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RESEARCH ARTICLE

UNEXPECTED DEATH OF REGULAR HEMODIALYSIS PATIENTS.

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Key words:-
Periodic hemodialysis, outside-clinic death, solitary death.

Abstract

Background: Most patients with end-stage renal disease on maintenance hemodialysis receive treatment on a thrice-weekly pattern. Almost all outside-clinic deaths are examined in the medical examiner's office.

Method: We examined outside-clinic death cases in hemodialysis patients.

Results: First discoverer of the deceased were family (53.5%), clinic worker (11.4%), care taker (11.4%) and others. Hemodialysis patients have to attend their scheduled treatment. The deceased were increased Mondays associated with about 32.3% in the Mon-Wed-Fri schedule, and Tuesdays with 29.2% in the Tue-Thu-Sat schedule. 26.9% deceased were found because they didn't come to the hemodialysis clinic.

Conclusion: All deceased were found within 3 days. Periodic hemodialysis in the clinic may be preventing the death without founding for a long period.

Introduction:-

The ability of patients under hemodialysis to maintain their water, electrolyte and acid-base homeostasis and to excrete some thousands of metabolic products is equally impaired every day of the week. Thus, it has been long proposed that this intermittent nature of conventional hemodialysis is linked with wide fluctuations of all these parameters and may per se increase the risk of complications and worsen patient outcomes [1]. Studies evaluating more frequent hemodialysis regimens showed beneficial results on intermediate cardiovascular end points and quality of life (QOL) [2-4], suggesting that such treatments may better compensate for fluctuations in hydration status, electrolyte and acid-base imbalances and accumulation of uremic toxins. The number of solitary households in advanced nations is increasing. Japanese 2010 population survey found that the percent of solitary households was 32.4% and that the solitary household category was the largest group among household types. The percent of elderly people more than 65 years old is 23.0%. Naturally, the number of elderly people living alone is increasing and is around 4.8 million[5]. Most patients with end-stage renal disease (ERSD) on maintenance hemodialysis receive treatment on a thrice-weekly pattern (Monday-Wednesday-Friday or Tuesday-Thursday-Saturday) and remain outside dialysis for two 2-day intervals during the week and for a longer 3 day interval during the weekend and prior to the first session of next week. Unexpected death among hemodialysis patients is referred to the medical examiner's office. Almost all outside-clinic deaths are examined in the medical examiner's office. We conducted a survey in the Osaka medical examiner's office. Osaka City has hemodialysis patients of about 8200.

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Methods and Results:-

From 2013 to 2014, 114 outside-clinic death cases in hemodialysis patients were examined in Osaka Medical Examiner's Office. We collected data on the gender, age, first discoverer of the deceased and cause of death. We reviewed the cause of death by examination. There were 85 males (average 68.6 years 42-87)and 29 females (average 69.6 years 48-87). 104 deceased were found at home. Family (53.5%), clinic worker (11.4%), care taker (11.4%) and others found deceased people (Table.1). Hemodialysis patients have to attend their scheduled treatment. 26.9%deceased were found because they didn't come to the hemodialysis clinic. 3-times-weekly hemodialysis deceased were 55.Mondays were associated with about 32.3% in the Mon-Wed-Fri schedule, and Tuesdays with 29.2% in the Tue-Thu-Sat schedule increased (Table.2).

Among these cases, 47.4%were identified as ischemic heart disease, and 29.8% as chronic renal failure. Only 3 (3.6%) had changed rot, and all deceased were found within 3 days. Periodic hemodialysis in the clinic may be preventing the solitary death.

Discussion:-

The first study on timing of mortal events in ESRD patients examined recordings during 1977-97 [6]. Analyses delineated that sudden deaths in hemodialysis patients occurred much more frequently during the last hours of the long inter-dialytic interval [7,8], which would technically be counted within the day of the first dialysis (Monday of Tuesday). The day exactly after the long inter-dialytic interval was associated with significantly higher risk of all-cause mortality, cardiovascular mortality, death from cardiac arrest and hospital admissions for cardiovascular events, when compared with any other day [9]. Patients in the Mon-Wed-Fri schedule, Mondays were associated with 41% higher mortality risk in US patients, similarly for patients on a Tue-Thu-Sat schedule, Tuesdays were associated with a significant 39% higher risk of all-cause mortality relative to the 7-day average in US [8]. Fluctuations in electrolytes and acid-base balance may also be involved in excess cardiovascular risk. Hyperkalemia and hypokalemia are both risk factors for cardiac arrhythmias and sudden cardiac death [10]. In the above observational studies, deaths attributed to hyperkalemia occurred more frequently on Mondays and Tuesdays [7,11]. In society, males tend to be more isolated than females even in hemodialysis patients. It is ambiguous to define solitary death. The Japan government describes solitary death as a "miserable death without any care that was not found for a long period" [12]. It is natural that the number of solitary death is increasing because the number of solitary households is increasing, but hemodialysis patients often receive 3-times-weekly hemodialysis and the care taker provide care to solitary people at home in no-hemodialysis day. As a result, hemodialysis patients may be able to prevent solitary death with periodic hemodialysis treatment.

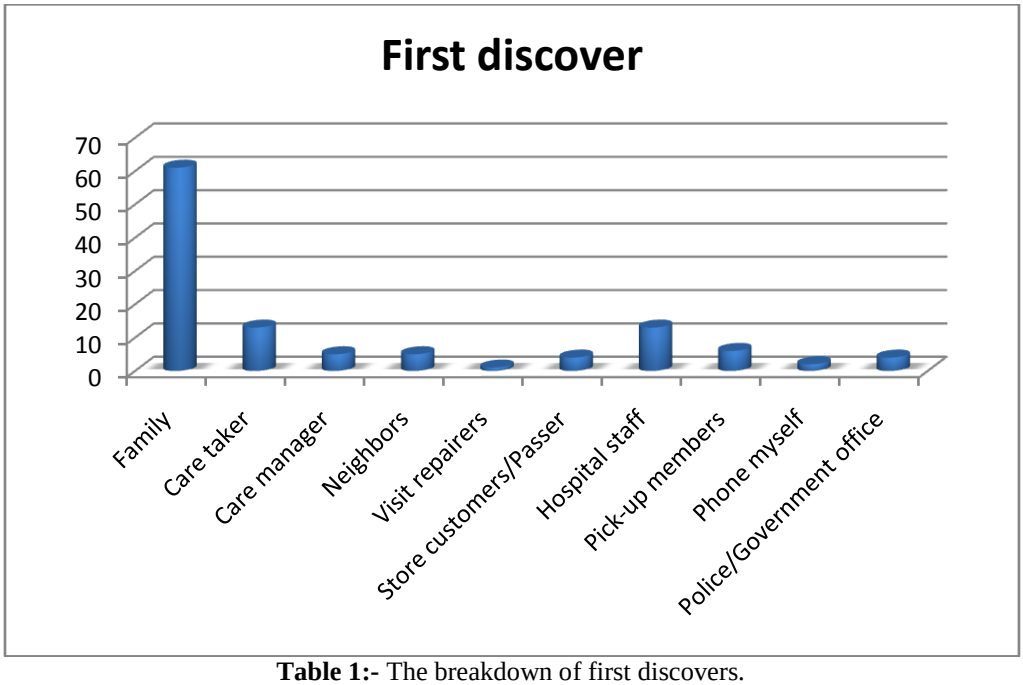
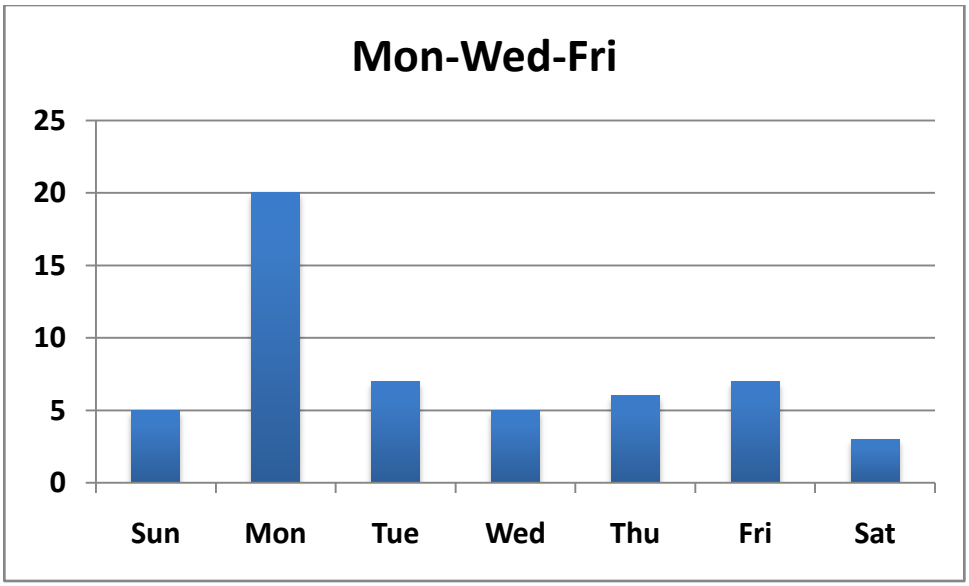


Table 1:- The breakdown of first discovers.



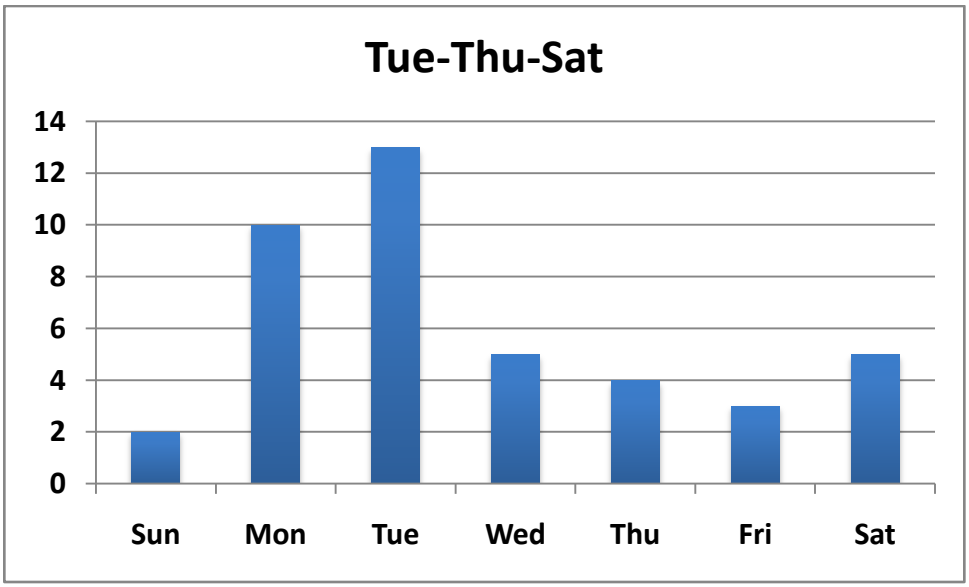


Table 2:- Hemodialysis patients in the Mon-Wed-Fri schedule, Mondays were associated with 32.3% higher mortality risk, similarly for patients on a Tue-Thu-Sat schedule, Tuesdays were associated with a significant 29.2% higher risk of all-cause mortality relative to the 7-day average.

Conclusion:-

Dialysis patients for two 2-day intervals during the week and for a longer 3 day interval during the weekend and prior to the first session of next week.

The care taker provide care to solitary people at home in no-hemodialysis day. Periodic hemodialysis deceased are increased on Monday and Tuesday, and are found by somebody within 3 days.

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Conflict of interest:-

We reviewed death cases of hemodialysis patients in the medical examiner's office. Statistical survey reports in view of outside-clinic deaths have never been reported.

References:-

1. Diaz-Buxo JA, White SA, Himmele R. Frequent hemodialysis: a critical review. Semin Dial 2013; 26: 578-589.
2. Chertow GM, Lecin NW, Beck GJ. In-center hemodialysis six times per week versus three times per week. N Eng J Med 2010; 363: 2287-2300.
3. Hall YN, Lerive B, Painter P. Effects of six versus three times per week hemodialysis on physical performance, health, and functioning: Frequent Hemodialysis Network (FHN) randomized trials. Clin J Am SocNephrol 2012; 7: 782-794.
4. Chan CT, Greene T, Chertow GM. Effects of frequent hemodialysis on ventricular volumes and left ventricular remodeling. Clin J Am SocNephrol 2013; 8: 2106-2116.
5. Population Census [Statistics Bureau Website], 2014. Available at: http://www.stat.go.jp/english/data/kokusei/2010/poj/pdf/2010ch10.pdf. Accessed July 1, 2014.
6. Bleyer AJ, Russell GB, Satko SG. Sudden and cardiac death rates in haemodialysis patients. Kidney Int 1999; 55: 1553-1559.
7. Bleyer AJ, Hartman J, Brannon PC. Characteristics of sudden death in haemodialysis patients. Kidney Int 2006; 69: 2268-2273.
8. Genovesi S, Valsecci MG, Rossi E. Sudden death and associated factors in a historical cohort of chronic haemodialysis patients. Nephrol Dial Transplant 2009; 24: 2529-2536.
9. Zhang H, Schaubel DE, Kalbfleisch JD. Dialysis outcome and analysis of practice patterns suggests the dialysis schedule affects day-of-week mortality. Kidney Int 2012; 81: 1108-1115.
10. Pun PH, Lehrich RW, Honeycutt EF. Modifiable risk factors associated with sudden cardiac arrest within hemodialysis clinics. Kidney Int 2011; 79: 218-227.
11. Krishnasamy R, Badve SV, Hawley CM. Daily variation in death in patients treated by long-term dialysis: comparison of in-center hemodialysis to peritoneal and home hemodialysis. Am J Kidney Dis 2013; 61: 96-103.
12. Cabinet office. Life style of aging people, In: Cabinet office, eds. Annual Report on the Aging Society. Tokyo, PA: Government publication; 2013: 43-45.