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Factors Affecting Outcome in Patients of Fournier's Gangrene- A Study

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ABSTRACT

Introduction: *Fournier's gangrene is a rapidly progressive necrotising fasciitis of genitalia, perineum and abdominal wall, that primary involves subcutaneous tissue up to deep fascia. It is a vascular gangrene of infective origin. It is polymicrobial, synergistic infection caused by aerobic and anaerobic organism from colorectal, genitourinary or cutaneous infection. It has got high mortality rate and multiple factors on patient and treatment part affect outcome.*

Material and Method: *74 patients with diagnosis of Fournier's gangrene admitted from September 2014 to September2015 and also which were admitted in last 10yearsin our facility were studied by records. The variables studied were age, haemoglobin, haematocrit, TLC, duration between start of illness and presentation, random blood sugar, comorbidity, serumsodium, potassium, bicarbonate, creatinine, blood urea, pulse and respiratory rate, BP with h/o hypertension, area involved, fever. Blood transfusion, pusculture, antibiotics given. All patients underwent extensive debridement and empirically antibiotics covering gram positive gram negative and anaerobes used subsequently changed after culture sensitivity. Demographic, Disease and Treatment related data is collected and analysed. Variables were compared in survivor and non-survivor group by using statistical methods.*

Result & Conclusion: *The most commonly affected were 40 and 70 years aged males. Disease affecting in early age was found more aggressive and extensive. Prognosis was found poor in patients presented with age > 45 years, lower mean haemoglobin and haematocrit, mean TLC value>15000/cumm, uncontrolled diabetes, high blood urea and creatinine, electrolyte imbalance. Ecoli was found to be most common organism. Elective use of more than one antibiotic covering whole spectrum of aerobic and anaerobic organism gives good outcome. The overall mortality came out to be 5.4%. Result indicates that aggressive management in these patients improves outcome.*

Introduction

Fournier's gangrene is a rapidly progressive necrotising fasciitis involving subcutaneous tissue of genital, perineum and abdominal wall. It was named after French dermatologist Alfred Fournier who first described it. It is a vascular gangrene having infective origin. Its a polymicrobial infection synergistically caused by aerobic and anaerobic organism from colorectal, genitourinary or cutaneous infection of genitals, perineum or anus. The organisms most commonly involved are Haemolytic streptococci, Staphylococci, E.coli, Clostridium welchii, Bacteroides fragillis. conditions predisposing for Fournier's gangrene are

Generalised debilitating disease like-

-Diabetes mellitus,

-Chronic alcoholism,

-Malignancy,

-Radiotherapy and Chemotherapy,

-Aids/immunosuppression,

-prolonged recumbency

-Chronic renal failure

Also few local factors which initiate disease are

-Local trauma,

-Periuretheral urine leak.

-Perineal surgery,

-Paraphimosis.

Its incidence is maximum in middle and old age but can be seen in young age also.

Fournier's gangrene involves scrotum, perineum, thighs, inguinal areas, abdominal wall, and chest wall up to axilla.

Presentation

-Pain involving perineum,

-Scrotal and perineal edema,

-Erythema and crepitation

-Rapidly spreading cellulitis of scrotal, penile and perineal skin up to anterior abdominal wall .

-Pyrexia with other signs of sepsis.

Pathogenesis

Infection progresses and spread in potential space between superficial and deep fascia but spread is limited by attachment of these fascias. Disease involves structures present in this potential space like Inferior epigastric artey, Deep circumflex iliac artery and External pudendal artery which lie in campers fascia. Localized infection adjacent to a portal of entry is the inciting event in the development. Ultimately an obliterative endarteritis develops and the ensuing cutaneous and subcutaneous vascular necrosis leads to localized ischemia with tissue and fascial destruction at rate as high as 2-3 cm/hr. and further bacterial proliferation leading to sepsis.

There seems to be various factors which affect outcome in these patients and also few studies have done for this disease in which mortality rates varies from 5-20% enhance we studied patients of Fournier's gangrene admitted in our hospital for same purpose to asses factors affecting outcome and mortality rate in our hospital.

Material and Method

Patients admitted in surgical ward from September 2014 to September 2015 along with available documents of patients who were treated in last 10 years in our facility were studied. The variables studied were

- Age,

- Haemoglobin,

-Haematocrit,

- TLC,

-Duration between start of illness and presentation,

-Random blood sugar at presentation,

-Associated comorbidities,

-Serum sodium,

-Serum potassium,

-Serum bicarbonate,

-Serum creatinine,

-Blood urea,

-Pulse rate,

-Respiratory rate,

-BP with h/o hypertension,

-Area involved at presentation,

-Fever during stay,

-H/o of blood transfusion,

-Pus culture & antibiotics given.

Patients admitted during study period underwent extensive debridement of involved necrotic tissue at earliest and empirically given combination of antibiotics covering gram positive, negative and anaerobes and subsequently changed after culture and sensitivity results. Some patients needed multiple debridement while single patient also required diversion colostomy.

Data of patients who were treated previously in facility was collected and analysed from records including demographic, disease and treatment.

Two ends of study are kept i.e. survivors and non survivors groups. Various risk factors were compared in survivor and non-survivor group by using statistical methods. The data was compiled and entered in the Microsoft excel sheet. It was analysed using statistical software SPSS IBM (Chicago) version 21. The data was represented in tables and charts. The frequency was displayed of all variables and mean and standard deviation was calculated for quantitative variables.

Unpaired student t test was applied for comparing means of quantitative data and chi square test was applied for qualitative data.

The test was considered significant if $p<0.05$, at 95% confidence limit.

Results

During the study period total of 85 patients were included and their data collected. Among these 85 patients 11 were excluded from study as they took incomplete treatment. Hence finally total of 74 patients were included in study.

Baseline characteristics of both groups are shown in table form.

The most common age group involved was between 40 and 70 years ie middle age group were more susceptible,

All patients found were males.

It was found that if disease occur in early age group it has more aggressive course with extensive involvement.

Patients belonging to higher age group i.e. above 45 years had poor outcome.

Mean haemoglobin and haematocrit values were found lower in case of non survivors group compared to survivors but p value in study does not came out to be significant.

Mean TLC value of survivors was lower than non survivors i.e. in non survivors mean TLC values came out to be >15000/cu mm but again p value does not came out to be significant.

High blood sugar with uncontrolled diabetes was found as predisposing factor and high Random blood sugar at time of admission warrants poor outcome also p value came out to be significant.

Among associated comorbidities Diabetes was most common while others were long standing hydrocele, paraplegia either traumatic or due to CVA, urinary fistulas, rectal prolapse but they cannot be used as predictor of outcome.

High blood urea and high creatinine i.e. presence of renal failure had poor outcome and p value came out to be significant in study.

Electrolyte imbalance at the time of admission predicts poor outcome also p value came out to be significant.

Debridement and other surgeries were carried out in both groups with equal frequency.

E.coli was found to be most common organism in pus culture.

Elective use of more than one antibiotic covering whole spectrum of aerobic and anaerobic organism preferably broad spectrum is done and gives good outcome.

The overall mortality came out to be 5.4%.

S.NO	Parameter	Mean Value In Survivors	Mean Value In Non Survivors	Normal range	Range in study patients	Z	Significance
1	Age	50.70	56.25	NA	20-70 years	0.48	Not Significant
2	Duration Between Start Of Illness And Presentation	12.59	12.50	NA	1-15days	0.99	Not Significant
3	Haematocrit	31.73	25.75	37-47%	16.5-50.1	0.25	Not Significant
4	Haemoglobin	10.30	9.25	11.5-16.5gm/dl	2.5-16.6	0.44	Not Significant
5	Total Leucocyte Count	13128	16050	3000-11000cells/cumm	4200-35200	0.41	Not Significant
6	Random Blood Sugar	121.57	205.57	80-140mg/dl	61-419	.034	Significant
7	Serum Creatinine	1.20	2.75	0.5-1.4mg/dl	0.65-3.81	<.001	Significant
8	Serum Sodium	140.54	134.50	135-155mmol/lt	133-150	.001	Significant
9	Serum Potassium	4.16	5.50	3.8-5.0mmol/lt	3.5-5.6		
10	Blood Urea	50.81	80.75	<40meq/dl	18.7-137	.022	Significant
11	SHOCK(With BP Recording)	Less Common	More Common	Systolic bp>100mmhg	60 mm hg systolic-160/100mmhg	+/-	Significant
12	Area Involved At Presentation	Scrotum	Scrotum With Abdominal Wall And Thigh	NA	NA		Significant
13	Fever During Stay	94.3%	5.7%	NA	NA	0.63	Not Significant
14	Debridement Surgery	Done In 100% pts	Done In 100% pts	NA	NA		Difference Could Not Be Found

FOURNIERS GANGRENE-PRE OP PIC

Discussion

Fournier's gangrene is a rapidly progressing necrotising fasciitis of unknown aetiology. Outcome in these cases varies from 4-80% and depends on various factors which involve both patients' part and treatment part. Among patient part middle age, predisposing factors like DM with high blood sugar level, renal dysfunction, Electrolyte imbalance and in treatment side early initiation of treatment, extensive debridement with antibiotic coverage using more than one antibiotics. Aggressive management of blood sugar level, electrolytes and renal function monitoring and management can improve survival.

Hari gopal Vyas et al[1] concluded that Age>55years, higher the extent of area involved, Presence of septic shock at admission, TLC>15000/cu mm, visual analogue scale score>7 and FGSI score at admission>8 were significantly associated with higher mortality.

David Kearney[2] found disease to be more common in old age and associated with comorbidities like immunosuppression, diabetes and alcoholism. Most common source of infection was genital and perineal infection. And disease is polymicrobial.

Feyzullah ersoz et al[3] concluded that despite aggressive intervention such as multiple debridement, combination antibiotics therapy and various type of supportive treatment disease continue to have higher mortality. They also concluded that presence of chronic renal failure and high TLC at first presentation were influencing mortality whereas age, gender were not and neither DM even though it was leading predisposing factor.

Bulent Erol et al done study in 18 pts with Fournier's gangrene treated and followed up. There clinical data were collected in terms of medical history, symptoms and physical examination, the biochemical, hematologic and bacteriologic study results at admission and at the final evaluation. The physical examination findings, the timing and extent of surgical debridement, and the antibiotic therapy was also recorded, the Charlson comorbidity index (CCI) and FGSI were also evaluated stratified by survival. individual laboratory parameters such as hypomagnesaemia low haemoglobin and haematocrit, high alkaline phosphatase, creatinine and heart and respiratory rate were associated with worse prognosis.in addition a FGSI>9, rectal involvement, colostomy diversion and high CCI score were associated with high mortality. They concluded that low magnesium levels might be a new prognostic marker for worse prognosis. High CCI and FGSI score might be associated with poor prognosis a FGSI threshold of 9was predictor of mortality during their assessment.

Adriano Antonio Mehl et alanalysing gender, age, predisposing factors. aetiology, lesion, location ,laboratory test, surgical procedure, antibiotic use and hyperbaric oxygen therapy and concluded that most common source of infection was Ano-rectal origin while most common etiological agent was E.coli, the most important predisposing factor was DIABETES. Majority of patients were male. All underwent surgical debridement, 17 underwent colostomy and 2 with associated cystostomy. All patients received antibiotics and usually more than 1 antibiotics were given most common being metronidazole and gentamicin.20 pts underwent hyperbaric therapy. Despite the overall mortality came out to be 20%.

Conclusion

In patients with Fournier's gangrene on study of all parameters included it was found that these few alterations in serum values affect outcome in these patients. Among all studied parameters it was found that High Random blood sugar i.e. uncontrolled diabetes, Low Serum Sodium conc., High Serum Potassium conc. i.e. Electrolyte imbalance, High Blood urea and High Serum creatinine i.e. altered renal function at time of presentation predicts poor outcome.

Also in patients with disease need extensive debridement with removal of all necrotic tissue at earliest with few patients may need second look or third look surgery or a serial debridement to get

rid of pus and dead tissue. Early approach to surgical facility with proper debridement and empirical initiation of antibiotic therapy covering gram +ve, gram-ve and anaerobic coverage should be done followed by culture/sensitivity of pus and shifting to specific antibiotics. Diabetes control along with close monitoring of electrolytes and renal function should be done with intervention if needed.

So the patients in whom these parameters are deranged should be monitored closely and managed aggressively.

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