  - Rationale for use in identifying high risk infants
  - Impact on discharge referral process
Step 6: Preparing for Implementation

- Equipment purchase:
  - Video cameras (2)
  - Tripod (2)
  - Memory card reader (2)

- Costs: PT and OT budgets

- Storage:
  - Physical and digital

- Space

- Documentation templates

- Billing

Step 7: Implementing GMA Protocol

- GMA Protocol for NICU:
  - Atypical movement patterns identified
  - Video consent obtained
  - Education with nursing
  - Education with multidisciplinary team
  - 1st video in preterm writhing stage 34-39 weeks PMA
  - 2nd video in term writhing stage 40-46 weeks PMA

- Billing
Videotaping Parameters$^2,10$

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Age</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of Video</td>
<td>&lt; 36 weeks PMA</td>
<td>3-5 minute recording</td>
</tr>
<tr>
<td></td>
<td>36 weeks PMA – 6 weeks PTA</td>
<td>3-5 minute recording</td>
</tr>
<tr>
<td></td>
<td>14-20 weeks PTA</td>
<td>1-2 minute recording</td>
</tr>
<tr>
<td>Preferred Behavioral State</td>
<td>Any age</td>
<td>No crying, no NNS</td>
</tr>
<tr>
<td></td>
<td>&lt; 36 weeks PMA</td>
<td>Quiet alert state</td>
</tr>
<tr>
<td></td>
<td>&gt; 36 weeks PMA</td>
<td>Quiet alert state</td>
</tr>
<tr>
<td>Position</td>
<td>Any age</td>
<td>Supine on flat surface</td>
</tr>
<tr>
<td>Clothing</td>
<td>Any age</td>
<td>No clothes with small diaper</td>
</tr>
<tr>
<td>Environment</td>
<td>Any age</td>
<td>Neutral temperature, sound, lighting. Avoid engaging with baby during recording</td>
</tr>
</tbody>
</table>

Educating Families on GMA

- Baseline assessment of movement patterns
- Describe using GMA language:
  - Variety and variability, fluency, complexity, connection between upper and lower body
- Allows tracking of progress over the first 3-4 months after discharge
- Explanation of NICU Transition and NICU Follow Up Clinics
Discharge Referral Process

- Creation of NICU Transition Clinic using GMA as primary assessment tool
- Order written for OT/PT in NICU - referral form for intake
- First appointment in NICU Transition Clinic prior to 6 weeks PTA for term writhing video
- Families leave NICU with appointment in hand → improved compliance with keeping appointments
- Continuity of care between NICU and NICU Transition Clinic with NICU therapists

NICU Transition Clinic

- GMA Protocol for NICU Transition Clinic:
  - Patient Services Representative script for appointment confirmation
  - Rotating schedule of evaluating therapist/consideration of discipline specific needs
  - 2nd/3rd video in term writing stage (prior to 6 weeks PTA)
  - 3rd/4th video in fidgety stage (14-20 weeks PTA)
  - Small part of overall assessment in terms of time: first 5 minutes of visit, complete evaluation, family education
  - Billed as OT or PT evaluation/treatment
Referrals for Ongoing Outpatient Services

- When to refer to outpatient therapy?
  - Many referrals made after 13-15 weeks PTA (fidgety stage)
  - NICU Transition Clinic held in outpatient therapy satellite
  - Clinically may present with need for earlier referral, fidgety video then done during outpatient visit in coordination with Transition Clinic Team

Clinical Usage of GMA at Cleveland Clinic Children’s Hospital

- GMA performed in:
  1. Hillcrest Hospital 36 bed Level III NICU: OT and PT receive referrals for high-risk infants/infants <34 weeks GA
  2. Children’s Hospital for Rehabilitation Beachwood Satellite:
     a. NICU Transition Clinic with OT or PT
     b. Outpatient Services

- GMA currently performed by certified PTs and OTs
  - Results of GMs conveyed to neurologists, neonatologists and pediatricians
  - Ability for MDs and NNP’s to also become certified to assess without therapist evaluation
Step 8: Dealing with Roadblocks

- IT issues
- Video uploading
- Storage of equipment
- Research vs. clinical application
- Need to streamline referral process

Step 9: Assessing if it is Making a Difference

- How many patients are we referring?
- How is this changing our practice?
- Replicating the GMA Protocol for additional NICUs in our system
Developing a Program for NICU Graduates

- GMA Certification for outpatient therapists
- Development of clinical skills specific to treating NICU graduates:
  - Targeted continuing education, mentoring, collaboration with NICU therapists
- NICU Family Support Group: Highest risk infants being followed in NICU Transition Clinic or Outpatient Therapy
Case Example at 2 ½ years of age

Discharged from NICU after 39 days

Term writhing video taken at 2 weeks PTA with subsequent referral to outpatient PT and Help Me Grow

Fidgety video taken at 16 weeks PTA (as part of outpatient PT visit) with subsequent referral to OT

Current medical team includes: Neurology, Pediatric Physiatry, OT, PT and Early Intervention Providers

Current medical management includes:
- Oral baclofen
- Botox injections
- Equipment
- Microcurrent

Current functional abilities:
- Began walking at 29 months
- Still limited in play, self-care and dressing skills

Expected to participate in a structured Constraint Induced Movement Therapy program this summer
Step 10: Seeking out Additional Resources

- When possible, have more than one person on your team trained
- Find out who in your region is certified
  - GMA Pow-Wows to maximize reliability post-certification
- Seek out advanced training once you have some practice\(^2,3\)
- Utilize eager therapy students to help manage some of the administrative logistics
- Explore using the GMA for tracking outcomes/research

In Summary:

- The GMA is a cost-effective, objective assessment tool that can accurately identify neonates at risk for neurobehavioral sequelae
- Steps exist to help streamline implementation of the GMA as a clinical standard of care
- The babies you see will thank you, as initiating early-targeted interventions can maximize long-term function and minimize disability
References


References - continued


Questions?