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GENERAL INFORMATION

Bangladesh Renal Journal is the official organ of the Bangladesh Renal Association. The Journal publishes two issue in a year i.e. June and December. The Journal is devoted to continuing education in kidney diseases.

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Editorial

Delayed Graft Function

The concept of organ transplant to replace lost organ function has been dreamt by physicians for centuries. Many attempts for kidney transplantation were made from the same and different species. Without immuno-suppression, these primitive transplants could function up to days before eventual failure. The first successful human transplant could only become possible between identical twin brothers in U.S.A. in 1954 at Peter Bent Brigham Hospital. With the advent of modern immunosuppression, the new era of renal transplantation has evolved.[1] Despite the advancements in transplant immunology and surgical techniques, graft failure remains the ultimate fate of most grafts in long term. The improvement in long term graft survival is the major goal for clinicians, patients and researchers. One of the important predictor of graft survival is immediate graft function.

Immediate graft function is evident by fast post-operative recovery of renal function, satisfactory diuresis and no further need of dialysis. Poor or delayed graft function (DGF) refers to acute kidney injury (AKI) in a kidney transplant that occurs in the first week of kidney transplant, which usually requires dialysis intervention. DGF may occur for all the same reason for AKI as native kidneys. However in most cases, the cause of DGF is related specifically to transplantation. Both immunological and ischaemic kidney injuries can contribute to DGF. Ischaemic reperfusion injury (IRI) is a potent pro-inflammatory stimuli, which can contribute to acute rejection and later development of graft vascular disease.[2]

Incidence of DGF is rare among living donor (2-3%). However, there is recent increasing trend in overall DGF (25-30%) in U.S. scientific registry which has been contemporaneous with the use of Expanded Criteria Donor (ECD) and donation after cardiac death (DCD) donors. DGF is associated with worse short and long term outcome and also associated with higher rejection rates.[3]

Various factors may contribute to DGF such as preexisting donor renal disease, organ retrieval procedure, prolonged ischaemic time and recipient factors like obesity, HLA sensitization. With the complexity and interplay of multiple factors, several risk factor prediction models using large data registry are available.[4] The Irish risk calculator is based on 20 independent recipient and donor related risk factors, it identified the most significant factors associated with DGF are cold ischaemic times, donor terminal creatinine, donor body mass index and donor age.[5]

DGF remains a major challenge in achieving desired transplant outcome. An increasing number of strategies and interventions are being investigated at the level of donor organs, organ preservation and therapies administered peri-operatively to recipients. Hypothermic machine perfusion is utilized in many organ procurement centers to minimize DGF.[6] Interventions in recipient such as eculizumab, dopamine, epoietin-a have not been successful in limiting DGF.[7]

In this issue of Bangladesh Renal Journal the effect of Immediate Graft Function on short term renal allograft outcome is published. This will encourage the transplant physicians and researcher in further endeavor to improve immediate graft function with the ultimate goal to improve long term graft survival.

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Original Articles

Effects of Immediate Graft Function on Short Term Renal Allograft Outcome

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Abstract

Introduction: Renal transplantation remains the treatment of choice for end-stage renal disease (ESRD) in regards to patient survival (Wolf RA et al. 2000). Living donation is a scheduled event that offers the advantage of optimal preparation for the recipient and donor. Since the living kidney donor is usually a close relative of the person getting the transplant, there is a better chance of a good genetic match and less chance of rejection, lower doses of immunosuppressive drugs required and this situation allows for control of logistics that minimize the organ preservation time. Graft function usually divided into immediate graft function (IGF) and poor early graft function or delayed graft function (DGF) group). Olwyn Johnston et al. 2006 in their study divide graft function in reduced graft function (with or without dialysis) and immediate graft function. Identification of a single short-term endpoint for renal transplantation has been difficult, as long-term transplant failures occur for many reasons, including chronic allograft nephropathy, recurrent disease, infection and death with a functioning kidney). An analysis of 105742 adult renal transplant recipients from OPTN/UNOS data revealed a correlation between 6-month and 1-year creatinine and long-term graft failure (Hariharan S et al. 2002). Long- term success of renal transplantation depends upon the quality of the donor organ, avoidance of peritransplant and early posttransplant damage and optimal maintenance of graft function after the first 6-12 months (Salvadori M et al. 2006). In this study, one-year S.creatinine was used as short term outcome of renal allograft as one year graft function can predict long-term renal graft survival.

Objectives: To assess the effect of Immediate graft function (IGF) on short term renal allograft outcome.

Method: In this prospective study, a total of 40 renal allograft recipients as well as 40 donors were evaluated. ESRD patients and kidney donor's preoperative details and clinical parameters were recorded in structured questionnaire. Peroperative variables like induction with antibody, cold ischemia time, warm ischemia time, peroperative hypotension, peroperative blood transfusion, peroperative urine production were recorded. Early postoperative clinical variables like BP, hourly urine production, temperature were monitored and biochemical Hb%, Tc, Dc, ESR, blood urea, serum creatinine, s. electrolytes, cyclosporin level (C_2 level), urine RME & CS and imaging USG of transplanted kidney and duplex study of renal vessels were done. On the basis of creatinine reduction ratio(CRR) on post-transplant day 7, renal allograft recipients were divided into IGF and RGF group respectively. Every patient was followed up for 12 months and renal function assessed. Data were processed and analyzed using computer software SPSS (Statistical package for social science) version 12.

Results: The mean age of donors was 39.15±10.09 years with a male female ratio 1:1.7. The mean age of renal allograft recipients was 32.30±8.85 years with a male to female ratio of 3.5:1. Among 40 patients, 52.5% recipients had IGF and 47.5% had RGF. At day 7 posttransplantation period mean serum creatinine in IGF group was 130.10±14.45 ìmol/L and in RGF group was 237.32±123.85 ìmol/L which was statistically strongly significant (p value <0.0001). At 12 months period, mean serum creatinine in IGF group was 147.86±25.69 ìmol/L and in RGF group was 209.32±35.29 ìmol/L which was statistically strongly significant (p value <0.0001). Significant effect of immediate graft function (7 days serum creatinine) was observed on short term (12 months serum creatinine) renal outcome. In IGF group, 7 days post transplantation mean serum creatinine was 130.10±14.45 ìmol/L and 12 months mean serum creatinine was 147.86±25.69 ìmol/L which was statistically highly significant (p value <0.003).

Conclusion: This study showed that 52.5% renal allograft recipient had IGF and 47.5 % renal allograft recipient had graft dysfunction (RGF). IGF has significant effect on short term renal allograft outcome.

Keywords: Delayed graft function (DGF), Immediate graft function (IGF), Live related Kidney transplantation, Reduced graft function (RGF)

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Introduction:

Renal transplantation remains the treatment of choice for end-stage renal disease (ESRD) in regards to patient survival (Wolf RA *et al.* 2000). Marked improvements in early graft survival, short-term and long-term graft function have translated into kidney transplantation being a more cost-effective alternative to dialysis. Restoration & Preservation of post-transplant renal function depends on many factors. Long- term success of renal transplantation depends upon the quality of the donor organ, avoidance of peritransplant and early posttransplant damage and optimal maintenance of graft function after the first 6-12 months (Salvadori M *et al*. 2006). Living donation is a scheduled event that offers the advantage of optimal preparation for the recipient and donor. This situation allows for control of logistics that minimize the organ preservation time. Since the living kidney donor is usually a close relative of the person getting the transplant, there is a better chance of a good genetic match and less chance of rejection. Lower doses of immunosuppressive drugs may be used with fewer side effects.

Graft function usually divided into immediate graft function (IGF) and poor early graft function or delayed graft function (DGF) group. Living donor transplants function immediately, while up to 30% of cadaver transplants undergo delayed graft function due to prolonged cold ischemic preservation (Venkat KK, Venkat A 2004). **Olwyn Johnston** *et al.* 2006 in their study divide graft function in reduced graft function (with or without dialysis) and immediate graft function. 7 days CRR marked as cut point of difference between immediate graft function (IGF) & reduced graft function (RGF) group. Recipients with a CRR between time 0 of transplantation and day 7 post-transplantation of e"70% had IGF and CRR <70% with or without dialysis had RGF. RGF may subdivided into DGF where CRR <70% with dialysis and SGF where CRR <70% without dialysis.

Identification of a single short-term endpoint for renal transplantation has been difficult, as long-term transplant failures occur for many reasons, including chronic allograft nephropathy, recurrent disease, infection and death with a functioning kidney. Use of post-transplantation renal function as an endpoint is limited by its dependence on donor, recipient, transplantation and post-transplantation variables; however, the very fact that post-transplantation renal function provides a combined indicator of all these factors also makes it useful. The absolute level of allograft function in the first year following transplantation as well as any deterioration in renal function over this period are highly significant determinants of long -term successes (Hariharan S *et al.*2002). An analysis of 105 742 adult renal transplant recipients from OPTN/UNOS data revealed a correlation between 6-month and 1-year creatinine and long-term graft failure (Hariharan S *et al.* 2002). In that study, one-year S.creatinine was used as short term outcome of renal allograft as one year graft function can predict long-term renal graft survival. IGF have good renal outcome in term of both short and long term but RGF have not smooth outcome as IGF. Suboptimal early renal allograft function is associated with increased early and late graft loss, increased hospitalization and costs (Rosenthal JT *et al*. 1991). Attempts have therefore been made to improve early graft function by a variety of mechanical, pharmacological and organ allocation strategies (Tahara M *et al*. 2005).

Objective

To assess the effect of Immediate graft function (IGF) on short term live related renal allograft outcome.

Methodology

This prospective observational study was done in department of Nephrology, Bangabandhu Sheikh Mujib Medical University (BSMMU) over a period of three years from January 2010 to December 2012. A total of 40 renal allograft recipients as well as 40 kidney donors were included in this study. ESRD patients and kidney donors preoperative details and clinical parameters were recorded in structured questionnaire. Peroperative variables like induction with antibody, cold ischemia time, warm ischemia time, peroperative hypotension, peroperative blood transfusion, peroperative urine production were recorded. Early postoperative clinical variables like BP, hourly urine production, temperature were monitored and biochemical Hb%, Tc, Dc, ESR, blood urea, serum creatinine, s. electrolytes, cyclosporin level (C_2 level), urine RME & CS and imaging USG of transplanted kidney and duplex study of renal vessels were done. On the basis of creatinine reduction ratio(CRR) on post transplant day 7, renal allograft recipients were divided into IGF and RGF group respectively. Every patient was followed up weekly upto 3 months, 15 days interval upto 6 months and then monthly upto 12 months. During followup clinically anaemia, BP, graft tenderness, tremor, gum hypertrophy was examined, biochemical Urine R/E, Hb%, TC, DC, ESR, B. Urea, S. Creatinine, S. Electrolytes, lipid profile, C2 level, CMV

status and imaging studies done as needed like USG of the transplanted kidney, Duplex study of the transplanted anastomotic vessels. Renal allograft biopsy was done if indicated. Data were processed and analyzed using computer software SPSS (Statistical package for social science) version 12.

Results:

Table-I

Preoperative characteristics of donors (n=40)

Parameters	Mean±SD	Frequency	Percentage
Age (years)	39.15±10.09		
Sex			
Male		15	37.5
Female		25	62.5
Creatinine clearance rate (ml/min)	84.03±17.61		
Anti CMV (IgM)			
Positive		0	0.0
Negative		40	100.0
Anti CMV (IgG)			
Positive		35	87.5
Negative		5	12.5

Table-II

Preoperative characteristics of recipients (n=40)

Parameters	Mean±SD	Frequency	Percentage
Age (years)	32.30±8.85		
Sex			
Male		31	77.5
Female		9	22.5
Pretransplant serum creatinine (ìmol/L)	523.23±109.77		
HLA typing (class I)			
4 mismatch		6	15.0
2 mismatch		33	82.5
0 mismatch		1	2.5
Anti CMV (IgM)			
Positive		2	5.0
Negative		38	95.0
Anti CMV (IgG)			
Positive		36	90.0
Negative		4	10.0

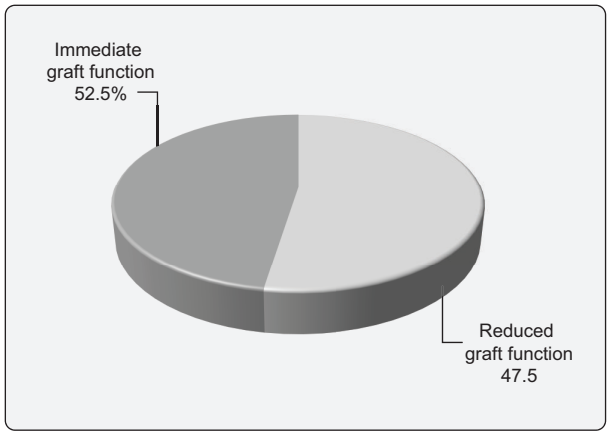

Fig.-1: *Recipients graft status at 7th post transplant day*

Table-III

Comparison of postoperative serum creatinine level between reduced and immediate graft function groups

Serum creatinine (ìmol/L)	Reduced graft function (n=19) (Mean±SD)	Immediate graft function (n=21) (Mean±SD)	p value[a]
At day 7	237.32±123.85	130.10±14.45	0.0001***
At 1 month	166.21±27.55	134.81±23.55	0.0001***
At 3 months	194.63±34.98	144.19±33.54	0.0001***
At 6 months	202.68±37.66	144.43±25.98	0.0001***
At 12 months	209.32±35.29	147.86±25.69	0.0001***

[a]Unpaired Student's 't' test
ns = Not significant
* = Significant at P<0.05
** = Significant at P<0.01
*** = Significant at P<0.001

Table-IV

Comparison of postoperative serum creatinine level in IGF group patients at various time intervals

Time	S. Creatinine (ìmol/L)	p value[a]
Day 7 vs 1 month	130.10±14.45 vs 134.81±23.55	0.413ns
Day 7 vs 3 month	130.10±14.45 vs 144.19±33.54	0.042*
Day 7 vs 6 month	130.10±14.45 vs 144.43±25.98	0.016*
Day 7 vs 12 month	130.10±14.45 vs 147.86±25.69	0.003**

[a]Paired Student's 't' test
ns = Not significant
* = Significant at P<0.05
** = Significant at P<0.01
*** = Significant at P<0.00

Discussion:

Renal transplantation improves the patient's quality of life to a greater extent than hemodialysis and peritoneal dialysis (Port FK *et al,* 1993). Reduced Graft Function (RGF) is a well-known complication that can affect the kidney

allograft in the immediate post-transplant period. Excellent organ quality and ideal transplant conditions contribute to immediate graft function (IGF) in a vast majority of living donor kidney transplantations (LDKT). However, poor early graft function still occurs after LDKT, although less frequently than after deceased donor kidney transplantation (Terasaki PI *et al*.1995). Poor EGF following LDKT has a large impact on long-term graft survival (J. Hellegering.2012).

For the purpose of the study, immediate graft function (IGF) was defined as return of normal renal function within 7 days after transplantation or creatinine reduction ratio (CRR)e" 70% on day 7 after transplantation, delayed graft function (DGF) as the requirement for dialysis within the first week after renal transplantation and slow graft function (SGF) as CRR< 70% on day 7 after transplantation without dialysis. Reduced graft function was defined as occurrence of DGF or SGF. In different studies various time points and criteria have used in their definition of immediate or reduced graft function post-transplantation. In a study by Rodrigo *et al.*2005 DGF and SGF were defined as a CRR d"30% with or without dialysis, respectively, on day 2 post-transplantation. However, this was a very early time point to define the study groups. **Olwyn Johnston** *et al.* 2006 in their study divide graft function in reduced graft function (with or without dialysis) and immediate graft function. They showed serum creatinine was significantly lower in the SGF group (reduced graft function without dialysis) compared with the DGF (reduced graft function with dialysis) group at 3 and 6 months, but not at the later time points examined (1 year, 2 year and 5 year). Day 7 after transplantation was used in this study to define graft function groups largely because, this was the time point coincided with the majority of patients achieving baseline levels of serum creatinine & it combines the 'classical' definition of DGF (requirement for dialysis within 7 days post-transplantation).

At 7 days posttransplantation period mean serum creatinine in IGF group was 130.10±14.45 ìmol/L and in RGF group was 237.32±123.85 ìmol/L which was statistically strongly significant (p value <0.0001). Among 40 patients, 52.5% recipients had immediate graft function and 47.5% had reduced graft function. Reduced Graft Function (RGF) is a well-known complication that can affect the kidney allograft in the immediate post-transplant period. Excellent organ quality and ideal transplant conditions contribute to immediate graft function (IGF) in a vast majority of living donor kidney transplantations (LDKT). However, poor early graft function (EGF)/ RGF still occurs after LDKT, although less frequently than after deceased donor kidney transplantation (DDKT) (Terasaki PI *et al*.1995). In previous studies, SGF was defined as a serum creatinine greater than 3 mg/dl on postoperative day 5. The incidence of SGF was found to be 9.5–10.7% after LDKT (Brennan TV *et al.*2004, Nogueira JM *et al*.2009). In another study, the definition of SGF was based on the glomerular filtration rate at day 14 and SGF occurred in 22.9% (Lee SY *et al*. 2010). The inci-dence of delayed graft function is higher in ca-daver transplantation varying from 5 to 50% in different centers (Organ Procurement Transplant Network. 2004). The incidence of delayed graft function in living related donor renal transplantation has been reported to be 4-10% (Senel FM *et al*.1998). In our study, RGF includes both delayed graft function (DGF) and slow graft function (SGF) and a broader definition for IGF, DGF, SGF and RGF were included with the concept of an average CRR each day post-transplantation of d"10 or e"10% to form a definition of a CRR on day 7 post-transplantation of d"70 with or without dialysis or e"70%.

Renal function measured by s. creatinine was found significantly different in every time point during 12 months followup period in between RGF and IGF group. During 1 month period s.creatinine in RGF group was 166.21±27.55 ìmol/L and in IGF group was 134.81±23.55 ìmol/L, during 3 months period s.creatinine in RGF group was 194.63±34.98 ìmol/L and in IGF group was 144.19±33.54 ìmol/L, during 6 months period s.creatinine in RGF group was 202.68±37.66 ìmol/L and in IGF group was 144.43±25.98ìmol/L, during 12 months period s.creatinine in RGF group was 209.32±35.29ìmol/L and in IGF group was 147.86±25.69ìmol/L which were statistically highly significant (p value 0.0001). In RGF group, renal function improved from 7 days posttransplant period to 1month period, then again deteriorate gradually. This was because in RGF patients, graft function recovery occurred slowly and highest recovery found during 1 month. In IGF patients, graft function recovery was observed in 7 days after transplantation and then gradual deterioration of graft function observed. Olwyn Johnston *et al.*2006 in their study showed in IGF group, lowest s. creatinine was seen at day 7 posttransplant period (130 ìmol/L), then s. creatinine gradually rises (14 day 135 ìmol/L, 3 months 140 ìmol/L, 12 months 145 ìmol/L, 24 months 150 ìmol/L). In SGF group, lowest s. creatinine observed at 3 months (170 ìmol/L). In that group, 7 days s. creatinine was 300 ìmol/L, 14 days 200 ìmol/L. In DGF group, lowest s. creatinine was

found at 3 months (200 ìmol/L), then gradually increase (6 months s. creatinine 230 ìmol/L). In that group, 7 days s. creatinine was 600 ìmol/L and 14 days s. creatinine was 400 ìmol/L. This study results supported our results. In our study, significant effect of immediate graft function (7 days serum creatinine) was observed on short term (12 months serum creatinine) renal outcome. In IGF group, 7 days post transplantation mean serum creatinine was 130.10±14.45 ìmol/L and 12 months mean serum creatinine was 147.86±25.69 ìmol/L which was statistically highly significant (p value <0.003). Worse renal function in RGF group than IGF group was probably due to permanent nephron loss in RGF patients. Gonwa TA *et al.*2002 reported that patients with DGF showed worse renal function in the first year. Boom H *et al.*2000 also found that patients with reduced graft function showed suboptimal renal function (Ccr <50 ml/min in SGF group, <30ml/min in DGF group).

Conclusion:

This study showed that 52.5% renal allograft recipient had IGF and 47.5 % renal allograft recipient had RGF. Immediate graft function has significant effect on short term renal allograft outcome. Renal function was significantly better in immediate graft function group than reduced graft function group at the end of 12 months.

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Association of Health related Quality of Life with Clinical and Biochemical Parameters in Patients Recieving Continuos Ambulatory Peritoneal Dialysis (CAPD)

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Abstract:

Introduction: Chronic kidney disease (CKD) is a common deadly disease contributing to significant morbidity and mortality. Chronic dialysis imposes a considerable burden on patients and families. While previous interest focused mostly on medical and technical aspects of dialysis care, psychosocial aspects are now increasingly explored, among them quality of life (QoL) mostly focused.

The health related-quality of life (HRQoL) covers the impact of the disease or medical actions on the physical symptoms, functional status, and mental and social functioning (Mercedes Moreiras-Plaza et al, 2011).the meta-analysis of Cameron et al. state that HRQOL of patients undergoing different types of renal replacement therapy and the Diaz-Buxo's report analyzing quality of life in hemodialysis and peritoneal dialysis patients. The KDQOL is a kidney disease–speciûc HRQoL instrument. At present, the KDQOL-SF v.1.3 has been developed to a shorter version, known as the KDQOL-36 questionnaire

Objective: To observe the association of quality of life parameters with clinical and biochemical parameters in patients on continuous ambulatory peritoneal dialysis.

Methods: This cross-sectional study was carried out in three tertiary renal care hospital. Total 40 CAPD patient were selected and 40 healthy individual also included as control.A semi-structured questionnaire had been developed in English and translated to Bangla. The questionnaire contained questions related to:1) KDQoL-36 developed by RAND 2)Clinical and 3) laboratory parameters Different clinical and laboratory parameters were evaluated. Quality of life (QOL) parameters were assessed by KDQOL-SF-36(V-1.3) questionnaire. The scoring procedure for the KDQOL-SF-36 first transforms the raw precoded numeric values of items to a 0-100 possible range. Higher transformed scores better quality of life (Hays et al, 1994).

Results: Mean age of the study subjects was 55±11and control 56±11years (p=.0.664). They were also matched for sex and BMI. The main primary disease responsible for ESRD was diabetic nephropathy (57.5%), Mean haemoglobin of the study subjects was 8.1±1.4 g/dl, albumin 3.1±1.4 g/dl and Kt/V 1.8±0.3. Mean physical composite score (PCS) calculated by KDQOL-SF-36 in CAPD and control group were 44±15 and 79±12 (p<0.001) and mental composite score (MCS) were 45±17 and 80±10(p<0.001).. When quality of life parameters between two groups of patients according to hemoglobin level(d"9g/dl and >9g/dl):compared in ESRD targeted area social support had higher values in higher haemoglobin (>9gm/dl) group.There were no significant difference also in Physical composite scores (PCS) (p=0.581) and mental composite scores (MCS) (p=0.552).When QOL parameters were compared between two groups according to Kt/V d"1.7 and >1.7 showed most of the scores were higher in Kt/V >1.7.

Conclusion: Quality of life parameters among patients on CAPD were better in patients with better clinical and biochemical parameters.

Key words: MCS: Mental composite score, PCS: Physical composite score, QOL:Quality of life

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Introduction:

Chronic kidney disease (CKD) is a common deadly disease contributing to significant morbidity and mortality and has now become major public health burden in Bangladesh.

Chronic dialysis imposes a considerable burden on patients and families. While previous interest focused mostly on medical and technical aspects of dialysis care, psychosocial aspects are now increasingly explored, among them quality of life (QoL) and satisfaction with care are mostly focused. (Kimmel *et al*, 2001).

Quality of life is a multidimensional concept that comprised not only aspects directly related to health but also other nonmedical aspects, like the autonomy, the retention of employment, the impact on family relationships, the economic resources, and many other life circumstances are connected as well.

The WHO definies it as: "the perception that individual makes about his position in life, within its cultural context and value system, and related to its goals and vital objectives."(WHO, QOL assessment, 1994).So the term health related quality of life is defined as "The extent to which one's usual or expected physical, emotional and social well-being is affected by a medical condition or its treatment." The concept of health related-quality of life (HRQoL) covers the impact of the disease or medical actions on the physical symptoms, functional status, and mental and social functioning (Mercedes Moreiras-Plaza *et al*, 2011).

There are a number of studies on HRQoL of patients receiving PD, and many of them are comparative with haemodialysis. Patients who are on peritoneal dialysis for the first time and by own choice tend to have better clinical state (physical, emotional, autonomous, social) and maintain longer residual renal clearance. Among the studies comparing different modalities of dialysis therapy, the NECOSAD Study Group's (NECOSAD Study Group,2003) is a good one that analyzes the effect of starting dialysis with haemodialysis or peritoneal dialysis modalities on survival adjusted for quality of life, the meta-analysis of Cameron et al.(Cameron *et al* ,2003) that studies HRQOL of patients undergoing different types of renal replacement therapy and the Diaz-Buxo's report (Diaz-Buxo*etal*,2000) analyzing quality of life in hemodialysis and peritoneal dialysis patients

Quality of life is important because long-term dialysis often results in a loss of ûnancial income, loss of freedom, dependence on health care personnel and caregivers, and negative effect on marital status, family, and social activities; thus, quality of life should be measured and monitored for better understanding of patients' condition (Lin *et al*, 2005). The disease-speciûc quality-of-life questionnaire is one of the best and most commonly used instruments to evaluate quality of life (Kimmel et al,2006).

The application of quality-of-life score is in clinical care to predict the risk of death. For example, Mapes et al.(Mapes et al, 2003) found that patients who had dropped 10 points in the Physical Composite Score (PCS) in the Kidney Disease Quality of Life – short form (KDQOL-SF) were associated with a 25% increased risk of death. DeOreo (DeOreo*et al*, 1997) found that patients with PCS below the median (34) were twice as likely to die and 1.5 times more likely to be hospitalized when compared with patients with PCS at or above the median score in his study.

The short-form 36 health survey (SF-36) is a general questionnaire whose scores are transformed into a scale ranging from 0 to 100 (Garrat *etal*, 1993). The KDQOL is a kidney disease–speciûc HRQoL instrument. At present, the KDQOL-SF v.1.3 has been developed to a shorter version, known as the KDQOL-36 questionnaire. The KDQOL-36 questionnaire is the preferred measurement tool for large-scale assessments in dialysis facilities because of its ease of administration with relatively minimal burden on patients and staff (Kalantar- Zadeh*et al* 2005).. The scores of the KDQOL-36 questionnaire are transformed into 0 to 100, with higher scores reûecting better quality of life. The SF-12 can estimate for all eight domains but often focuses on the PCS and the Mental Composite Score (MCS) (Ware et al, 1998). Scale scores are computed with the KDQOL-36^{TM} scoring program (UCLA Division of General Internal Medicine and Health Services Research 2013)

Objectives:

To observe the association between the quality-of-life parameters with clinical and laboratory parameters in patients on continuous ambulatory peritoneal dialysis (CAPD).

Materials and Methods:

This observational study was conducted in the Department of Nephrology Sir Salimullah Medical College and Mitford Hospital(SSMC& MH),National Institute of Kidney Diseases and Urology (NIKDU) and Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorder (BIRDEM) over a period of one year from Jan 2015 to Dec 2015.Diagnosed case of ESRD receiving continuous ambulatory peritoneal dialysis (CAPD) for at least 3 months as study group and healthy individual: Individual with no diabetes mellitus, hypertension,CKD,ishchaemic heart disease and any other chronic disease as control were enrolled. Each group had 40 subjects.

A semi-structured questionnaire had been developed in English and translated to Bangla. The questionnaire contained questions related to:1) KDQoL-36 developed by RAND 2)Clinical and 3) laboratory parameters.

The KDQOL is a kidney disease–speciûc health related quality of life instrument. The KDQOL-SF v.1.3, which

contains the SF-36 with 36 items and 43 kidney disease–speciûc items, was introduced.

The scoring procedure for the KDQOL-SF-36 first transforms the raw pre-coded numeric values of items to a 0-100 possible range. Higher transformed scores better quality of life (Hays et al, 1994).

Complete blood count, Serum urea, serum creatinine, serum albumin, serum total protein, serum potassium, serum glucose, serum calcium, serum phosphate, dialysate urea and creatinine were measured.

After collection all the data was checked. Then data had beenentered into the computer with the help of software SPSS for windows programmed version 16.0 Analysis was done by 't' test (for quantitative data) and x^2 test (for qualitative data) where and whenever required. Pearson's correlation test had been also used.

Ethical consideration: Before the commencement of the study, the protocol for the following study was approved by ethical authority of respective institute.

Results:

Total 40 persons on CAPD were enrolled for this cross-sectional study.40 healthy individual were also included as control.

Table-I

Descriptive Statistics of clinical, laboratory parameters of CAPD patient (n=40).

Variables	Mean±SD
Demographic data	
Age (years)	55 ± 11
HTN duration(years)	7.5 ± 3.9
CKD duration(years)	4.4 ± 2.2
Blood transfusion duration	5.7 ± 3.0
BT per month (unit)	1.2 ± 0.4
Systolic BP (mmHg)	142 ± 25
Diastolic BP (mmHg)	77 ± 9
Duration of CAPD (months)	17.8 ± 9.2
EPO n (%)Laboratory parameters:	12 (30.0)
Haemoglobin (g/dl)	8.1 ± 1.4
Creatinine (mg/dl)	7.7 ± 1.8
Kt/V	1.8 ± 0.3
S. Albumin (g/dl)	3.1± 0.4
S. K^+ (mmol/l)	3.4 ± 0.4
S. Ca^{+2} (mmol/l)	6.8 ± 0.8
S. PO_4^{-3} (mmol/l)	5.7 ± 0.6

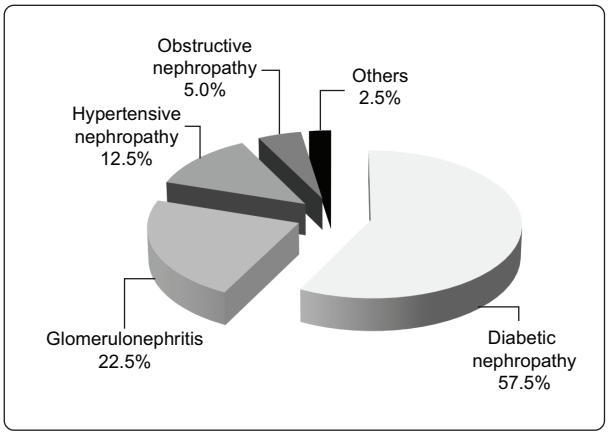

Fig.-1: *Distribution of patients according to primary disease*

Table-II

Comparison of quality of life according to hemoglobin level (≤9g/dl and >9g/dl) (Mean ± SD)

Variables	Hemoglobin ≤9 g /dl (n=21) [7.0±0.85]	p value >9 g /dl (n=19) [11.4±1.54]	
ESRD Targeted areas			
Symptom/problem list	62±11	66±12	0.321
Effects of kidney disease	53±17	56±13	0.583
Burden of kidney disease	26±16	25± 17	0.912
Work status	100±0	100±0	
Cognitive function	59±17	61±22	0.664
Quality of social interaction	62±20	67±15	0.377
Sexual function	58±22	66±16	0.588
Sleep	60±16	62±9	0.689
Social support	50±25	70±25	0.015
Dialysis staff encouragement	65±16	69±17	0.425
Patient satisfaction	50±11	50±12	0.870
36-item health survey (SF-36)			
Physical functioning	51±16	52±19	0.869
Role-physical	36±21	32±12	0.587
Pain	49±14	53±19	0.458
General health	45±15	54±15	0.075
Emotional well-being	51 ± 15	54±16	0.509
Role – emotion	47±22	45±17	0.827
Social function	47±22	58±20	0.104
Energy/fatigue	49±18	49±15	0.937
PCS	42±15	45±16	0.581
MCS	43±18	47±16	0.552

In ESRD targeted area social support had higher values in higher haemoglobin (>9gm/dl) group.

Table-III

Comparison of quality of life according to serum albumin level (≤3g/dl and >3g/dl) (Mean ± SD)

Variables	Serum albumin		p value
	≤3 gm /dl (n=18) [2.7 ± 0.3]	>3 gm /dl (n=22) [3.5 ± 0.35]	
ESRD Targeted areas			
Symptom/problem list	59 ± 8	68 ± 12	0.011
Effects of kidney disease	50 ± 15	58 ± 14	0.077
Burden of kidney disease	22 ± 10	29 ± 19	0.219
Work status	100 ± 0	100 ± 0	
Cognitive function	52 ± 18	67 ± 18	0.013
Quality of social interaction	57 ± 21	71 ± 13	0.013
Sexual function	59 ± 28	63 ± 14	0.807
Sleep	53 ± 9	67 ± 12	0.001
Social support	48± 24	69 ± 26	0.012
Dialysis staff encouragement	62 ± 14	71 ± 17	0.075
Patient satisfaction	49 ± 11	5 1 ± 12	0.531
36-item health survey (SF-36)			
Physical functioning	46 ± 13	57 ± 19	0.042
Role-physical	33 ± 12	35 ± 19	0.747
Pain	45 ± 11	55 ± 19	0.069
General health	43 ± 12	55 ± 17	0.018
Emotional well-being	49 ± 10	55 ± 18	0.193
Role – emotion	41 ± 15	48 ± 21	0.416
Social function	40 ± 18	62 ± 19	0.001
Energy/fatigue	45 ± 12	53 ± 19	0.177
PCS	37 ± 11	49 ± 16	0.016
MCS	38 ± 12	51 ± 19	0.011

Physical composite scores (PCS) was also significantly higher in higher (>3g/dl) albumin group (p=0.016).Mental composite scores (MCS) was also significantly higher in higher (>3g/dl) albumin group (p=0.011).

Table-IV

Comparison of different clinical and laboratory parameters in relation to Kt/V(≤1.7 and >1.7) (Mean ± SD)

Parameter	Kt/V		p-value
	≤1.7 (n=14) [1.42±0.07]	>1.7 (n=26) [2.11±0.24]	
Systolic blood pressure (mm Hg)	135 ± 33	146±20	0.194
Diastolic blood pressure (mm Hg)	78±10	78±9	1.000
Haemoglobin (g/dl)	7.0±1.3	8.6±1.1	0.001
S. albumin (g/dl)	2.8±0.4	3.3±0.4	0.002
Serum K^+ (mmol/l)	3.2±0.5	3.5±0.4	0.142
S. Ca^{+2}(mg/dl)	6.8±0.8	6.8±0.8	0.475
S. PO_4^{-3} (mg/dl)	5.4±0.6	5.7±0.6	0.518
Creatinine (mg/dl)	9.0±2.1	7.0±1.3	0.001
Residual CCR (ml/min)	3.1±1.3	4.5±1.3	0.004

In table IV clinical and biochemical parameters compared between two groups in relation to Kt/V(d"1.7 and >1.7). Haemoglobin, serum albumin and residual CCR were significantly higher in patients with higher Kt/V and serum creatinine was significantly lower in patients with higher Kt/V.

Table-V

Comparison of quality of life parameters in relation to Kt/V(d"1.7 and >1.7) (Mean ± SD)

Variables	Kt/V		p-value
	≤1.7 (n=14) [1.42±0.07]	>1.7 (n=26) [2.11±0.24]	
ESRD Targeted areas			
Symptom/problem list	60 ± 9	66 ± 12	0.094
Effects of kidney disease	47 ± 15	58 ± 14	0.026
Burden of kidney disease	17 ± 12	31 ± 16	0.014
Work status	100 ± 0	100 ± 0	
Cognitive function	52 ± 14	64 ± 20	0.048
Quality of social interaction	54 ± 20	70 ± 15	0.008
Sexual function	54 ± 31	64 ± 13	0.463
Sleep	54 ± 9	65 ± 13	0.005
Social support	49 ± 25	65 ± 26	0.062
Dialysis staff encouragement	64 ± 14	68 ± 18	0.470
Patient satisfaction	43 ± 10	53 ± 10	0.006
36-item health survey (SF-36)			
Physical functioning	44 ± 13	56 ± 18	0.036
Role-physical	25 ± 00	38 ± 19	0.109
Pain	41 ± 14	56 ± 16	0.005
General health	43 ± 12	53 ± 16	0.049
Emotional well-being	46 ± 12	56 ± 16	0.041
Role – emotion	33 ± 0	50 ± 21	0.060
Social function	39 ± 19	58 ± 20	0.009
Energy/fatigue	40 ± 16	54 ± 16	0.011
PCS	35 ± 9	48 ± 16	0.007
MCS	34 ± 13	51 ± 17	0.002

In ESRD targeted area there are significant difference in most of the domains. Physical composite scores (PCS) was also significantly higher in higher (>1.7) Kt/V group (p=0.007).Mental composite scores (MCS) was also significantly higher in higher (>1.7) Kt/V group (p=0.002).

Discussion:

In the present cross sectional study health-related quality of CAPD patients were evaluated by using KDQOL-SF-36 questionnaire and observe the association of QoL parameters with clinical and biochemical parameters.

In this study majority of our patients were above 50 years of age (Mean age55yrs) which were similar toCAPD population in Asian community. (Sunder *et al,* 2008; Nakamoto H *et al* 2004).An European study (Sushan et al, 2002) found mean age of the CAPD patients was 77 yrs that indicates Asian CKD patients progress to ESRD early.

Most common primary primary disease leading to ESRD in presenting study was diabetic nephropathy that is consistent with previous study (Iqbal*et al* ,2004). Modalities of RRT were opted by majority of patients due

to cardiac and haemodynamic instability, which also consistent with a study done in our country by Iqbal *et al*, 2004.

Nakamoto*et al*, 2004 found in a study that most of their study population was hypertensive. In this study the mean±SD of systolic BP were 142±25 mm of Hg that is most of the population of our study were nearly optimum control of their blood pressure might be due to adequate dialysis.

In the present study serum albumin (g/dl) among the patients was 3.1±.04 that meaned low albumin which was consistent with several study on CAPD patients in our country and also in abroad. (Iqbal*et al*,2004; Bake well et al ,2002, Sankarnarayanan et al,2004).PD patients losses a significant amount of albumin in effluent might be the cause.

In the presenting study most of our PD patients achieved targets given the target Kt/V ofatleast 1.7 (KDIGO).This finding is consistent with the studyby Iqbalet al, 2004. But a study bySankarnarayanan*et al,* 2004 found high total kt/v 2.3±0.5 that wasdue to most of his study patient received 4 exchange/day.

The mean QoL scores in all domain in our study was around50. Higher scores indicate better quality of life. The DOPPS study on HD patients showed that QoL score was around 60 for Japan,USA and Europe (Fukuhara*et al*,2003).

Study done by Ardine, 2000 found lower score specially in PCS (38±11)thatis not similar to our study as in our study was 44±15.But our study was consistent with the scores of a meta analysis conducted by Liem *etal,* 2007. The scores of different domain were higher in another study done by Ibrahim N *et al*, 2011 in Malaysia; this is probably due to increased dose of dialysis.

Physical composite score (PCS) of control group was 79±12.A previous study by Ardine et al, 2000 found PCS of 50±10 that was much lower and not consistent with our study.

In the presenting study there were no significant difference in quality of life parameters except social support when the Hb cut off was (d"9g/dl and>9g/dl).A study in Thailand found that QOLscores were higher in higher haemoglobin level(Thaweethamcharoen et al, 2011) which was not similar to present study. Saha et al, 2014 showed higher quality of life in higher haemoglobin group in his study on haemodialysis patient. Most of the patients had low haemoglobin in this study that might be a cause of insignificant difference in quality of life scores.

In terms of QOL score there are significant difference in most of the domain and specially in physical composite score (PCS) and mental composite score (MCS) between two groups by s. albumin (d"3g/dl and>3g/dl) with higher scores in higher albumin group. Mittal *et al* reported that for every 1 g/dl increase in serum albumin, the physical functioning score on the SF-36 improved by 1.8 in their sample of PD patients. Kalender*et al* found that increased serum albumin was associated with better physical functioning. These studies are consistent with the findings of the presenting study.

Chen J *et al*,2012 showed in a study that more components of the SF-36 were influenced byKt/V values with higher scores found in higher Kt/V. Similarly in the presenting study when the two-group divided by total Kt/V(d"1.7and>1.7) had significant differencewith higher values in higher Kt/V group in almost all domains of QOL parameters (p<0.001-0.049).

Conclusion:

Health-related quality of life parameters among patients on CAPD are better in patients with higher serum albumin and Kt/V. In general the quality of life scores are lower than healthy individual but similar to scores of many other countries both in PD and haemodialysis.

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Pattern of Dyslipidaemia among the Asymptomatic Male Soldiers of Bangladesh Army- A Single Centre Observational Study

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Abstract:

Background: Although lipids are highly essential, abnormal levels contribute to the progression of atherosclerosis and increase the risk of cardiovascular disease (CVD) [1]. The abnormalities in lipids can be assessed via the lipid profile panel which is a panel of blood tests that serves as an initial broad medical screening tool for abnormalities in lipids [2]. It is seen that CVDs are increasing markedly in population including military soldiers. This study will evaluate the status of lipid profile in asymptomatic soldiers of the Bangladesh Army after 40 years of age and may provide the basis for a future study aimed at ongoing patterns of physical activity and lifestyle in the Bangladesh Army. It will also help to find out soldiers who are at risk of developing CVDs and take early preventive measures.

Materials and Methods: This was an observational type of cross-sectional study conducted at CMH, Dhaka between February 2019 to July 2019. The total number of participants was 300. Detailed history, clinical examination and required investigations were done and the findings were recorded on a data sheet.

Results: ***The mean age of the participants was 44.64 ± 2.854 years. This study demonstrates among 300 participants, 209(69.6%) had dyslipidaemia. Among 300 participants 197 (65.7%) had low HDL level, 29 (9.7%) had high LDL level, 85 (28.3%) had high TG level, 27 (9.0%) had high total cholesterol level and 12 (4.0%) had high BMI. Dyslipidaemia was found to be associated with smoking, obesity, irregular participation in physical activities, and having a family history of heart disease.***

Conclusion: Dyslipidaemia was found in many military personnel and was found to be significantly associated with smoking, obesity, irregular participation in physical activities, and having a family history of heart disease.

Keywords: Dyslipidaemia, military service, soldiers

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Introduction:

The incidence of CVDs are rapidly increasing at an alarming rate worldwide and is now considered the leading cause of death in both developing and developed countries. Lipid abnormalities enhance the atherosclerotic process ultimately culminating in CVDs. Although lipids are highly essential, abnormal levels contribute to the progression of atherosclerosis. Though military personnel goes through regular heavy exercise, they are not immune to this deleterious effects of atherosclerosis, and it's more with increasing age. So this is required to see the lipid status and associated factors that affect the lipid status in soldiers of the Bangladesh Army after 40 years of age.

Occupation-related stress has been considered to be a potentially important cardiovascular risk factor and consequently, a bulk of recent investigations have focused on the detection of cardiovascular risk factors in certain jobs[3,4,5]. Occupations with heavier responsibilities are shown to impose a significant adverse effect on the health status of subjects[6]. On the other hand, investigations revealed that army personnel is generally under high pressure of duty-related stress with its biological ill effect and mental strain[7,8]. Whereas members of the armed forces with their favorable physical conditions are generally considered as one of the healthiest layers of each society; some recent studies reported a trend toward increasing cardiovascular risk factors among military personnel [9,10,11].

Materials and methods

This was a cross-sectional study conducted at CMH, Dhaka from February 2019 to July 2019. 300 participants

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from different army units of Dhaka cantonment participated. Participants were healthy male soldiers aged more than 40 years who reported for an annual health check-up.

Known diabetes mellitus (DM), hypertension (HTN), ischemic heart disease (IHD), stroke, thyroid disorder, chronic kidney disease(CKD), soldiers who can't participate in physical activities due to other causes like back pain, ligament tear, etc, soldiers already taking lipid-lowering drugs and who did not give informed consent were excluded from the study.

Lipid panel: Lipid panel is considered abnormal if the fasting triglyceride level is more than 150 mg/dL, LDL-C level more than 130 mg/dL, HDL level less than 40mg/dL, and total cholesterol more than 200mg/dL[12].

Data were gathered from history, physical examination, and relevant investigations. Lipid profile were measured after 10-12 hours of fasting. Complete data were collected in a specially designed case recording form. Collected data were transferred to a Master Chart which is subjected to statistical analysis.

Data analysis was performed by Statistical Package for Social Science (SPSS), version-20. The level of significance (p-value) is set at 0.05 and the confidence interval at 95%. Results are presented as text and tables. Statistical analyses were done and the level of significance was measured by using the chi-square test (X2). An ethical clearance certificate was taken from Dhaka CMH Ethical Committee.

Results:

The mean ± SD age was 44.64±2.854 years. Among 300 participants,14 were smokers. Out of 14 smokers, 4(1.3%) participants had high LDL level, 8(2.7%) participants had high TG level, and 5(1.7%) participants had high total cholesterol level. Statistically significant relation was found between smoking to high TG, high cholesterol, and high LDL level. Smoking was not found related to low HDL level.

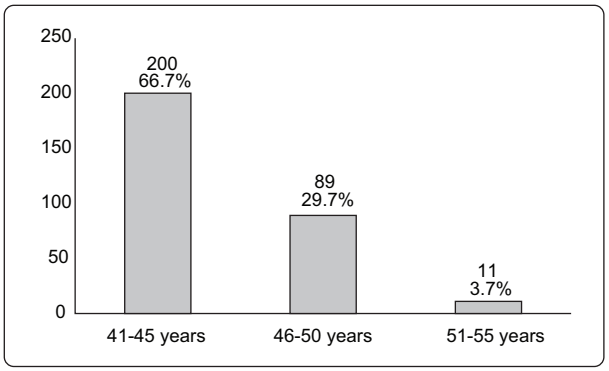

Fig.-1: *Bar diagram showing the age-wise grouping of the study population (n=300).*

10 participants were irregular in physical activities due to their job patterns (like clerks). Physical inactivity was found associated with high LDL level, high TG level, high total cholesterol level, and obesity.

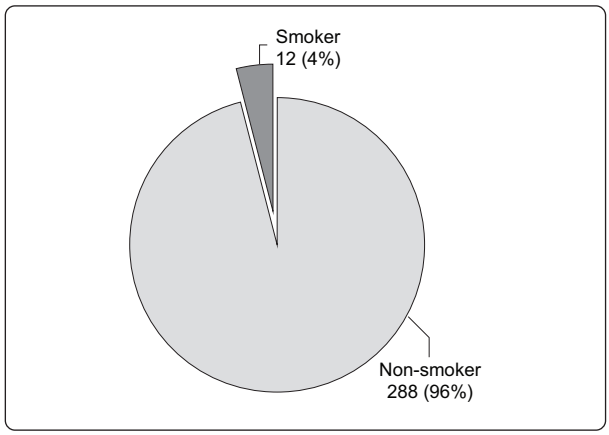

Fig.-2: *Pie diagram showing the number of smokers*

Table-I

Pattern of components of lipid profile among participants (n=300)

Lipid profile	Normal	Abnormal
HDL	103(34.4%)	197(65.7%)
LDL	271(90.3%)	29(9.7%)
TG	215(71.7%)	85(28.3%)
Cholesterol	273(91%)	27(9%)

Table-II

Pattern of waist-hip ratio among participants who can't participate in physical activity regularly

Participation in physical activity	Waist-hip ratio		Total
	Normal	High	
Regular	273	17	290
	91.0%	5.7%	96.7%
Irregular	5	5	10
	1.7%	1.7%	3.3%
Total	278	22	300
	92.7%	7.3%	100.0%

Discussion:

The age of the participants ranged from 41 to 55 years. The mean age was 44.64±2.854 years. A similar study was

done in Pakistan Army at Multan garrison where 1000 male soldiers participated ages ranging from 20 to 50 years[13].

Despite standards for weight and fitness, military personnel is not immune to obesity and its impact. One study reported that soldiers gain similar amounts of weight every year as civilians[14] and a 2008 survey of military personnel reported that 60% were overweight or obese[15]. A recent study of service members who died of combat or unintentional injuries in support of Operations Enduring Freedom and Iraqi Freedom/New Dawn between October 2001 and August 2011 revealed that 8.5% had atherosclerosis on autopsy, which was related to dyslipidemia and obesity[16]. Central adiposity is considered particularly dangerous as visceral fats are known to secrete pro-inflammatory substances and are associated with an increase in dyslipidaemia and cardiovascular disease and one previous study has proved it[17]. Most previous studies have shown that levels of triglycerides are positively associated with BMI and body fat in obese persons[18,19]. Our study showed a statistically significant relationship between obesity and cholesterol level. There was also a statistically significant relationship with the waist-hip ratio to low HDL level, high TG level, and high total cholesterol level.

Although obesity is one factor in the development of dyslipidaemia and cardiovascular disease risk, other lifestyle factors such as tobacco use and alcohol are known to be related[20]. The 2008 Department of Defense Survey of Health Related Behaviors reported that 15% of military personnel had been told they had high cholesterol level, 79% reported alcohol use, 20% reported heavy alcohol use and 30% reported cigarette use[7]. In one previous study, tobacco consumption was found associated with dyslipidaemia and deaths because of cardiovascular disease [21]. In our study, we have also found that smoking is associated with dyslipidaemia. Out of 300, 4 (1.3%) participants who had high LDL level are smokers. The p-value was 0.014. So, there was a statistically significant association with smoking and LDL level .8 (2.7%) participants had high TG level who were smokers. P value was 0.014, which indicated a statistically significant association with smoking and TG level. 5(1.7%) participants had high total cholesterol level and were smokers. P value was 0.00, which indicated a statistically significant relationship with smoking and cholesterol level. No statistically significant relation was found with smoking and HDL level.

Our study showed that soldiers, who can't participate in regular physical activities due to their nature of the job (like clerks), had a strong statistically significant relation with raised LDL (p=0.027), TG (p=0.024), total cholesterol (p=0.00), and obesity (p=0.00). It is known that physical exercise produces an increase in the metabolism of lipids and carbohydrates. One of the most significant changes is the increase in HDL, considered to be the faction that has a protective effect on atherosclerotic disease[22]. But in this study, no relation was found with physical inactivity and HDL level.

Previous studies have demonstrated that the groups with low educational levels may have an increased risk of cardiovascular disease, partly due to an unhealthy lifestyle compared with the groups with high educational levels[23,24]. Even in early life, low parental education may contribute to an individual's overall risk of developing cardiovascular disease in midlife[25]. But we did not find such a relation in our study. The relationship between educational level and overweight/obesity may differ in various settings, according to economics and cultural traits [26,27].

This study flashed a statistically significant relationship among a family history of heart disease and high LDL level (p=0.044), high TG level (p=0.044), and high cholesterol level (p=0.031). And at the same time found no statistically significant relation with HDL level.

In this study 4 (1.3%) of participants had a history of stroke in the family. There was no statistically significant relationship between the dyslipidaemia of the participants and the history of stroke in the family. Our study also revealed no statistically significant relationship with the food source and awareness about lipid status to dyslipidaemia. No participants take alcohol. Fasting blood sugar and routine urine analysis were found normal in all participants.

Conclusion:

This study has found dyslipidaemia in many participants. Dyslipidaemia was found to be associated with smoking, obesity, irregular participation in physical activities, and having a family history of heart disease. No significant relationship was found with dyslipidaemia to the educational qualification of the participants, education of parents, food source of the participants, awareness of lipid status, and family history of stroke.

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Review Article

Artificial Intelligence in Nephrology: Real or Fictional?

Tanveer Bin Latif [1], Elena Haque[2]

Abstract:

Artificial intelligence (AI) has been applied widely in almost every area of our daily lives already without us being very aware. Due to the growth of computing power, advances in methods and techniques, and the explosion of data, this new computational method also plays a critical role in academic disciplines. AI can augment the intelligence of clinicians in diagnosis, prognosis, and treatment decisions. Kidney disease causes great economic burden worldwide. Outstanding challenges in nephrology may be addressed by using big data and AI. It will assist renal care givers in diagnosis and management in a novel way in near future. In this review, we summarized advances in machine learning (ML), artificial neural network (ANN) and deep learning (DL), with a special focus on acute kidney injury (AKI), chronic kidney disease (CKD), end-stage renal disease (ESRD), dialysis, Kidney Transplantation and Nephropathology.

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Introduction:

Although there is no widely accepted definition of AI, it is generally regarded as the capability to imitate intelligent human behavior using machines, and is based on computer science, statistics, algorithms, machine learning, information retrieval, and data science. Through AI's powerful functions, large patients' datasets can be accessed, acquired, and easily stored for further processing. Thus, big data are regarded valuable treasures for medicine development and have potential to drive innovation, minimize cost, and improve healthcare quality.[1] Here we discuss a few definitions for our understanding of AI.

Machine learning (ML)

ML is a major branch of AI in which computers are trained using algorithms and statistical models to learn sample data and analysis data processing experience instead of being definitively programmed to perform specific tasks.[2]

The main purpose of ML is to introduce algorithms that ingest input data, use computer analysis to predict output values within an acceptable range of accuracy, identify patterns and trends within the data, and learn from previous experience.[3]

Artificial neural network (ANN)

ANN, is a mathematical model based on nonlinear statistical data modelling tools where complex relationships occur between inputs and outputs, and is a mainstay of ML. It imitates the human brain to process various data types and creates patterns for use in decision making.[4]

Deep learning (DL)

DL is a branch of ML based on ANN and is regarded as a more sophisticated implementation of ML capable of performing more detailed analyses, combining more data, and representing higher abstraction levels.[5]

Artificial Intelligence in different aspects of Nephrology

Application of AI and ML requires a large number of data set. In many advanced countries data are already being kept in structured way on different parameters in Nephrology. It means that nephrology as a specialty is already primed for potential uses for AI. And it is also true that with the overwhelming amount of data faster computing is required for analysis and application in the real world.

AI in acute kidney injury (AKI)

AKI occurs approximately 20% of hospitalized patients, of whom 10% require kidney replacement therapy.[6] AI can

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help doctors identify AKI at early stage and greatly improve patients' outcome. Therefore, AKI is an ideal candidate for big data and AI to improve medical care.[7]

AKI is frequently associated with other underlying conditions and will, in most cases, be handled by non-nephrologists in the hospital. This has made the development of detection or prediction models of AKI an important topic.

England's National Health Service recommended wide adoption of an automated computer software for detecting AKI.[8] Google has developed the Streams Program, which may predict AKI and alert doctors for early intervention. In this trial an RNN (Recurrent Neural Network) for real-time prediction of postoperative AKI within 7 days after cardiothoracic surgery—based on routinely collected features during the hospital stay were analysed. From the data of 15,564 admissions, a balanced training set (2224 admissions) was constructed for the development of the RNN. The model was then evaluated on an independent test set (350 admissions) and yielded an area under curve (AUC) (95% confidence interval) of 0.893 (0.862–0.924). They compared the performance of that model against that of experienced clinicians. The RNN significantly outperformed clinicians (AUC = 0.901 vs. 0.745, p <0.001) and was overall well calibrated. This was not the case for the physicians, who systematically underestimated the risk of AKI(p <0.001). In conclusion, the RNN was superior to physicians in the prediction of AKI after cardiothoracic surgery[9]

In Nature, Toma_sev et al. reported the development of a continuous prediction model for AKI based on artificial intelligence. The authors used longitudinal data from electronic

health records of >700 000 inpatients, as well as outpatients, across all specialties to train a deep learning recurrent neural network model. The system was trained using not only current

medical data, but also previous data for up to 2 years before admission, resulting in an enormous 6 billion independent data entries. For every case, presence or absence of AKI was labelled to allow supervised learning. The resulting model was able to predict AKI in 55.8% of all inpatient cases of diagnosed AKI, with a lead time of up to 48 hours and a ratio of two false alerts for every true alert.[10]

Yin et al. retrospectively reviewed 8800 patients who received contrast and developed a model for predicting contrast-induced nephropathy (CIN) based on machine learning. A total of 8800 patients undergoing contrast administration were randomly assigned in a 4:1 ratio to development and validation data sets. CIN was defined as an increase of 25% and/or 0.5 mg/dL in serum creatinine within 72 hours above the baseline value. Preprocedural clinical variables were used to develop the prediction model from the training data set by the machine learning method of random forest, and 5-fold cross-validation was used to evaluate the prediction accuracies of the model. The model was tested in the validation data set. The incidence of CIN was 13.38%. The model gave prediction accuracy of 80.8%, sensitivity of 82.7%, specificity of 78.8%. [11]

Ibrahim et al. developed an ML-based clinical AKI risk prediction in a prospective study of 889 patients who underwent coronary angiography. Clinical and biomarker predictors of AKI were identified using machine learning and a final prognostic model was developed. They found that Forty-three (4.8%) patients developed AKI. Six predictors were present in the final model: four (history of diabetes, BUN to creatinine ratio, CRP, and osteopontin) had a positive association with AKI risk, while two (CD5 antigen, Factor VII) had a negative association with AKI risk. The final model had a 77% sensitivity, 75%specificity, and a negative predictive value of 98% for procedural AKI.[12]

Thottakkara et al.analyzed 50,318 patients who underwent major surgery and compared 4 ML approaches (logistic regression, generalized additive model, naïve Bayes, and Support Vector Machines) in postoperative sepsis and AKI prediction using data from Electronic Medical Records (EMRs). The areas under the receiver operating characteristic curve for different models ranged between 0.797 and 0.858 for acute kidney injury and between 0.757 and 0.909 for severe sepsis. Logistic regression, generalized additive model, and support vector machines had better performance compared to Naïve Bayes model. [13]

AI in chronic kidney disease (CKD)

CKD is a group of diseases with heterogeneous manifestations. Here we discuss the use of AI in CKD from Immunoglobulin A nephropathy (IgAN), Diabetic Nephropathy, and Autosomal Dominant Polycystic Kidney Disease (ADPKD).

Liu et al. used AI (Random Forest) to predict ESRD status in IgAN patients. The predictive model showed that Oxford-MEST scores, C3 staining, and eGFR were important for

ESRD prediction. A total of 262 IgAN patients were enrolled in this study with a median follow-up time of 4.66 years. Logistic regression also showed that these factors were statistically associated with ESRD status. They first trained an initial RF (Random Forest) model using gender, age, hypertension, serum creatinine, 24-hour proteinuria and histological grading. This 6-predictor model achieved a F-measure of 0.8 and an AUC of 92.57%. By adding Oxford-MEST scores, this model outperformed the initial model with an improved AUC (96.1%) and F-measure (0.823). When C3 staining was incorporated, the AUC was 97.29% and F-measure increased to 0.83. Adding the estimated glomerular filtration rate (eGFR) improved the AUC to 95.45%.[14]

A 2018 study by Arianna et al. using ML to predict type 2 diabetes mellitus complications in 1000 patients found that the RF model had the highest predictive performance to detect Diabetic Nephropathy(accuracy = 0.838)[15]

Makino et al.[16] developed a new predictive model for diabetic kidney disease(DKD) using AI processing natural language and longitudinal data with big data ML based on Electronic Health Records from 64,059 patients. AI could predict DKD aggravation with 71% accuracy (average AUC = 0.743).

The use of AI in ADPKD diagnosis has focused on medical imaging, where the use of AI has actually exceeded that of nephrology. Kanishka et al.[17] used an automated segmentation method based on DL for total kidney volume (TKV) measurement on a CT dataset from 244 ADPKD patients with mild to moderate renal insufficiency. The new method allowed fast and reproducible diagnosis, and TKV measurement transmission is consistent with manual segmentation by clinical experts.

AI in renal replacement therapy

Studies have demonstrated that nephrologists can use big data and AI to predict the risk of hospitalization and death in patients with ESRD. It can also be used to predict complications of ESRD like anemia, fluid overload, renal bone disease.

The benefits of AI in the management of anemia for patients with HD include prediction of future hemoglobin concentration, optimization of dosage of erythropoietin and iron. In 2014, an anemia control model (ACM) was developed to improve the treatment of patients. [18] To develop the ACM model, a neural network was trained to predict changes in hemoglobin value. This model can predict future changes in hemoglobin and recommend a precise ESA dosage.[19] In 2016, the team established a full ML-based algorithm to promote the management of anemia in patient with HD and found that it improved the primary outcomes of the study (i.e., increased Hb on-target (70.6%–83.2%), decreased Hb fluctuations (9.5 g/L–8.3 g/L), reduced Hb > 120 g/L (18.06%–7.5%), decreased EPO and iron consumption).[20]

In 2018, María et al.[21] reported the model predicts the optimal dose of darbepoetin and iron sucrose to achieve target Hb and ferritin levels. Application of the model also suppressed the transfusion rate, hospitalization, and incidence of cardiovascular events.

In2019, an AI model was developed using 766,000 records to predict the removal of fluid volume, heart rate, blood pressure, and session-specific Kt/V. The model showed good accuracy and precision, and is expected to help clinicians make optimal treatment decisions.[22]

AI in vascular access

Patients with renal failure rely on arteriovenous fistula (AVF) for hemodialysis, AVF is the "first" access for HD patients. The life of AVF can be predicted using ML algorithms. Chao et al.[23] also applied the Support Vector Machine to evaluate the health of AVF using small-sized sensors. The model showed a high accuracy (89.11%) and low type II error (9.59%).

Application of AI in kidney transplantation

The application of AI in kidney transplantation can be summarized from two aspects: prediction of graft rejection and augmentation of post transplantation immunosuppressive therapy.

Prediction of graft function

In a quality improvement initiative, graft loss and mortality prediction models incorporating longitudinal structured and unstructured patient-level data from Electronic Health Record (EHR) were constructed. It was found that application of big data approach significantly improves the accuracy of predicting transplant failure and death, EHR can be used to optimize results[24]

Abdeltawab et al.[25] also developed a DL algorithm by fusing imaging markers and clinical biomarkers for early detection of acute renal transplant rejection. The overall accuracy of the system was 92.9%,with a sensitivity of 93.3% and specificity of 92.3% in distinguishing non-rejected kidney transplants from rejected ones.

Optimizing immunosuppressive therapy

Tacrolimus, an immunosuppressants, is commonly applied as a post transplantation immunosuppressive therapy. This drug has a narrow therapeutic window and variability across patients. Clinically, it is important to identify indications for tacrolimus therapy. Tang et al.[26] successfully identified clinical and genetic factors that influence the dose of tacrolimus by using AI model. To our knowledge, this is the first study to use machine learning models to predict TSD (Tacrolimus Standard Dose), which will further facilitate personalized medicine in tacrolimus administration in the future

Application of AI in Nephropathology

Images work well in appropriate AI environment. Histopathology slides can be broken down into segment and fed into an algorithm and assist histopathologists to reach a more refined diagnosis.

Computer algorithms have a high discriminative power to detect subtle yet relevant pathologic changes. Moreover, such automated assessment algorithms can overcome the tedious nature of visual assessment. The most widely applied DL models in the analysis of images is CNN(Convolution Neural Network), which has applied in kidney histopathology as well. Pre-trained neural networks can identify glomerular and non-glomerular regions based on tissue characteristics.[27]

Elsewhere[28], six CNN models were trained using trichrome-stained images processed from renal biopsy samples. The study demonstrated that CNNs showed better performance compared to pathologists in determining the percentage of estimated interstitial fibrosis. The results prove the potential of AI and ML techniques in supporting the activity of renal pathologists.

In a study by Paola Suavo-Bulzis et al ,26 renal biopsy images were analyzed and classified using the IBM Watson Visual Recognition tool which was able to distinguish automatically and

with very high accuracy between sclerotic and non-sclerotic glomeruli (ERA). Results proved the potential of AI in augmenting the activity of nephrologists.[29]

Conclusion:

In this review we have discussed AI use in various nephrology subspecialties. First, the applications and studies of AI in nephropathies with high-morbidity and mortality, such as AKI, Diabetic Nephropathy, IgAN, ESRD are of high priority. Moreover, in coming years, AI is likely to achieve the most success in nephropathology. Renal biopsy images will undoubtedly be valuable for use in the application of AI in kidney diseases. With the development of Electronic Health Record, the resulting large dialysis datasets will be ideal for AI research.

In Bangladesh we have just started hearing about AI and ML but it might have good potential application for us. In our country, one of the largest limitations for AI development is the lack of publicly available large data sets. Given that we have a large population of renal patients to treat with very few nephrologists and histopathologists these very new kind of technology might help us creating better renal service provided we act now to accumulate data sets from our own population.

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29. Paola Suavo-Bulzis et.al Artificial Intelligence In Renal Pathology: IBM Watson for the Identification of Glomerulosclerosis

Case Reports

Spontaneous Hypoglycaemia Presenting as Primary Renal Lymphoma: A Case Report

Najeeb Mahiyuddin[1], Tabassum Samad[2], Muhammad Abdur Rahim[2], Wasim Md. Mohsinul Haque[2], Sarwar Iqbal[3]

Abstract:

Primary renal lymphoma is a rare disease. We report a case history of 70-year-old man, who was evaluated for spontaneous hypoglycaemia, abdominal heaviness, mass and acute kidney injury. Unfortunately, the patient succumbed to the disease and eventually expired.

(Bang. Renal J. 2022; 4(2): 45-49)

Introduction:

Primary Renal Lymphoma (PRL) is defined as non-Hodgkin lymphoma (NHL) arising in renal parenchyma and not invasion from an adjacent lymphomatous mass.[1] PRL is rare as the kidney is an extranodal organ and does not contain lymphatic tissue. Therefore, the existence of a PRL has been continuously debated. PRL accounts for less than 1% of all renal lesions.[2] Here we report a case of PRL and discuss this rare entity.

Case:

A 70-year-old diabetic male with acute kidney injury (AKI) presented with spontaneous hypoglycemia, anorexia and abdominal heaviness to a tertiary care hospital in Bangladesh. He gave no history of abdominal pain, fever, hematuria, burning sensation during micturition or diarrhea. He also denied of consuming any nephrotoxic agents. The patient was looking ill and anemic. He was haemodynamically stable and afebrile. Left kidney was enlarged (approximately 15 cm × 15 cm) and tender. He had mild nonproliferative diabetic retinopathy (NPDR) and 1+ proteinuria. There was no other organomegaly or lymphadenopathy. His initial investigations are shown in Table I. Ultrasonogram (USG) showed an enlarged left kidney (143 mm) with altered echogenicity and a soft tissue mass like area in left perinephric region (Figure 1). Computed tomogram (CT) of the abdomen (Figure 2) revealed emphysematous pyelonephritis of left kidney (size 27 cm x 15 cm) with mild ascites. Since the CT scan finding was not consistent with the clinical findings, FNAC (Figure 3) was done from the left kidney which was suggestive of sarcoma. Core needle biopsy was done from the left abdominal mass that revealed high grade diffuse non-Hodgkin lymphoma (NHL). The immuno-histochemistry analysis showed the cells were positive for LCA, CD20 and negative for Desmin, CD3 and CD5. The diagnosis was diffuse large B-cell lymphoma (DLBCL). The 18F-fludeoxyglucose positive emission tomography/ computed tomography (^{18}F-FDG PET/CT) scan findings (Figure 4) revealed a large metabolically active soft tissue mass involving the left side of the abdomen (inseparable from the left kidney) with moderate ascites, bilateral pleural effusion and diffuse mesenteric haziness with patchy hypermetabolism in relation to marrow. The mass was measuring approximately 18.2 cm antero-posteriorly X 19.6 cm transversely X 19.3 cm cranio-caudally and the standardized uptake value (SUV_{max}) was 12.45. During hospital course the patient developed recurrent hypoglycaemia which was initially treated with intravenous glucose and frequent meals but later oral glucocorticoids had to be initiated to control the hypoglycaemic episodes. Unfortunately the definitive treatment for the NHL could not be started due to poor general condition of the patient. The patient eventually expired.

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Table-I

Initial investigations of the patient

Investigation	Result	Reference value
Complete blood count		
Haemoglobin	9.3 g/dl	13-18 g/dl
Total count	11,500/mm^3	4000-11000/mm^3
Neutrophil	83%	40-75%
Lymphocyte	13%	20-50%
Monocyte	5%	2-10%
Eosinophil	0%	1-6%
Platelet count	1,23,000/mm^3	150000-450000/mm^3
ESR	75 mm	0-12 mm
CRP	24 mg/l	< 6 mg/l
Renal function test		
Blood urea	128 mg/dl	10-45 mg/dl
S. creatinine	2.5 mg/dl	0.67-1.3 mg/dl
Serum electrolytes		
Na	129 mmol/l	136-148 mmol/l
K	4.5 mmol/l	3.5-5.2 mmol/l
Cl	100 mmol/l	98-108 mmol/l
CO_2	26 mmol/l	25-29 mmol/l
Ca	9 mg/dl	8.4-10.4 mg/dl
Po_4	3.7 mg/dl	2.5-4.9 mg/dl
Mg	0.8 mmol/l	0.7-1.05 mmol/l
Urine RME		
Pus cell	2-3/HPF	d" 5/HPF
Epithelial cell	7-10/HPF	d" 20/HPF
RBC	1-2/HPF	d" 3/HPF

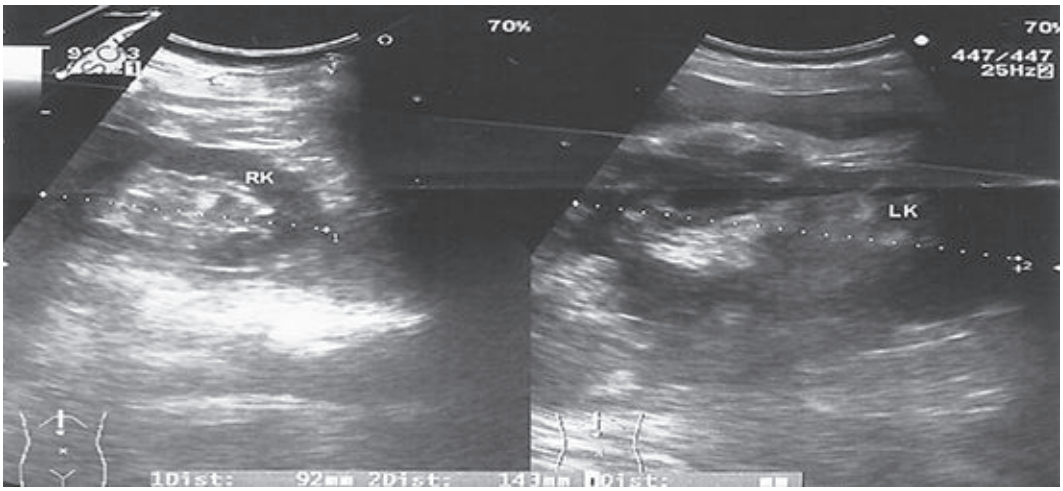

Fig.-1: *USG of the patient showing an enlarged left kidney (143 mm) with altered echogenicity and a soft tissue mass like area in left perinephric region*

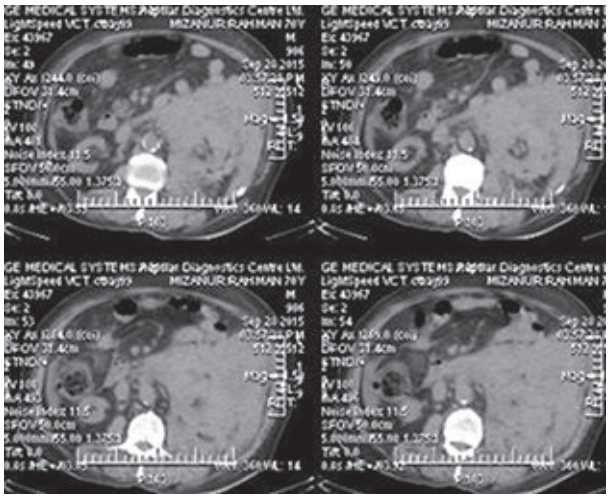

Fig.-2: *CT scan of the abdomen revealed emphysematous pyelonephritis of left kidney (size 27 cm x 15 cm) with mild ascites*

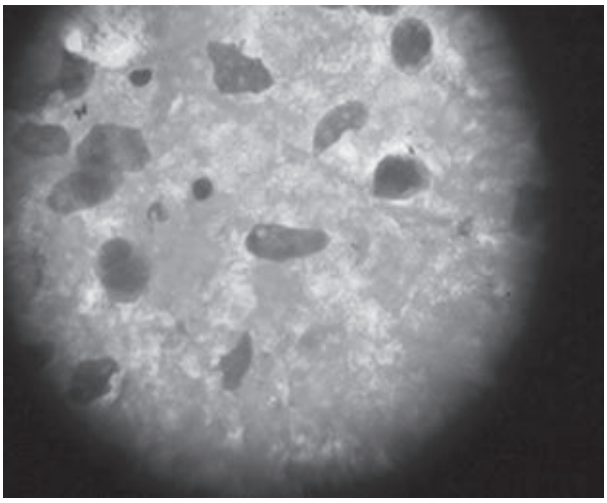

Fig.-3: *FNAC slide from the left kidney, which showed malignant cells suggestive of sarcoma*

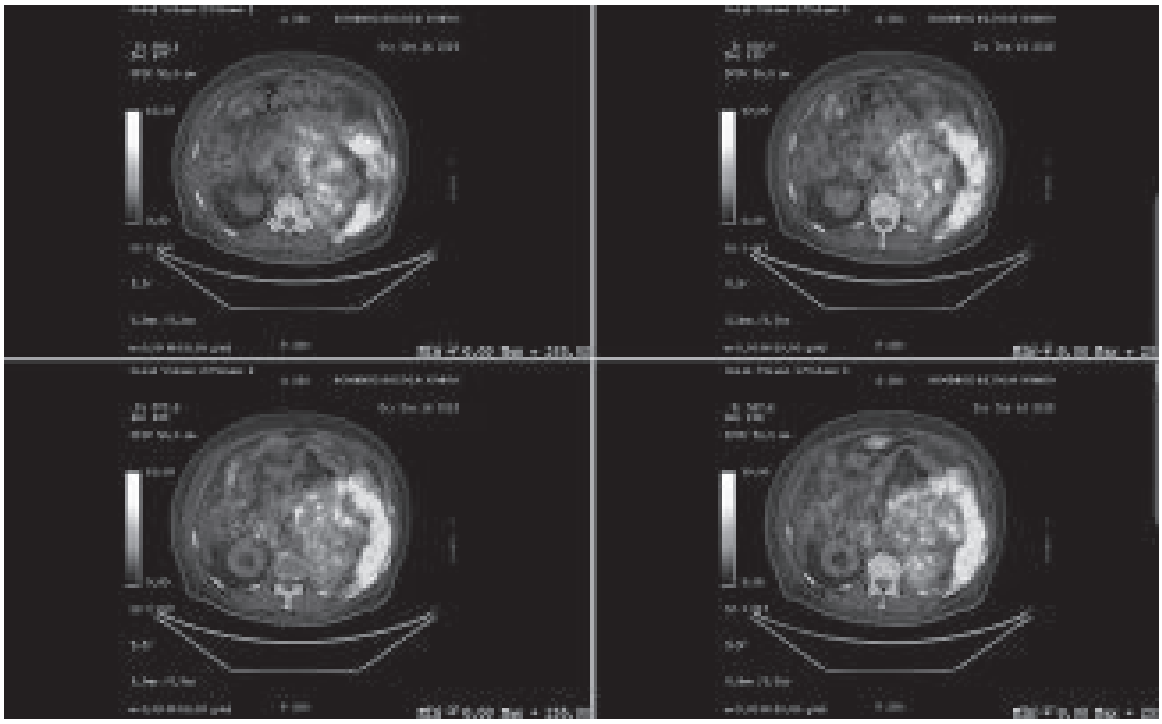

Fig.-4: *^{18}F-FDG PET/CT scan findings reveal a large metabolically active soft tissue mass (measuring approximately 18.2 AP X 19.6 TR X 19.3 CC cms, SUV_{max} 12.45) involving the left side of the abdomen (inseparable from the left kidney) with moderate ascites, bilateral pleural effusion and diffuse mesenteric haziness with patchy hypermetabolism in relation to marrow*

Discussion:

PRL is rare. In autopsy series, estimates of renal involvement in patients with known lymphoma range from 30% to 60%.[3] Kidneys can be the primary site of disease or a site of disseminated extranodal involvement. Common extranodal sites include the kidneys, bone marrow, liver, and gastrointestinal tract. Malbrain (1994) elucidated criteria for the diagnosis of PRL: (i) acute renal failure at

the presentation in the absence of other causes of renal impairment; (ii) rapid improvement of renal function after treatment; (iii) increased kidney size without any urinary tract obstruction; (iv) an absence of other nodal involvement beyond the kidney; (v) a confirmed diagnosis made by biopsy.[4] More recently Stallone (2000), in a review of 29 cases of PRL, stated that the following criteria be met for diagnosis: (i) there is lymphomatous renal infiltration; (ii) there is non-obstructive uni- or bilateral renal enlargement; (iii) there is no extra renal localisation of lymphoma at the time of diagnosis.[2] Our case met 4 out of the 5 criteria proposed by Malbrain and all the criteria listed by Stallone.

Since kidney is not a lymphoid organ, the very existence of lymphomas of kidney was questioned by some investigators. The proposed pathogenetic mechanisms include: origin in the subcapsular lymphatics, seeding via hematogenous route, an extension from retro peritoneal disease or inflammatory disease with a lymphoplasmacytic infiltrate.[1,5]

The most common presentation of PRL is of acute renal failure, flank pain and mass.[1] Other reported presenting complaints include fever, weight loss and haematuria.[5] PRL can also present with proteinuria or nephrotic syndrome.[6] Our patient presented with abdominal mass, proteinuria and acute renal failure. PRL has been associated with inflammatory and infectious chronic diseases, such as chronic pyelonephritis, Sjögren's syndrome, systemic erythematous lupus, or Epstein-Barr virus.[2]

Our patient also presented with features of hypoglycaemia. NHL can cause hypoglycaemia, which may be due to increased glucose consumption by the tumour mass.[7] Other proposed mechanism for hypoglycaemia include release by tumour of insulin like growth factor 2 (IGF-2) and production of autoantibodies against insulin or insulin receptor.[8]

The role of imaging is very crucial. PRL appears as a hypovascular hypo to anechoic mass on ultrasonogram.[1,3,6,9] CT patterns of renal lymphoma include multiple renal masses (60%), renal invasion from contiguous retro peritoneal disease (25-30%), peri-renal or diffuse renal infiltration (25-30%), solitary mass (<6%) and enlarged non enhancing kidneys.[1,3,5,6] PRL should be differentiated from renal cell carcinoma (RCC) in view of widely varying treatment. On CT, homogeneous post contrast attenuation points more in favour of PRL, whereas presence of calcification, renal vein thrombosis and mass effect on renal vessels and the pelvicalyceal system is more likely to be RCC.[1,5,6] On magnetic resonance imaging (MRI), PRL exhibits a hypointense signal on T1-weighted images, isointense to hypointense signal on T2-weighted images and restricted diffusion on diffusion-weighted imaging. Less enhancement on early gadolinium-enhanced images differentiates renal lymphoma from RCC.[1,5,9] PRL shows an area of intense ^{18}F-FDG uptake on ^{18}F-FDG PET/CT scan images.[1,9,10] Studies have shown that FDG uptake for more than 10 SUV is suggestive of aggressive B-cell lineage or presence of more aggressive histological component.[10]

Percutaneous biopsy is always required to confirm the diagnosis. Renal biopsy has shown a sensitivity of 70% to 92% and specificity of almost 100% in the diagnosis of PRL.[1,5] Diffuse large B cell lymphoma (DLBCL) is the most common histology though encountering a follicular lymphoma, small lymphocytic lymphoma or MALToma is not unusual.[5] Our patient also had DLBCL positive for LCA and CD 20.

In a study of 54 patients with DLBCL who had a PET scan and bone marrow biopsy (BMB) performed before therapy showed discordance between the two examinations with PET showing an excellent sensitivity (92%) and a very high negative predictive value (98%) when compared to BMB. The author concluded that a negative PET result for bone marrow involvement (BMI) in DLBCL should eliminate the need for BMB; only patients with BMI on PET will benefit from a targeted biopsy in focal involvement or a blind biopsy in case of diffuse involvement.[11] Our patient showed increased ^{18}F-FDG uptake (12.45 SUV) in the soft tissue mass (inseparable from the left kidney) with no abnormal ^{18}F-FDG uptake on bones in ^{18}F-FDG PET/CT scan images. Thus BMB was not done in our patient.

Systemic chemotherapy is currently the first treatment option for PRL. Although most authors believe that the cyclophosphamide, hydroxydaunorubicin, oncovin and prednisone (CHOP) protocol should be an elective option (as it is in non-Hodgkin's BCL), there is no agreed-upon standard treatment approach for PRL.[6] The earli-er reviews report a poor prognosis for patients with PRL, with 1-year mortality rates of PRL can be as high as 75%,[1,5,6,9] the median survival time is only 8 months to 3 years and the 5-year survival rate is only 40–50%,[12] but the recent reports suggest a better survival probably due to the addition of rituximab to the combination chemotherapy.[6,12]

Unfortunately, in our case the chemotherapy could not be started which led to the ultimate demise of our patient.

Treatment of tumour-induced hypoglycaemia comprises palliation of an acute episode with intravenous glucose or intramuscular glucagon followed by specific management directed at its ultimate cause. Complete removal of tumour abolishes any tendency of hypoglycaemia. However, if chemotherapy is not feasible other management options are the use of diazoxide-chlorothiazide combination, human growth hormone (hGH), prednisolone, anti-inflammatory and immunosuppressive agents.[13] The hypoglycaemic episodes of our patient were controlled after we initiated oral glucocorticoids.

Conclusion:

Although PRL is a rare tumour type, it must be taken into account when making a differential diagnosis of any renal mass. Standard management of a renal mass is nephrectomy but PRL is an exception in which patient should be treated with chemotherapy. An effort should be made to make a preoperative diagnosis so that unnecessary nephrectomies might be avoided. It also should be kept in mind that lymphomas can unusually present with hypoglycaemia. In this regard presenting signs and symptoms of the disease require special attention and in conjunction with early diagnosis and management can help to improve outcome in these patients.

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Challenges in the Management of Extra Pulmonary Tuberculosis in a Kidney Transplant Recipient with HCV Positive Chronic Liver Disease: A Case Report

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Abstract:

Infections in renal transplant recipients are more common than in the general population, mostly because of immunocompromised state. Tuberculosis carries special importance in developing countries like Bangladesh where TB is one of the top ten causes of death. We report the case of a 35 years' man who was a kidney transplanted HCV positive patient with compensated chronic liver disease (CLD). He was eventually diagnosed with tubercular lymphadenitis and treated with modified anti TB regimen as he developed decompensation of his chronic liver disease featured by melena. Tubercular lymphadenitis in a kidney transplanted patient can be treated successfully taking into consideration the co-existing conditions and modifying the anti TB drugs accordingly.

(Bang. Renal J. 2022; 4(2): 50-52)

Introduction:

Tuberculosis is an important infection in patients with solid organ transplantation which is more common in countries with high TB burden and prevalence is 43 times greater in kidney transplant recipients than in the general population.[1]Though pulmonary tuberculosis is the commonest form in immunocompetent individuals, extra pulmonary tuberculosis is more frequent in kidney transplant recipients.[2]

Bangladesh is the 7th among 20 high TB burden countries as published in the 2015 global TB report [3]. So tuberculosis must be taken into consideration when a renal transplant recipient presents with fever for a long duration.

We report a case of renal transplant in which the recipient had tubercular lymphadenitis while he already had hepatitis C positive chronic liver disease and new onset diabetes after transplantation (NODAT). He was treated successfully with a modified anti TB drug regimen keeping in mind his existing hepatic dysfunction and titrated immune suppression to avoid toxicity and or graft rejection.

Case Report:

A 35-year-old Bangladeshi man underwent kidney transplantation from a living donor after 8 months of hemodialysis for End stage renal disease (ESRD) due to chronic glomerulonephritis (CGN). He was diagnosed with new onset diabetes after transplantation (NODAT) after one year and hepatitis C virus positive chronic liver disease (CLD) after three years respectively. He was on immunosuppressive therapy consisting of MMF, tacrolimus and prednisolone with good renal function.

He presented with a high-grade intermittent evening rise of temperature and gradually enlarging painful swelling on the right side of his neck and face for 10 days. Fever was not associated with chills and rigor, drenching night sweats, cough, rash, joint pain, weight loss or any swelling in other parts of the body. There was no contact with any TB patient.

The patient was moderately anemic and febrile A physical examination revealed the following vital signs: temperature, 103°F; heart rate, 94 beats per minute; blood pressure, 100/70mmHg; respiratory rate, 16 breaths per minute; and O2 saturation, 98% on room air. He had tender swelling over the right side of his face which was firm to soft in consistency with raised local temperature. A tender submandibular lymph node was also palpable on the right side measuring 2cm x 2cm.It was not adherent to the underlying structure or overlying skin and without any discharging sinus. Other lymph nodes were not palpable and there was no bony tenderness. There was no sign of stigmata of CLD on general examination. He was hemodynamically stable. Abdominal examination revealed a non-tender transplanted kidney with an overlying surgical scar and just palpable spleen.

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Table-I
His laboratory findings are given

	1st day	6th day	16th day	21st day
Hb	8.2 gm/dl	9.4 gm/dl	6.1 gm/dl	8.2 mg/dl
TC of WBC	5,030 cmm	3,940 cmm	3,620 cmm	2,600 cmm
Neutrophils	57.6%	51.7%	49.4	44%
Lymphocytes	23.3%	35.1%	36.7	34.8%
Monocytes	16.6%	10.9%	11.9	15.4%
Eosinophils	0.3%	1.3%	1.7	5.8%
Platelets	75,500 cmm	64,000 cmm	85,000 cmm	73,000 cmm
S. Creatinine	2.2 mg/dl	1.6 mg/dl	1.6 mg/dl	2.1 mg/dl
S. Na^+	123 mmol/l	130 mmol/l		
S. K^+	5.1 mmol/l	4.7 mmol/l		
S. Ca^{2+}	7.4 mmol/l			
S. Mg^{2+}	0.6 mmol/l			
SGOT	27U/L			19 U/L
SGPT	73 U/L			50 U/L
S. Bilirubin	1.1 mg/dl			0.8 mg/dl
S. Albumin	2.1 gm/dl			
PT	15.3 secs			
APTT	54.3 secs			
S. iron	25.6			
TIBC	48.2			
S. ferritin	2307 ng/ml			
CRP	48 mg/l			
HbA_1C	7.6%			
Tacrolimus level	3.2 ng/ml			

USG of neck region revealed swollen and inflammatory change in right parotid gland with necrotic change within. FNA from enlarged submandibular gland showed granulomatous lymphadenitis cytologically compatible with tuberculosis.(Fig 1) Anti TB drug was started at a dose of isoniazid 300 mg , rifampicin 600 mg, ethambutol 800 mg, moxifloxacin 400 mg. Immunosuppressive drugs were continued. His fever subsided and swelling was reduced but he developed melena. Upper GI endoscopy with endoscopic variceal ligation was done. He received 8 units of red cell concentrate and 4 units of fresh frozen plasma. His general condition improved and he was discharged.

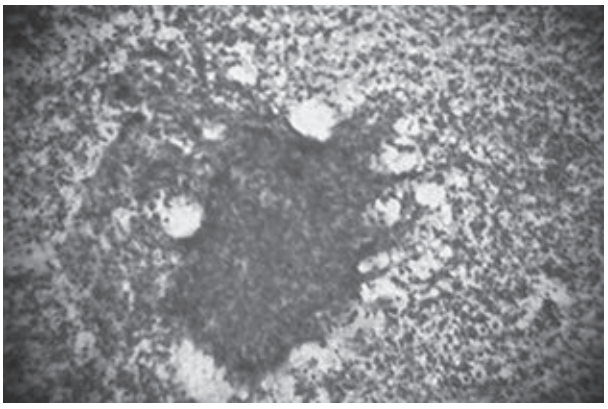

Fig.-1: *FNA from right submandibular gland showing granulomatous lymphadenitis cytologically compatible with tuberculosis.*

Discussion:

Our case report showed the occurrence of tubercular lymphadenitis in a HCV positive renal transplant patient which was diagnosed based on the report of granulomatous lymphadenitis in a histopathological examination of fine needle aspirate from right submandibular swelling and subsequent respond to treatment with anti TB drugs. Post transplantation TB is a result of reactivation of latent TB focus in more than 95% of the cases. Less than 5% can be transmitted by contact with TB patients or from donors.[2]Though mycobacterium tuberculosis infection occurs commonly in 1- 6 months in

post-transplant period.[4] and more than 50% within the first 2 years.[2] but that's not always the case as found in our patient who was in his 4th year after transplantation. Data suggested pulmonary TB to be more common, presented usually with pyrexia of unknown origin, poor general condition, cough, hemoptysis and less common extra pulmonary cases present with atypical features. Nosocomial acquisition, longer pre- transplant period on hemodialysis, AB blood group, diabetes, HCV positive and chronic graft dysfunction (serum creatinine> 1.5 mg/dl) are considered as risk factors for TB transmission to a kidney transplanted patient.[2,5] Among immuno-suppressives; prolonged use of high dose steroids, cyclosporine (CsA), azathioprine, tacrolimus, mycophenolate mofetil; all are associated with high risk of TB.[5]

Infection with mycobacterium tuberculosis in kidney transplanted patient is challenging in many ways as it's presents with atypical features, difficult to diagnose, hard to prevent by prophylaxis, prolong need for anti TB drugs, drug interactions causing graft rejection and eventually raised mortality and morbidity.[6]In this case patient presented with fever and swelling of neck not responding to broad spectrum antibiotics, diagnosed by histopathological examination, drug interaction caused decompensated chronic liver disease with variceal bleeding needing band ligation with modification in anti TB drug regimen and longer duration of course. Eventually patient got better with proper care and team effort despite all the challenges of extra pulmonary tuberculosis in a Kidney Transplant recipient, decompensated CLD (HCV related) withGrade II esophageal varices, chances of Immunosuppressive drug toxicity.

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BANGLADESH RENAL JOURNAL

(A Journal of continuing education in kidney diseases)

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Only scientific papers written in English will be accepted. Restriction to the essential is recommended. Original papers should normally not exceed 16 type- written pages including tables, illustration and references. The arrangement of the paper should include summary, introduction materials and methods, results and discussion. Each section being clearly marked. The manuscripts must be type-written on a white paper, on one side of the sheet only and double spaced on consecutively numbered pages. Figures and illustrations, tables. captions, references, summary (15-20) lines and acknowledgement are to be submitted on separate paper. The caption should be brief and should not represent a duplication of information provided in the text.

STYLE

Abbreviations and symbols of chemical terms must be in conformity with the regulation as published in J. Biol. Chem. 241-527, 1966. Spelling should conform to chambers twentieth century dictionary. Drugs should be spelt out when first used in the text. Scientific measurements should be given in SL. units, Followed, in the text by traditional units in parentheses.

Any statistical method used should be detailed in the method section of the paper.

CITATION

The authors name should be listed in the text with year, examples (Merrill, 1965, Gabrel and Margan, 1976) For 3 or more authors (Oreagan et al. 1979).

REFERENCES

References should be limited. Only paper quoted in the text are to be listed in the bibliography. The references should be numbered consecutively as it appear in text and listed at the end of the article as in index Medicus.

Examples :

I. **PAPERS PUBLISHED IN JOURNALS**

Patel R, Mickey MR and Tersaki PI : Leucocyte antigens and disease. Association of HLA A_2 and chronic glomerulonephritis. Br Med J 1969; 2 : 424-426.

II. **ARTICLE IN BOOKS**

Peters DK, and Lechmann PJ : The complement system in renal disease, In; Renal diseases (ED) DAK Black and NF Jones Oxford. Blackwell, 1976, P-169-384.

III. **BOOKS**

Grindley MF: Manual of histologic and special staining Nephrologic, Elammarion, Paris, 1965.

ABBREVIATIONS

Angstrom	A
body surface area	BSA
body weight	body wt.
centimeter	cm
celius	C
complement components	C1,C2,C3
Correlation coefficient	r
creatinine clearance	Ccr.
curie (s)	Ci
Equivalents	Eq
Fahrenheit	F
Glomerular fitration rate	GFR
gram (s)	g
Grams per cent	g/100mi
half-time	tf1/2
hour (s)	hr
inch	inch
International Unit (s)	IU
Intramuscular	im.

intraperioneal	i.p.
intravenous	i.v.
inulin clearance	Cln
Kilogram (s)	Kg
liter (s)	L
meter (s) or milli	m
microns (s) or micro	µ
milligram (s) per cent	mg/100ml
minute (s)	min
molar	M
mole (s)	mole (s)
Molecular weight	molwt
nanogram (s) (millimicrogram)	ng
nanoliter (s) (millimicroliter)	nl
normal (concentration)	N
not significant	NS
optical density	OD
osmole (s)	Osm
probability	P
second (s)	sec
standard deviation	SD
standard error	SE
standard error of the mean	SEM
ultraviolet	UV
unit (s)	U
volt	V

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