P-11

신장과 혈액관류를 통한 파라쿼트 (Paraquat) 제거량 비교

순천향대학교천안병원 내과[1], 청주한국병원 내과[2]

강문수[2] · 길효욱[1] · 양종오[1] · 이은영[1] · 홍세용[1]

Comparison between the Kidneys and Hemoperfusion for Paraquat Elimination

Moon-Soo Kang[2], Hyo-Ook Gil[1], Jong-Oh Yang[1], Eun-Young Lee[1] and Sae-Yong Hong[1]

[1]Soonchunhyang University Cheonan Hospital

Department of Internal Medicine[2], Cheongju Hankook Hospital Department of Internal Medicine

Background : The mortality rate of acute paraquat (PQ) poisoning depends on the PQ concentration in the blood. The kidney has been known to eliminate PQ most effectively; that is, the renal clears the PQ more effectively than the creatinine. However, it has frequently been observed that the renal deteriorates early through acute PQ intoxication. This study was designed to compare the efficacy of PQ elimination between hemoperfusion(HP) and the kidney, with varying degrees of functional deterioration taken into account.

Method : Ten patients with acute PQ intoxication were enrolled in this study (Table 1). All the patients underwent HP for 3 hours with the same protocol, blood flow of 200 ml/min. Blood samples for both creatinine and PQ were drawn from both the artery and venous lines, through the tubing system: beginning at zero and every hour during the 3 hours of HP. Urine samples were also collected.

Eliminated amount, by kidney (KE_{PQ}) and HP (HPE_{PQ}), was calculated as follows:

KEPQ (mg)=uC of $_{PQ}$×UV (uC of $_{PQ}$=urine concentration of PQ, UV=Urine volume)

HPE_{PQ} (mg)=CHP×AUC

(C_{HP} (HP Clearance)=Extraction Ratio×Blood Flow Rate×(1- Hct))

(AUC=Area under the plasma PQ concentration- time curve)

Results : The PQ clearance and the actual amount of PQ elimination by the HP cartridge during the HP procedure were 111±11 mL/min and 251.4 mg(range; 4.6- 1655.7) each. While, the renal clearance and actual amount of renal elimination of PQ was was 79.8±56.0 mL/min (range; 9.7- 177.0) and 75.4±73.6 mg (range; 4.9- 245.8). As the creatinine clearance decreased, the PQ elimination by HP was as effective as or more effective than the renal elimination (Fig. 1, 2).

Conclusion : Early HP must be provided for life saving treatment in patients with acute PQ intoxication, especially in early deterioration of renal function or high plasma level of PQ.

Key Words : 중독, 혈액관류, 파라쿼트

Intoxication, Hemoperfusion, Paraquat

Table 1. Demographics and Parquet Concentrations of the Subjects

Case No.	Sex	Age (yrs)	Amounts of ingestion (mL)	Time lag (hours)	PQ levels (ug/mL)	Clinical outcome
1	M	68	200	4.0	48.7	Death
2	M	25	200	7.0	8.0	Death
3	F	33	100	5.5	1.2	Survivor
4	F	39	50	2.0	13.7	Death
5	M	50	300	11.0	12.7	Death
6	F	33	30	4.0	1.4	Survivor
7	F	76	250	4.5	21.8	Death
8	M	60	200	2.0	167.0	Death
9	M	47	100	3.0	33.0	Death
10	M	61	100	2.0	30.7	Death

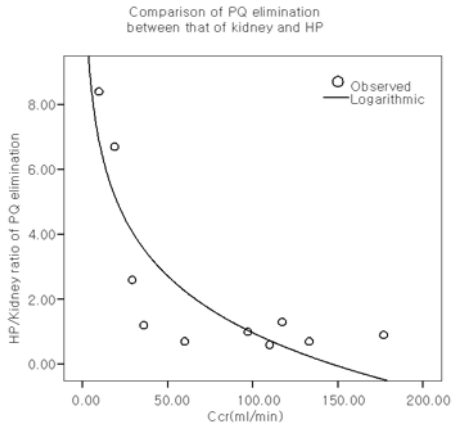


Fig. 1. Comparison between Kidney and HP elimination according to the creatinine clearance. When renal function stays within the normal range, the renal PQ elimination rate is higher than or just as good as the HP. However, as the creatinine clearance decreases, the PQ elimination by HP was more effective than the renal elimination.

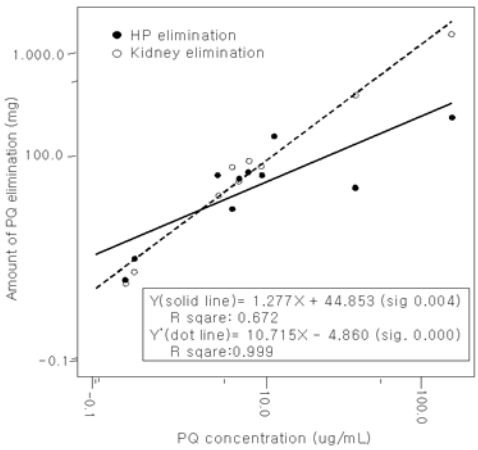


Fig. 2. Comparison between Kidney and HP elimination according to PQ concentration. Note that the intersection of the two lines from the renal and HP elimination equation was at 5.3 g/mL.