

Non-transplant related Postoperative atypical Hemolytic Uremic Syndrom(aHUS) in older age patient

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aHUS is rare but life-threatening disease that triggered by complement cascade system. Activation of complement cascade system occurs thrombotic microangiopathy in blood system that makes thrombosis in small vessels resulting multi-organ failure especially kidney and brain. We present cases of aHUS patient after surgery of bipolar hemiarthroplasty, analyzing patient initial characteristics and disease courses. Case 1. A 81-year-old woman was proceed Lt. bipolar hemiarthroplasty for femur neck fracture by local anesthesia. In her past medical history, she has hypertension as a comorbidity disease taking anti-hypertensive medication. On postoperative day 2, blood test showed anemia and low platelet count (Hb:10.1mg/dL, plt: $95 \times 10^3/\mu\text{L}$), elevation of LDH (1517IU/L) level, BUN and Cr level of 25.0(mg/dL), 2.26(mg/dL) each. After postoperative day 4, she underwent hemodialysis with plasma exchange for aHUS treatment. After total 6 times plasma-exchange and 16 times hemodialysis were performed. She was discharged with subtle renal impairment but free of hemodialysis. Case 2. A 94-year-old woman who has also received Lt. bipolar hemiarthroplasty for femur fracture by local anesthesia. In past medical records, she has diabetes and hypertension. There is no abnormal laboratory data in her initial visit. A blood test showed Hb count of 11.5(mg/dL) and platelet count of $60 \times 10^3/\mu\text{L}$. BUN/Cr level were increased 36.4/2.28(mg/dL) after postoperative day 2. Oliguria and metabolic acidosis were seen that she has started hemodialysis after postoperative day 7. Total 24 times of hemodialysis were performed for this patient without plasma exchange treatment. In peripheral blood test, schistocytes and MAHA were seen all cases. A stool test of E.coli O157 was negative and ADAMTS 13 activity was above 40% in all three cases. Conclusion aHUS can triggered by multiple sources including infection, drug or transplant related surgery. But certain condition, cases we mentioned (non-transplant related surgery), also related to aHUS. Monitoring CBC (Hb, platelet) and hemolytic parameters is important for whom are suffering acute renal failure with anemia and thrombocytopenia.

	Case 1	Case 2	Case 3
Age (year)	81	94	79
Sex (M, F)	female	female	female
Comorbidity			
DM (yes, no)	No	Yes	No
HTN (yes, no)	Yes	Yes	Yes
CKD (yes, no)	No	No	No
CBC			
WBC ($10^3/\text{mm}^3$)	8.3	11.2	10.6
Hb (g/dL)	12.9	11.0	11.9
Hct (%)	38.6	33.7	36.2
platelet($10^3/\text{mm}^3$)	194	276	222
Chemistry			
BUN (mg/dL)	8.5	18.7	13.9
Cr (mg/dL)	0.68	0.99	0.77
eGFR(MDRD)ml/min/1.73m ²	83.47	52.23	72.31
AST (IU/L)	40	20	28
ALT (IU/L)	16	13	30
Alb (g/dL)	3.8	3.4	4.0
HbA1c (%)	5.7	6.7	5.6
hsCRP(mg/dL)	0.28	2.04	0.03
Prothrombin Time			
INR (sec)	11.7	12.8	11.8
aPTT	27.9	29.3	27.2
Urinalysis			
protein	-	-	trace
Occult blood	-	-	-
RBC	<1	1-3	1-3

Table 1. Baseline characteristics for case 1-3

	Case 1	Case 2	Case 3
Antibiotics	cefotetan	cefotetan	cefotetan
LMWH (yes, no)	yes	yes	yes
Time of thrombocytopenia, anemia (postoperative date)	POD 2	POD2	POD2
CBC			
WBC ($10^3/\text{mm}^3$)	12.4	11.3	11.8
Hb (g/dL)	10.1	11.5	8.6
Hct (%)	29.0	34.9	25.2
platelet($10^3/\text{mm}^3$)	95	60	37
PB smear (schistocytes) (/HPF)	5-7	5-7	6-10
Chemistry			
BUN (mg/dL)	25.0	36.4	49.9
Cr (mg/dL)	2.26	2.28	2.22
eGFR(MDRD)ml/min/1.73m ²	20.87	19.95	21.31
AST (IU/L)	113	31	157
ALT(IU/L)	29	16	26
Total bilirubin(mg/dL)	0.6	0.4	1.6
LDH (IU/L)	1517	318	1633
Albumin (g/dL)	3.2	3.1	3.1
hsCRP(mg/dL)	4.99	15.49	26.74
Urine P/Cr (mg/mg)	6.11	11.07	25.60
DIC profile			
Haptoglobin (mg/dL)	<10	49	<10
Antithrombin III (%)	64.7	80.8	67.9
D-dimer (mg/L)	1.2	0.78	3.84
Fibrinogen (mg/dL)	421	465	289
FDP (ug/ml)	4.4	2.9	19.9
Prothrombin time			
PT (sec)	14	15.5	13.9
aPTT (sec)	36.6	34.2	37.9
DIC score (ISTH DIC score)	5	2	5
ADAMTS 13 activity (%)	59	45.2	62.2
E.coli O157:H7	-	-	-
Treatment			
Hemodialysis	Yes (16 times)	Yes (24 times)	Yes (4 times)
Plasma exchange	Yes (6 times)	No	No
3month Follow-up			
Hb (g/dL)	12.2	8.0	11.9
platelet($10^3/\text{mm}^3$)	189	291	251
BUN (mg/dL)	25.7	42.4	16.5
Cr (mg/dL)	2.40	1.75	1.16
eGFR(MDRD)ml/min/1.73m ²	19.47	27.07	45.06

Table 2. Postoperative laboratory data, treatment and post three-month laboratory data.