

High levels of FDP and D-dimer for the diagnosis of invasive group A streptococcal infection during pregnancy: A review



劇症型A群レンサ球菌感染症「分娩型」の診断におけるFDPとDダイマーの異常高値の意義

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今回の演題に関連して利益相反状態はない

Aim. Invasive group A streptococcal (**GAS**) infections during pregnancy are uncommon and its early diagnosis remains challenging. Moreover, the outcomes for the mother and the fetus/neonate are often poor. In this review, we aimed to assess the fibrin/fibrinogen degradation products (**FDP**) and D-dimer levels in pregnant women with invasive GAS infections and determine whether they could aid in the diagnosis.

Methods. We identified 45 cases involving pregnant women with invasive GAS infection published during 2000–2017 in English or Japanese. We analyzed the laboratory data including FDP and D-dimer levels measured between fulmination and just before delivery along with those observed in a case we had experienced.

Results. Mean maternal age was 34.5 years; 81% mothers were multiparous. Most (80%) mothers had fulminating

invasive GAS infections during third trimester. Modes of delivery included emergency cesarean sections (48%), vaginal delivery (37%), and abortion (9%). Three mothers (7%) died before delivery. Fetal/neonatal and maternal mortality rates were 61% and 28%, respectively. Laboratory test results just before delivery, available for 24 cases, were as follows: white blood cell count $\geq 12,000/\mu\text{L}$, 46% cases; platelet count $\leq 100,000/\mu\text{L}$, 55% cases; and C-reactive protein level $\geq 10 \text{ mg/dL}$, 40% cases. These variables showed no substantial sensitivity in invasive GAS infection diagnosis. However, 100% of the cases were positive for FDP ($\geq 10 \mu\text{g/dL}$) and D-dimer ($\geq 2 \mu\text{g/dL}$), with these variables showing extremely high levels in many cases.

Conclusions. FDP and D-dimer levels may help diagnose invasive GAS infections during pregnancy.

Table 1

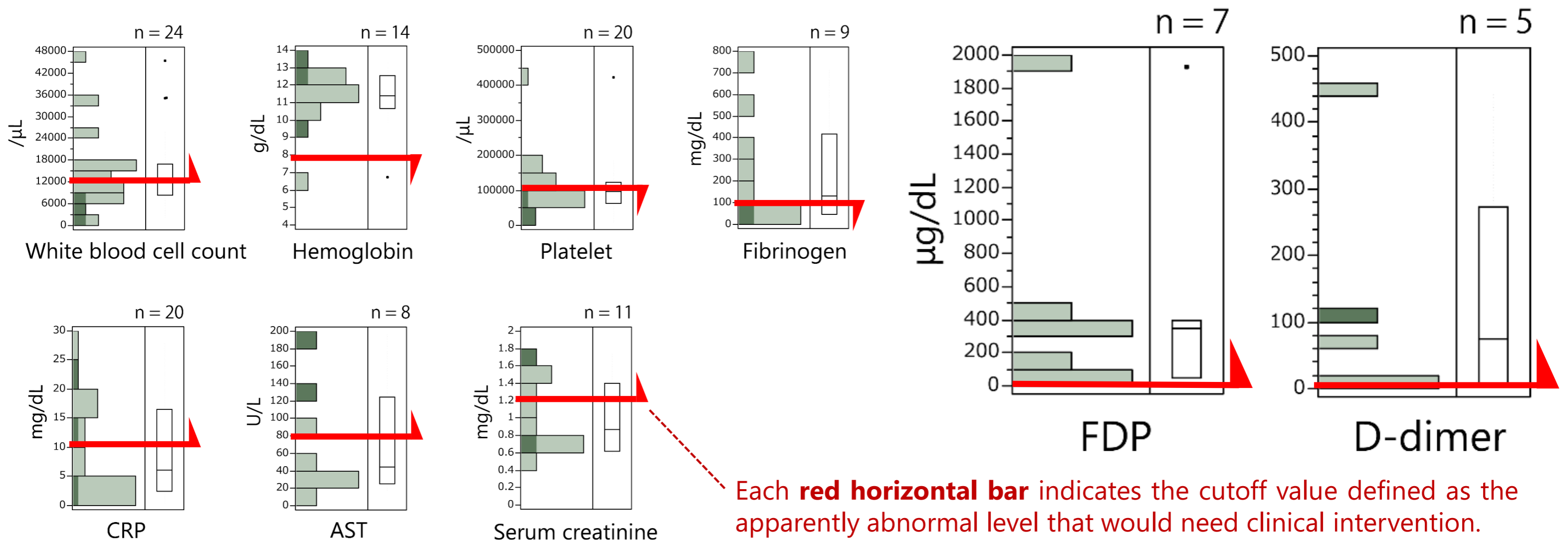
Summary of categorical data for clinical background, symptoms, outcomes, and therapies from the 46 cases.

Factor	n	%
Maternal age (y)		
Teens	1	2.2
Twenties	9	19.6
Thirties	32	69.6
Forties	4	8.7
Parity		
Nuriparous	8	19.4
Multiparous	37	80.6
NA	1	
Maternal complications		
Yes	10	24.4
No	31	75.6
NA	5	
Pregnancy week at fulmination		
Abortion period (<22 week)	5	10.9
Second trimester (22–27 week)	4	8.7
Third trimester before term (28–36 week)	18	39.1
Term (37 week <)	19	41.3
Fulminating period		
Antenatal (before beginning of the labor)	45	97.8
During labor	1	2.2
Mode of delivery		
Emergent cesarean	22	47.8
Vaginal delivery	17	37
Abortion	4	8.7
None (maternal death before delivery)	3	6.5
Mortality		
Fetal/neonatal death	28	60.9
Maternal death	13	28.3
Symptoms at fulminating period (There is some overlapping)		
Fever ($>38^\circ\text{C}$)	44	95.7
Respiratory symptoms	20	43.5
Abdominal pain	32	69.6
Gastrointestinal symptoms	17	37
Abnormally strong uterine contractions	20	43.5
Unconsciousness	5	10.9
Administration of antibiotics		
Yes	40	88.9
No	5	11.1
NA	1	
Administration of immunoglobulins		
Yes	20	44.4
No	25	55.6
NA	1	

Table 2

Summary of laboratory test values in the 24 available cases whose laboratory tests were carried out during fulmination and just before delivery.

Item	n	%	Median
White blood cell count (μL)			
$\geq 12,000$	11	45.8	12,490
$< 12,000$	13	54.2	
NA	0		
Hemoglobin concentration (g/dL)			
≤ 8	1	7.1	11.4
> 8	13	92.9	
NA	10		
Platelet count (μL)			
$\leq 100,000$	11	55	96,000
$> 100,000$	9	45	
NA	4		
AST (U/L)			
≥ 80	3	37.5	44.5
< 80	5	62.5	
NA	16		
Serum creatinine (mg/dL)			
≥ 1.2	4	36.4	0.87
< 1.2	7	63.6	
NA	13		
C-reactive protein (mg/dL)			
≥ 10	8	40	6.2
< 10	12	60	
NA	4		
Fibrinogen (mg/dL)			
≤ 100	4	44.4	130
> 100	5	55.6	
NA	15	62.2	
FDP ($\mu\text{g/mL}$)			
Strong positive (≥ 40)	6	85.7	352
Positive (≥ 10)	7	100	
Negative (< 10)	0	0	
NA	17		
D-dimer ($\mu\text{g/mL}$)			
Strong positive (≥ 10)	3	60	75
Positive (≥ 2)	5	100	
Negative (< 2)	0	0	
NA	19		



Figure

Histograms for laboratory data from the 24 available cases whose laboratory tests were measured between fulmination and just before delivery.

Positive FDP ($\geq 10 \mu\text{g/dL}$) and positive D-dimer ($\geq 2 \mu\text{g/dL}$) each had 100% sensitivity.

Strong positive FDP ($\geq 40 \mu\text{g/dL}$) and strong positive D-dimer ($\geq 10 \mu\text{g/dL}$) had a sensitivity of 86% and 60%, respectively.

(Areas with a deep color indicate maternal death.)