Platelet Function Testing – Results from Proficiency Challenges

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Disclosures: K. Moffat

Relevant Financial Relationship(s)

None

Off Label Usage

None

Session Outline

- Discuss external proficiency challenges developed for two tests used for the investigation of platelet disorders

External Proficiency Challenges

- Laboratory participation is important for quality monitoring
- Few organizations have applied proficiency challenges to tests used for the investigation of platelet disorders
- In 2008, NASCOLA began offering challenges for platelet disorder investigations

NASCOLA Platelet External Proficiency Challenges

1. Post analytical challenges on the interpretation of light transmission aggregometry (LTA)
   - Distributed to both NASCOLA and ECAT members
2. Whole mount electron microscopy (EM) assays for dense granule deficiency (DGD)
   - Distributed to NASCOLA members

Post Analytical Challenges on the Interpretation of Light Transmission Aggregometry

Post Analytical Challenges on Interpretation of LTA

- 2 challenges per year
- Each consist of 5 patient cases, distributed electronically, that include:
  - Reason for testing
  - Complete blood counts
  - Tested sample platelet count
  - Platelet aggregation tracings
  - % maximal aggregation (MA) data with reference intervals
  - Reference aggregation tracings for healthy controls

Methods

- Results reported electronically
  - made anonymous prior to scoring
  - SurveyMonkey® tool – 2008, 2009
  - NASCOLA website - 2010
- Consensus on acceptable interpretations for each case prior to scoring as:
  - Correct
  - Incorrect
  - Non-ideal

Example of Distributed Material

NASCOLA LTA EQA Pilot Survey

Case 1

Reason for referral: 49 year old female with increased bruising for 2 years.

Complete Blood Count

Test	Result	Flag	Reference
LKCS	8.3		4.0-11.0 X10 9/L
ERCS	4.36		3.8-5.8 x10 12/L
HB	143		115-165 g/L
HCT	0.412		0.370-0.470
MCV	94.5		82-99 fL
MCH	32.9	H	27-32 pg
MCHC	348		300-350 g/L
RDW	13.3		11.5-15.0
PLT	280		150-400 x10 9/L
MPV	8.3		7.4-10.4 fL
RELATIVE LYMPHS	0.39		
RELATIVE MONOS	0.07		
RELATIVE GRANS	0.52		
RELATIVE EOS	0.02		
RELATIVE BASOS	0.01		
ABSOLUTE LYMPHS	3.2		1.5-4.0 x10 9/L
ABSOLUTE MONOS	0.6		0.2-0.8 x10 9/L
ABSOLUTE GRANS	4.3		2.0-7.5 x10 9/L
ABSOLUTE EOS	0.2		0.0-0.4 x10 9/L
ABSOLUTE BASOS	0.0		0.0-0.1 x10 9/L
BANDS	0.03		
SEG NEUT	0.44		
LYMPHOCYTES	0.41		
MONOCYTES	0.09		
EOSINOPHILS	0.03		
SMEAR SCAN	COMPLETE		
LKCS COMMENT	MORPHOLOGY NORMAL		
ABSOLUTE BANDS	0.2		x10 9/L
ABSOLUTE NEUTS	3.7		2.0-7.5 x10 9/L
ABSOLUTE LYMPHS	3.4		1.5-4.0 x10 9/L
ABSOLUTE MONOS	0.7		0.2-0.8 x10 9/L
ABSOLUTE EOS	0.2		0.0-0.4 x10 9/L
POLYCHROMASIA	MILD		
PLT COMMENT	NORMAL IN NUMBER		

DRAFT Version: 2.0

Version Date: 7/17/2007 Effective Date: 7/17/2007	Section: **Special Hematology** Sub-Section: *Special Coagulation*
Title: *08-340-102-F2 Platelet Aggregation Worksheet*	
Approvers: *Director, Laboratory Medicine, Discipline Director, Special Hematology, Manager, Special Hematology*	*Page 1 of 2*

Year	
Patient	Case 1
ID#	
Hematologist	
Control Name (first and last)	
Technologist perform testing	

Check List					
Repeat agonist if outside RI	3rd repeat if req'd	NSQ PRP for repeat	Time sample collected	Time testing started	Time testing completed

Patient CBC				Control CBC			
Plt	MPV	Hgb	WBC	Plt	MPV	Hgb	WBC

Patient PRP			Control PRP		
Plt	RBC	WBC	Plt	RBC	WBC

Adjusted PRP Platelet Count	
Patient	Control
250	

STIMULUS	Initial Conc	Final Conc	Reference Interval %	Patient				Control			
				MAX%	SLP1	SLP2	LAG	MAX%	SLP1	SLP2	LAG
ADP	25 µM	2.5 µM	>24	89							
	50 µM	5.0 µM	>43	89							
Collagen	12.5 µg/mL	1.25 µg/mL	>51	90							
	50 µg/mL	5 µg/mL	>85	94							
Epinephrine	60 µM	6 µM	9 - 100	93							
	1000 µM	100 µM	11 - 101	91							
Arachidonic Acid	16 mM	1.6 mM	>77	95							
U46619	10 µM	1 µM	>70	92							
Ristocetin	5 mg/mL	0.5 mg/mL	<7	2							
	12.5 mg/mL	1.25 mg/mL	>75	99							

Comment:

Example of Distributed Material

PACKS-4 PATIENT REPORT

Platelet Aggregation Assays 13:01 9-13-2006

atient Name :

CH NO.	REAG. LOT#	REAG.	CONC.	UNIT	PPP	PRP	MAX %	MAX TIME	SLP1	SLP2	LAG
.1	Green line	ADP	2.5	uM	0.026	0.535	89.1	269 sec	69.6	20.3	2 sec
Ch.2	Red line	ADP	5.0	uM	0.039	0.573	88.6	288 sec	75.3	53.8	1 sec
Ch.3	Blue line	COLL	5.0	ug/ml	0.002	0.499	93.6	287 sec	120.5	N/A	1 sec
.4	Grey line	COLL	1.2	ug/ml	0.054	0.561	90.0	284 sec	95.9	N/A	62 sec

mments: _____

PACKS-4 PATIENT REPORT

Platelet Aggregation Assays 13:09 9-13-2006

stient Name :

CH NO.	REAG. LOT#	REAG.	CONC.	UNIT	PPP	PRP	MAX %	MAX TIME	SLP1	SLP2	LAG
.1	Green line	EPN	6.0	uM	0.020	0.522	92.7	527 sec	19.6	37.0	3 sec
Ch.2	Red line	EPN	100.0	uM	0.041	0.523	91.4	448 sec	23.6	56.4	4 sec
Ch.3	Blue line	ADA	1.6	mM	0.002	0.456	94.5	569 sec	23.7	47.9	32 sec
.4	Grey line	U46	1.0	uM	0.048	0.576	91.8	576 sec	44.8	19.8	3 sec

mments: _____

Participants

	2008	2009	*2010-1
Total # of Participants	56	52	83 registered 55% completed (n=46)
NASCOLA Participants	22	20	30 registered 63% completed (n=19)
ECAT Participants	34	32	53 registered 51% completed (n=27)

*2010-1

- First challenge using NASCOLA website
- Closing date extended to allow participants time to complete the challenge

Results based on Interpretation	2008	2009	2010-1 PRELIMINARY RESULTS ONLY
Normal	94%	100%	-
Bernard Soulier Syndrome	85%	-	98%
Glanzmann thrombasthenia	-	100%	-
Non-diagnostic finding	22%	98%	-
Possible platelet secretion defect	38%	93%	88%
Potential false positive	60%	-	56%
Thromboxane generation defect	-	95%	-
Aspirin like defect	-	-	81%
Von Willebrand Disease	-	-	89%

Whole Mount EM Proficiency Challenges for DGD

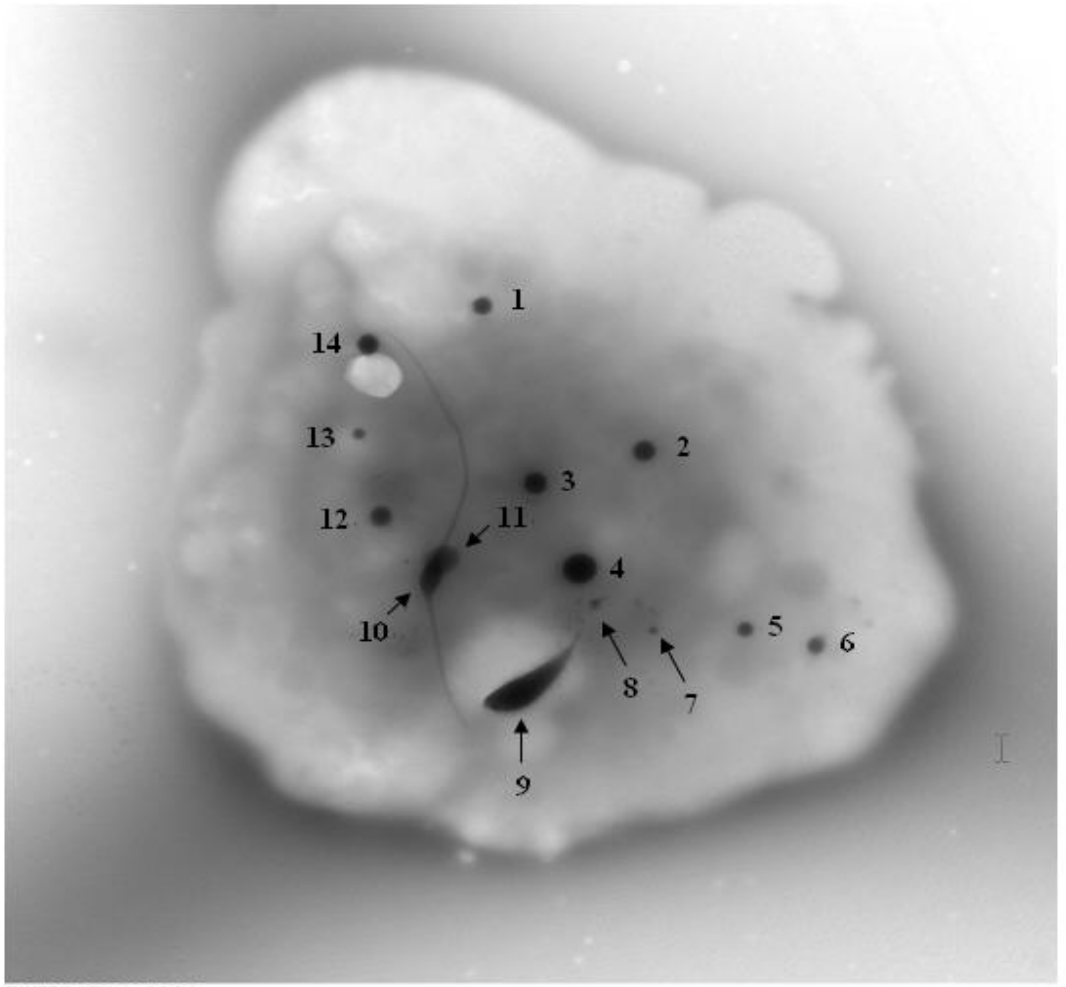
EM Proficiency Challenges for DGD

- 2 components

- EM grid challenges
  - 1 normal patient volunteer
  - 1 patient with confirmed DGD
- EM DG image challenges
  - Numbered structures

Example of Labeled EM Image - 2010-1 Challenge

Image 1:



Participants

	2008	2009-1	2009-3	2010-1
Total # of NASCOLA Participants	8	3	3	6

Results

- All participants correctly identified the normal and DGD samples in each of the 4 grid challenge sets
- Good overall agreement for classifying structures in the labeled EM DG images

Conclusions

- For LTA, there has been improvement in the number of correct interpretations over time, however there continues to be issues with interpretation of common platelet disorders
  - Platelet secretion defects
  - Aspirin like defects
- Published guidelines do not provide recommendations for LTA interpretation
- North American consensus guidelines for performance and interpretation of LTA – in press (AJCP)
  - Hayward CP, Moffat KA, Raby A, et al. Development of North American Consensus Guidelines for Medical Laboratories that Perform and Interpret Platelet Function Testing Using Light Transmission Aggregometry. AJCP – in press. [includes CME component]

Conclusions

- DG proficiency challenge performance has been excellent
- Provides valuable peer comparisons for laboratories performing EM for DGD

- Both the LTA and EM external proficiency challenges are valued by participants

Thank you for your attention

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- NASCOLA and ECAT laboratories
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- HRLMP Special Coagulation and EM laboratory staff

Hamilton Regional Laboratory Medicine Program

McMaster University Health Sciences