Immunology of *E. coli* Persistant pyuria

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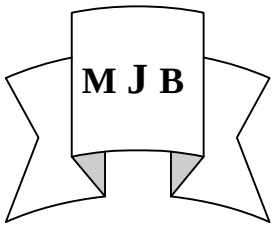

Abstract

Fourty Persistent Pyuria Patients were diagnosed as *E. coli* persistant pyuria . Of which 33 were Immune (In a sense of mounting normal adapted immune response) and seven were immunocompromised (In a sense of mounting subnormal adapted immune response .The female / Male ratio was 13/27 . The patients age range was 30-70 years .The median total serum protein was 7.274 g/dl . Likewise the median serum total globulin was 4.302 g/dl . while the median of systemic to the median of mucosal globulin ratio was 0.69 . These scores were generally higher than those of normal control subjects . The median immunoglobulin class concentrations were 2.339, 0.195 and 0.309 g/dl to classes IgG , IgM and IgA respectively .

E. coli immunodominant epitopes were intiating specific circulating and mucosal agglutinin as well as significant leucocytes inhibition factors in immune patients and nonsignificant in immunocompromized .

Thus, *E. coli* epitopes could be of T dependent type and activate either or both Th1 and Th2 lymphocyte, or it might be of T independent epitope type .

الخلاصة

جرى تشخيص اربعون مريضا ببيلة قيحية مستديمة مشتركة مع اشركيا القولون . كان ٣٣ منهم منيعون وسبع منخفضي المناعة . كانت نسبة الاناث للذكور ١٣ الى ٢٧ والفئة العمرية بمدى ٣٠-٧٠ سنة . كان وسيط تركيز البروتين الكلي المصلي٢٧٤، ٧غم/دلتر . ووسيط تركيز الكلوبيولين المناعي الكلي المصلي ٤،٣٠٢ ووسيط تركيز الكلوبيولين في المخاط هي ٠,٧٢ وتعد هذه القيم بشكل عام اعلى مما هو عليه بين الأشخاص الأسوياء في مجموعة السيطرة .

وظهر بان وسيط تركيز أصناف الكلوبيولين المناعي IgA,IgM,IgG على التوالي٢،٣٣٩;٠،١٩٥ و ٠,٣٠٩ غم/دلتر .

ويبدو بان الذرى المستضدية ذات السيادة المناعية قد حفزت حصول اضداد تلازينية متخصصة دوارة ومخاطية متخصصه باشركيا القولون وبعيارات معنوية من المجموعة الأولى من المرض وبشكل اقل بالمجموعة الثانية من المرضى . وقد أحدث معاملات تثبيط الهجرة الخلايا البيض معنوية وغير معنوية على التوالي لمجاميع المرضى على التوالي وبهذا فمن الممكن إن تكون الذرى المستضدية السائدة مناعيا تنشط خلايا تائية مساعدة Th1 ,Th2 . أو معتمدة وغير معتمدة على الخلايا التائية .

Introduction

The pathogensis and immunology of uropathogenic *E. coli* allover the world have been tackled by several workers [1,2,3,4] . In this area , however , among the uropathogens *E. coli* has been documented [5,6] Mahdi [7] has been studied *E coli* specific muucosal immune responses in persistant pyuria patients .

The objective of the present work was to investigate the immunology of *E. coli* human persistant pyuria patients .

Materials And Methods

Fourty persistant pyuria patient were investigated . From each of which clean catch midstream urine & blood with and without anticoagulant were collected [8, 9] . The normal human subjects were sampled as for test group. The bacteriology and immunology of these samples were performed by standardized methodology [23 – 34] and were briefed in the followings :

The urine samples were processed for culture by direct quadrate streaking technique [23] as well as by indirect broth enrichment and quadrate streaking technique [24] . Growth on blood and MacConkey agar plates were checked for metallic sheen on Eosin methylene blue agar . Pure isolates were identified by classical and miniaturized biochemical tests [25] . Whole cell somatic *E. coli* antigens were prepared by heat killing at 60 C° for one hour at waterbath [26] . Cell free culture filtrate was made from 24 broth culture after centerfugation for 10 min. at 5000 RPM . Supernates were Millipore (0.22) filtered in microfiltration unite of injection type . This preparation was used as sensitizer in leukocyte inhibition test . The leukocyte inhibition test was done by capillary method using peripheral blood leukocyte and mucosal leukocyte [9 , 29] . The immunoglobulin classes were determined by specific anti immunoglobulin partigen plates

according to Mancini and Laurel [30] . The separation of mucosal immunoglobulin (MIG) was done by 6% PEG 6000 [31] . MIG was partially characterized as ; dialysis for three days using saline for two shifts and distilled water for one shift [32] , protein determination by biurate method [33] , slide agglutination , standard tube agglutination with and without 2ME treatment using heat killed somatic antigen of the causal *E. coli* bacteria [34] statistical analysis was made as in Dawed and Al-Yas[10] .

Results

From these fourty patients .Thirty three were immune and seven were immunocompromized . *E. coli* were identified from the urine cultures of these patients (table .1) .The female / male ratio 13/27 . The age range of these patients were from 30 to 70 years .

The median total serum protein concentrations were 7.274 g/dl while that for total globulin concentrations was 4.302 g/dl . The median mucosal globulin concentrations were 0.072 g/dl . The albumin to globulin ratio was 0.69 . The median concentrations for immunoglobulin class concentrations were 2.339,0.195 , 0.309 g/dl in patient which corresponds to 1.197 , 0.295 and 0.294 g/dl for IgG , IgM and IgA respectively in controls .The *E. coli* specific circulating and mucosal agglntinin titres , were 360 and 40 respectively . The ratio of systemic to mucosal antibody titre was 9:1 for the immune patient group and 6:1 for the immunocompromised group . There was a linear correlation between MIG concentrations and the *E. coli* specific antibody titers, as simple regression analysis showed :

Serum Y=-1596.7 + 45.012 X

Y=0.6263

Fc=24.533 at p=0.01

Ft= 7.35 at p=0.01

Mucosa Y=-8.828 + 65.715 X

r = 0.61497

Fc = 23.11274 at p=0.01

Ft=7.35 at p=0.01

The leucocyte inhibition factors in peripheral blood and mucosal leucocytes were 0.57 , 0.5 for the immune and 0.85 as well as 0.77 for immunocompromy patient respective-ely . In other word it was significant in immune patient and non signification in the other group .

Discussion

Uropathogenic *E. coli* was documented (table1,2,Fig 1) the pathogenesis in these cases can be ascending exogenous and descending

haematogenouse and / or lymphogenous [11-13] . The net outcome of host – parasite interaction depends on balance versus imbalance between the pathogen and the host. Thus the persistant *E. coli* infection may be due to antibody coated bacteria , cryptic organisms and / or cell well defective state [6,2,3,13]

The virulence associated antigens of uropathogenic E cloli are Exo and Endo-toxin , adhesion factors , K antigen [1,15,16]. In these, uropathic *E. coli* the immunodominant epitopes could be of a T – dependent and T independent types or they may be of activation potential to Th1 and Th2 cells [17] In uropathy , howover , *E. coli* epitopes may be K,O and / or F components . To date knowledge has indicated that one or more of these antigens may be protective and helpful in diagnosis , Thus *E. coli* in these persistant pyuria cases , stimulated mucosal and systemic response at both humeral and cellular levels , since they induced specific antibody response and significant LIF both at mucosal and systemic levels

[13,18-22] .

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Table 1: Biochemical charcteriztion of uropathic ***E. coli***

Gram reaction	**–**	**–**
Shape	**Rod**	**Rod**
Motility	**M**	**M**
Facult.O2	-	-
Growth on MacConkey agar	**Lactose fermenting colonies**	
Capsule	-	-
Catalase	-	-
Oxidase	–	-
Urease	**(+)**	
Indole	+	+
MR	+	+
VP	–	-
Citrate	-	-
Lactase	+	+
Glucose	+	+

Table 2: Immunology of *E. coli* human persistant pyuria in an immune and immuno compromised patients

Character	*E. coli*	control
F/M	13/27	3/5
Age range	1	-
1-20	1	2
21-29	17	3
30-39	16	3
40-49	1	3
50-59	4	-
60-69		
median of		
total serum protein g/dl	7.274	7.027
total serum globulin g/dl	4.302	3.492
mucosal globulin g/dl	0.72	0.02
S/M globulins	5.945	17.46
serum alb /serum globulin	0.69	0.101
median IgG g/dl		2.339 1.197
IgM g/dl		0.145 0.245
IgA g/dl		0.305 0.294
median of serum specific agglutinin. Titre		360 -
median of mucosal specific. Agglutinin .		40 -
Median of serum specific. Agglutinin .Titre/comp.		240 -
Median of mucosal specific Agglutinin .Titre/comp		40 -
systemic LIF		0.57 -
systemic LIF Com		0.85 -
mucosal LIF		0.5 -
mucosal LIF Comp*		0.77 -

* Comp = immunocompromised patient

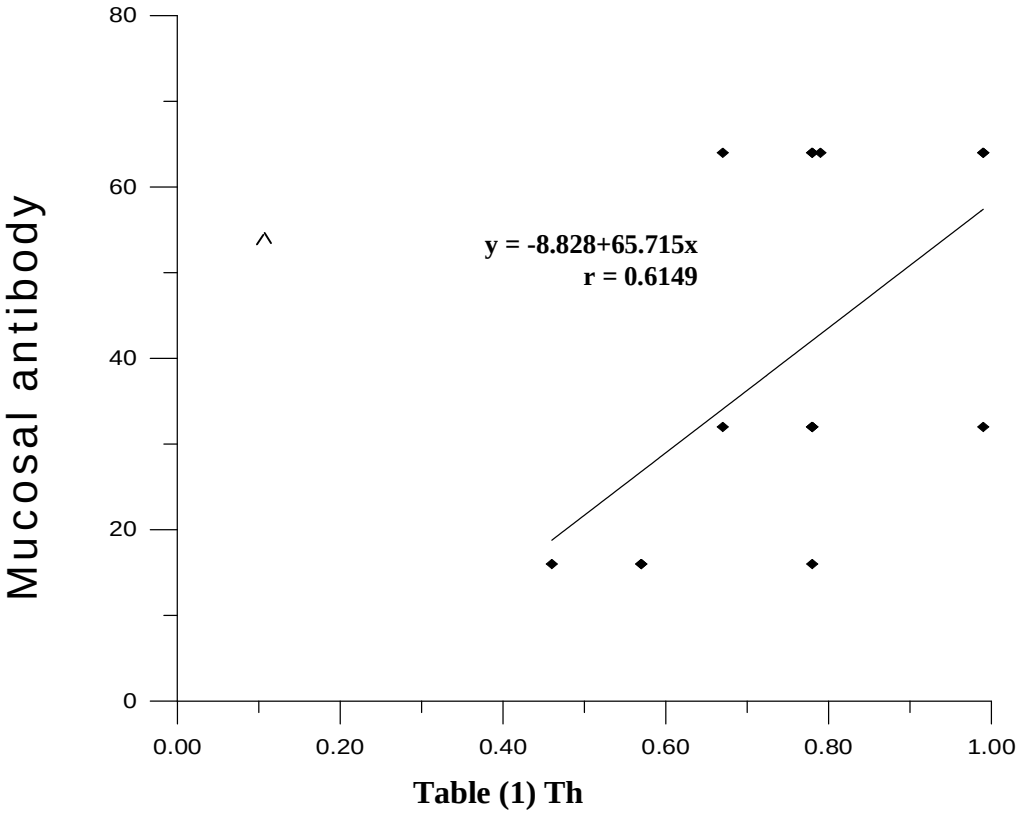
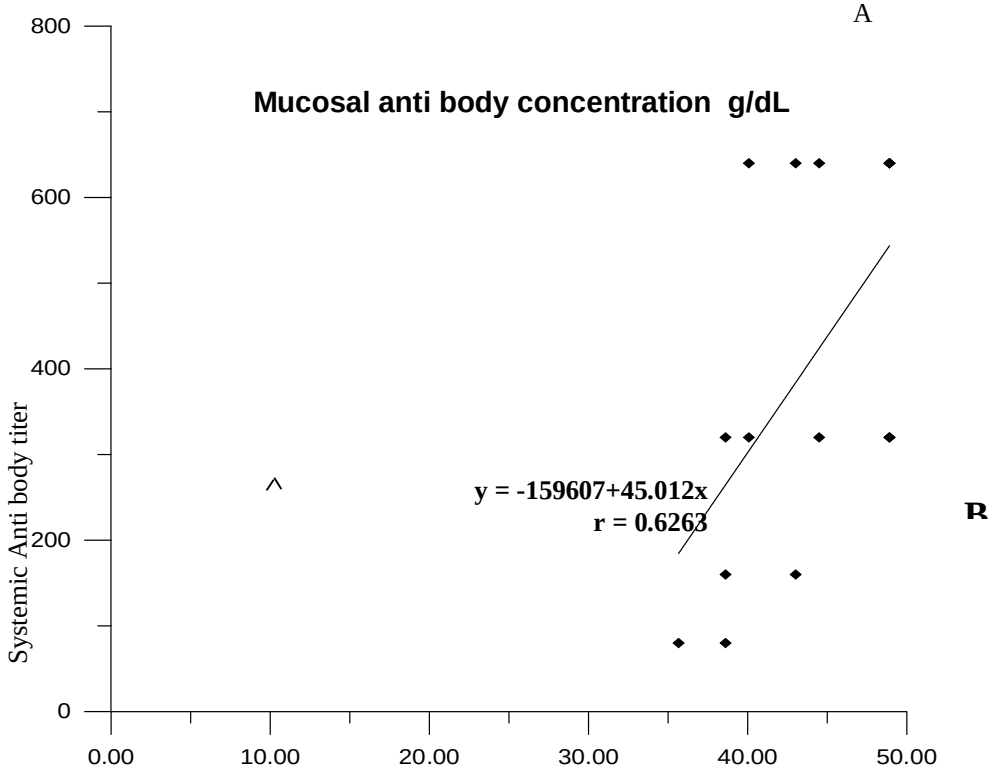

Mucosal antibody
y = -8.828+65.715x
r = 0.6149
0
20
40
60
80
0.00
0.20
0.40
0.60
0.80
1.00

Table (1) Th

A


Mucosal anti body concentration g/dL
Systemic Anti body titer
y = -159607+45.012x
r = 0.6263
0
200
400
600
800
0.00
10.00
20.00
30.00
40.00
50.00

B