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review

Fournier's gangrene secondary to locally advanced prostate cancer: case report and review of the Literature

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SUMMARY: **Fournier's gangrene secondary to locally advanced prostate cancer: case report and review of the Literature.**

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Fournier's gangrene is a rare and potentially lethal condition. Previously described as an idiopathic process, this necrotising fasciitis is secondary to infection and in 95% of cases the cause arises from ano-rectum (30-50%), uro-genitalia (20-40%) or genital skin (20%). Cancer could lead to a Fournier's gangrene thanks a compromised host immunity condition. In the past the rate of death was high ranging from 20% to 80%, while currently mortality is decreasing to 10%. We report a case of a 76-years-old man with Fournier's Gangrene due to locally advanced prostate cancer. The multimodal therapeutic management included broad-spectrum antibiotic therapy, intravenous fluid resuscitation and surgical debridement that was delayed by the will of the patient. To our knowledge, this is the first case of Fournier's gangrene caused by prostate cancer without common predisposing factors. In order to improve the knowledge about this rare disease, we performed a narrative review of the literature.

KEY WORDS: Fournier's gangrene - Necrotising fasciitis - Prostate cancer - Pelvic mass.

Introduction

Fournier's gangrene (FG) is a rare and potentially lethal condition with an incidence of 1.6 for 100.000 males/year (1). Factors predisposing to the development of this necrotising fasciitis are oldness, diabetes, alcohol and tobacco consumption, obesity, cardiovascular diseases, human immunodeficiency syndrome (HIV), kidney failure, perianal abscess, anal fissures, diverticulitis, urinary calculi, genitalia ulceration, poor perineal hygiene and cancer (2, 3). A prompt multimodal approach including broad-spectrum antibiotic therapy, intravenous fluid resuscitation, surgically approach and successive wound cares is mandatory (4). The surgical debridement must be performed early, if possible within a few hours from hospital intake: this helps to stop the necrotising fasciitis progression and reduces the risk of death (5). We describe an unusual case of FG secondary to locally advanced prostate cancer in order to improve the knowledge concerning this rare disease. We also performed a narrative review of the literature.

Material and methods

We performed a narrative review of the literature by searching "*Fournier's gangrene*", "*necrotising fasciitis*" on PubMed and Scopus. Case reports, case series, and studies were chosen and used to extract data on many cases, gender, age, pathogens, number of surgical debridement performed, length of hospital stay, number of intensive unit care hospitalisation, number of death. Three authors (AP, SC, GF) independently performed online bibliographic searches to identify titles and abstracts of interest (Table 1).

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TABLE 1 - CASES OF FOURNIER'S GANGRENE, REVIEW OF THE LITERATURE.

Reference	Year	Gender	N. of cases	Mean age	Surgical debridement	Days of hospital stay	Sepsi / ICU	Hyperbaric oxygen therapy	Pathogen	N. of death
Hahn et al. (22)	2018	33M 11F	44	54.4	3.3	47	18	ND	Polymicrobial flora (Escherichia coli, Enterococcus, Staphylococcus, Klebsiella) (7), Monomicrobial flora (Staphylococcus, Escherichia coli, Klebsiella, Streptococcus, Enterococcus, Candida) (22)	9
Overholt et al. (23)	2018	M	1	44	2	13	0	0	Escherichia coli, Enterococcus avium, Gemella morbillorum	0
Pehlivanli et al. (24)	2018	19M 4F	23	65.9	6	18	ND	ND	Escherichia coli, Klebsiella, Staphylococci, Enterobacter	5
Kranz et al. (25)	2018	154M	154	62.7	4.2	26.6	104	13	mixed flora (73), Streptococci (12), Staphylococci (10), Enterococcus (10), Citrobacter (1), Pseudomonas (1), Candida (2)	17
Kobayashi et al. (26)	2018	M	1	68	1	59	1	0	Escherichia coli	0
Pandey et al. (27)	2018	M	1	65	1	ND	ND	ND	ND	ND
Matsuura et al. (28)	2018	M	1	88	ND	ND	ND	0	ND	1
Sen et al. (29)	2018	M	1	47	1	18	0	0	Rhizobium radiobacter	0
Elsaket et al. (30)	2018	43M 1F	44	51	1.33	26	6	ND	Staphylococcus aureus, Acinetobacter, Streptococcus pyogenes, Proteus mirabilis,	5
Heijkoop et al. (31)	2018	ND	14	ND	6	36	8	0	ND	1
Takano et al. (32)	2018	F	1	44	1	ND	ND	0	Streptococcus constellatus, Clostridium ramosum	1
Semenič et al. (33)	2018	M	1	30	2	16	1	0	Escherichia coli, Bacteroides fragilis, Prevotella oralis, Streptococcus anginosus	0
Abbas-Shereef et al. (8)	2018	M	1	71	>1	30	1	0	Pseudomonas aeruginosa, Klebsiella pneumoniae, Candida albicans, Staphylococci, Group A Streptococcus	0

To be continued

Continued from Table 1

Wetterauer et al. (34)	2018	20M	20	66	4	ND	15	0	Escherichia coli, Klebsiella, Pseudomonas aeruginosa	3
Demir et al. (35)	2018	49M 25F	74	57.6	1.87	23.18	ND	ND	Escherichia coli, Staphylococcus aureus, Streptococci, Enterobacter, Pseudomonas aeruginosa, Bacteroides, Proteus, Clostridium	6
Chen et al. (36)	2018	M	1	29	2	11	1	0	Streptococcus Agalactiae, Staphylococcus haemolyticus, Escherichia coli, peptostreptococci, Prevotella corporis	0
Yuan et al. (37)	2018	M	1	62	1	ND	1	ND	Enterococcus avium, Escherichia coli	ND
Katsimantas et al. (38)	2018	M	1	68	2	17	0	0	Enterococcus faecalis, Streptococcus gordonii, Prevotella melaninogenica	0
Althunayyan et al. (39)	2018	F	1	36	2	31	1	0	Escherichia coli, Acinetobacter baumannii	0
Pittaka et al. (40)	2018	F	1	24	>1	14	ND	ND	ND	0
Taylor et al. (41)	2018	F	1	58	1	ND	1	ND	Bacteroides fragilis, Clostridium ramosum, Gram positive cocci	1
Dos Santos et al. (10)	2018	29M 11F	40	51.7	1.8	19.6	9	ND	ND	9
Fukui et al. (42)	2018	M	1	85	1	104	1	0	Streptococcus dysgalactiae, Escherichia coli, Staphylococci	0
Kuzaka et al. (43)	2018	13M	13	59.6	>1	31.9	0	ND	Enterobacteriaceae, Bacteroides, Parabacteroides, Klebsiella, Staphylococcus, Lactobacillus acidophilus, Escherichia coli	0
Goel et al. (44)	2018	M	1	60	1	14	0	0	ND	0
Ghodoussipour et al. (45)	2018	54M	54	49.3	3.9	37.5	53	ND	ND	3
Tenório et al. (46)	2018	99 M, 25F	124	50.8	ND	21.7	ND	1	Escherichia coli, Proteus, Klebsiella, Pseudomonas, Staphylococci, Enterococcus, Clostridium	32

To be continued

Continued from Table 1

Weimer et al. (47)	2017	M	1	55	>1	90	1	0	Parabacteroides distasonis, Prevotella melaninogenica, Fusobacterium nucleatum, Bacteroides	0
Wähmann et al. (48)	2017	F	1	46	3	ND	1	ND	Streptococci, Enterobacteria, gram+	0
Wang et al. (49)	2017	M	1	61	1	ND	ND	ND	Klebsiella pneumoniae	0
Yücel et al. (50)	2017	11M, 14F	25	54.3	2.4	21.4	ND	0	ND	1
Üreyen et al. (51)	2017	18M, 11F	29	51.5	1.8	11.5	17	ND	Escherichia coli, Acinetobacter, Streptococci, Staphylococcus aureus, Pseudomonas, Klebsiella,	6
Dell'Atti et al. (52)	2017	M	1	75	1	28	1	0	ND	0
Yanaral et al. (53)	2017	54M	54	58.3	1.4	15.3	ND	0	ND	4
Chia et al. (12)	2017	42M, 17F	59	56	>1	19	11	ND	Streptococci, Escherichia coli, Prevotella	9
Kordahi et al. (54)	2017	M	1	57	>1	ND	ND	ND	ND	ND
Hong et al. (55)	2017	18M, 2F	20	61.8	1.55	36.9	15	0	Escherichia coli, Streptococci, Proteus, Klebsiella pneumoniae, Enterococcus faecium, Pseudomonas aeruginosa, Staphylococcus aureus	5
Sanders et al. (56)	2017	M	1	70	2	ND	1	0	Escherichia coli, P. mirabilis	0
Ferretti et al. (57)	2017	19M, 1F	20	56	4	31.7	17	4	ND	3
Kumar et al. (58)	2017	M	1	41	2	15	1	0	Streptococcus anginosus, anaerobes, Gram -	0
Ioannidis et al. (59)	2017	20M, 4F	24	58.9	1	16	18	3	Escherichia coli (11), Klebsiella pneumoniae (3), Pseudomonas aeruginosa (3), Acinetobacter baumannii (2), Proteus mirabilis (2), Providencia stuartii (1)	5
Bocchiotti et al. (60)	2017	M	1	40	3	ND	0	0	Escherichia coli, Streptococcus pyogenes, Prevotella loescheii	0
Choi et al. (61)	2017	F	1	31	1	17	0	0	Streptococcus anginosus, Pseudomonas, Clostridium	0

To be continued

Continued from Table 1

Sawayama et al. (62)	2017	M	1	66	1	ND	0	0	ND	0
Laureman et al. (63)	2017	125M, 43F	168	ND	>1	ND	92	0	Enterococcus faecalis, Klebsiella pneumoniae, Escherichia coli, Clostridium difficile	6
Smith et al. (64)	2017	M	1	50	>1	ND	1	0	ND	0
Baek et al. (65)	2017	F	1	57	1	ND	1	ND	ND	0
Huang (66)	2017	M	1	46	1	ND	1	0	ND	0
Morais et al. (67)	2017	12M, 3F	15	70	ND	32	ND	0	Escherichia coli, Proteus, Staphylococcus aureus, Enterococcus faecalis	4
Okumura et al. (68)	2017	M	1	70	1	39	1	0	Klebsiella pneumoniae, Group G Streptococcus	0
Osbun et al. (21)	2017	ND	165	53.4	1.97	16.6	43	ND	ND	11
Kahn et al. (69)	2017	M	147	52	2.5	19	112	ND	ND	11
Misiakos et al. (70)	2017	47M, 15F	62	63.7	4.8	19.7	32	0	ND	11
Obi (71)	2017	4M	4	34.3	1	17.3	0	0	Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa, Proteus mirabilis	0
Pernetti et al. (72)	2016	M	1	70	1	21	1	ND	ND	0
Faria et al. (73)	2016	M	1	46	1	4	1	0	ND	0
Ozkan et al. (70, 74)	2016	7M, 5F	12	62.4	5.7	19.6	ND	0	Polymicrobial flora (6), monomicrobica (6)	0
Yoshino et al. (75)	2016	M	1	64	1	33	1	0	Streptococcus. alpha-emolitico	0
Crowell et al. (76)	2016	M	1	54	3	18	1	0	Rhizopus (zygomycosis)	1
Taken et al. (77)	2016	57M, 8F	65	52.5	2.5	9.2	13	0	Escherichia coli, Streptococcus, Staphylococcus aureus, Enterobacter, Bacteroides, Pseudomonas aeruginosa, Proteus, Clostridium	6
Wanis et al. (78)	2016	M	1	28	1	14	1	0	ND	0
Sheehy et al. (79)	2016	M	1	48	2	ND	1	0	Polymicrobial flora	0

To be continued

Continued from Table 1

Sarkut et al. (80)	2016	32M, 32F	64	57	3	16.6	ND	ND	ND	18
Sinha et al. (81)	2015	F	1	30	1	ND	1			0
Marín et al. (82)	2015	53M, 6F	59	68	ND	24.4	50	ND	ND	15
Chalya et al. (83)	2015	82M, 2F	84	34	ND	28	ND	ND		24
Namkoong et al. (84)	2015	M	1	61	1	ND	1	0	ND	0
Schulz et al. (85)	2015	M	1	59	>1	ND	1	0	ND	0
McCormack et al. (86)	2015	25M	25	56.6	1.4	ND	3	ND	Polymicrobial flora	5
Tarchouli et al. (87)	2015	64M, 8F	72	51	3.2	28.7	17	56	Polymicrobial flora (37), Monomicrobial flora (1)	12
Paonam et al. (88)	2015	M	1	65	1	ND	1	0	Escherichia coli, Enterococcus	0
Oguz et al. (89)	2015	34M, 9F	43	52	>1	ND	43	0	Polymicrobial flora (Escherichia coli 48%)	6
Asahata et al. (90)	2015	M	1	70	1	ND	0	0	Listeria monocytogenes, Escherichia coli	0
Ye et al. (91)	2015	M	1	47	1	21	0	0	Pseudomonas aeruginosa	0
Danesh et al. (92)	2015	8M	8	44	>1	ND	ND	0	Enterococcus, Pseudomonas, Staphylococcus haemolyticus, Proteus, Clostridium	3
Ossibi et al. (93)	2015	M	1	60	1	ND	0	0	ND	0
Mahmoudi et al. (94)	2015	M	1	44	1	ND	1	0	ND	0
Cochetti et al. (4)	2015	2M	2	42.5	0.5	ND	2	1	Staphylococcus warneri	1
Sarmah et al. (95)	2015	M	1	68	1	1	1	0	Bacteroides fragilis	1
Papadimitriou et al. (96)	2015	M	1	56	1	90	1	0	Polymicrobial flora	0
Ozsaker et al. (97)	2015	M	1	69	1	ND	0	0	ND	0
García Marín et al. (98)	2015	53M, 6F	59	68	ND	ND	18	0	ND	15
Toh et al. (99)	2014	M	1	61	6	ND	1	0	Polymicrobial flora	0
Parry et al. (100)	2014	M	1	48	1	ND	0	0	ND	0

To be continued

Continued from Table 1

Tena et al. (101)	2014	M	1	73	1	55	1	0	Actinomyces funkei, Clostridium hathewayi, Fusobacterium necrophorum	0
Matilsky et al. (102)	2014	M	1	51	4	30	1	0	Polymicrobial flora	0
Lee et al. (103)	2014	3M	3	50.7	ND	ND	ND	ND	ND	ND
Di Serafino et al. (104)	2014	M	1	63	1	ND	ND	ND	ND	0
Galukande et al. (105)	2014	2M	2	35.5	2.5	ND	0	0	ND	0
Tattersall et al. (106)	2014	M	1	61	2	47	1	ND	Escherichia coli	0
Omisanjo et al. (107)	2014	11M	11	51.9	>1	22.7	7	0	Klebsiella (10), Escherichia coli, Pseudomonas aeruginosa, no microbes (1)	0
Rubegni et al. (108)	2014	2M	2	58.5	1	ND	0.5	0	ND	1
Dinc et al. (109)	2014	M	1	51	>1	16	0	0	ND	0
Dayan et al. (110)	2014	M	1	27	>1	ND	0	0	ND	0
Ludolph et al. (111)	2014	3M	3	48.7	>1	ND	0	0	ND	0
Ozkan et al. (112)	2014	7M, 5 F	12	62.4	5.7	19.6	ND	0	Pseudomonas, Acinetobacter, Escherichia coli, Enterococcus, Stafilococcus aureus, Proteus, Corynebacterium, Polymicrobial flora (6)	ND
Shimizu et al. (113)	2014	M	1	74	2	ND	0	0	Proteus vulgaris, Prevotella denticola, Peptostreptococcus species	ND
Ho et al. (114)	2014	F	1	78	1	14	0	0	ND	1
Aslanidis et al. (115)	2014	F	1	23	>1	ND	1	0	Candida albicans, Staphylococcus epidermidis, Klebsiella pneumoniae	0
D'Arena et al. (116)	2014	M	1	66	1	ND	0	0	ND	0
Perkins et al. (117)	2014	M	1	73	1	ND	0	0	Candida albicans	0
Sliwinski et al. (118)	2014	M	1	24	>1	ND	1	0	ND	0
Agostini et al. (7)	2014	M	1	64	2	58	1	1	Staphylococcus epidermidis, Proteus mirabilis, Enterococcus faecalis	0

To be continued

Continued from Table 1

Oymaci et al. (119)	2014	10M, 6F	16	61.2	4.44	25.5	ND	0	Escherichia coli, Acinetobacter baumannii, Proteus mirabilis, Staphylococcus aureus, Enterococcus	3
Eskitascioglu et al. (120)	2014	76M, 4F	80	53.5	1.55	34.78	ND	0	Polymicrobial flora (14), Escherichia coli, Staphylococcus aureus, Enterococcus, Acinetobacter baumanii, Staphylococcus epidermidis, Proteus, etc.	3
Yilmazlar et al. (121)	2014	81M, 39F	120	58	3	14.5	48	0	Escherichia coli, Streptococci, Enterococci, Staphylococci, Klebsiella, Pseudomonas, Proteus, fungi	25
Akbulut et al. (122)	2014	M	1	77	1	20	0	0	Escherichia coli	0
Coyne et al. (123)	2014	M	1	48	1	ND	0	0	ND	0
Li et al. (124)	2014	48M, 3 F	51	49.7	>1	17	ND	0	Escherichia coli, Streptococcus, Staphylococcus aureus, Pseudomonas, Proteus, Clostridium, Bacteroides	6
Oyaert et al. (125)	2014	M	1	43	1	63	1	0	Atopobium	0
Lee et al. (126)	2013	M	1	47	>1	ND	0	0	Enterococcus, Enterobacter	0
Abate et al. (127)	2013	M	1	63	1	21	0	0	Enterococcus faecalis, Citrobacter freundii, Pseudomonas aeruginosa, Escherichia coli, Bacteroides fragilis, Bacteroides ovatus	0
Anantha et al. (128)	2013	M	1	59	1	16	1	0	Streptococcus anginosus	0
Benjelloun et al. (9)	2013	44M, 6F	50	48	2.5	21	11	0	Escherichia coli, Klebsiella	12
Pastore et al. (13)	2013	M	1	60	>1	34	0	1	Streptococcus A	0
Eray et al. (129)	2013	34M, 14F	48	53.7	ND	25.3	ND	0	ND	9
Bjurlin et al. (130)	2013	40M, 1F	41	49	ND	ND	ND	ND	Polymicrobial flora (34), Bacteroides (43.9%), Escherichia coli (36.6%), Prevotella, Streptococci, Staphylococcus aureus	2
Park et al. (131)	2013	M	1	59	>1	ND	0	0	ND	0

To be continued

Continued from Table 1

Subramaniam et al. (132)	2013	M	1	80	3	ND	1	0	Escherichia coli, Anaerobes	0
Sabzi Sarvestani et al. (133)	2013	28M	28	44.6	2.2	17.22	ND	0	Escherichia coli, Bacteroides, Streptococci, Enterococci, Staphylococci, Pseudomonas, Klebsiella, Proteus	10
Katib et al. (134)	2013	20M	20	55.95	1.7	22.3	1	0	Acinetobacter spp. (most common)	0
Czymek et al. (135)	2013	72M, 14F	86	57.9	4	52	52	ND	Polymicrobial flora (71), Escherichia coli, Enterococci, Streptococci, Pseudomonas, Staphylococci, etc.	14
Akilov et al. (136)	2013	28M	28	47.1	3.5	24.4	8	0	Monomicrobial flora (18), Staphylococci, Streptococci, Enterobacter, Pseudomonas	0
Bakari et al. (137)	2013	10M	10	50.5	ND	ND	ND	0	ND	ND
Avakoudjo et al. (138)	2013	ND	72	ND	ND	72	ND	ND	Escherichia coli, Staphylococci, Pseudomonas aeruginosa, Klebsiella	7
Chan et al. (139)	2013	M	1	78	1	ND	1	0	Escherichia coli	0
Chan et al. (140)	2013	M	1	49	15	ND	0	0	Escherichia coli, Streptococci, Arcanobacterium	0
Aliyu et al. (141)	2013	43M	43	37.82	>1	28	ND	0	Polymicrobial flora (27)	6
Ozkan et al. (142)	2013	F	1	43	4	ND	1	0	ND	0
Khan et al. (143)	2013	M	1	47	3	ND	1	0	ND	0
Vyas et al. (144)	2013	30M	30	39.6	2.2	9.7	ND	0	Escherichia coli, anaerobes, Streptococci, Pseudomonas, Staphylococci	6

ND = not defined
ICU = intensive care unit

Case report

A 76 years old man with oedema and dyschromia of scrotum, penis and perineal region was admitted to our Emergency Department. At the hospital intake, he did not complain about any other signs, symptoms or fever. The blood exams revealed leukocytosis with white blood cell counts of 15 000 per microliter, hemoglobin 14,1 g/dl, urea nitrogen 49 mg/dl, creatinine 1,5 mg/dl, sodium 142 mEq/L, potassium 3,4 mEq/L, C-reactive protein 10,6 mg/L, procalcitonin 0,19 ng/ml. Intravenous fluid resuscitation and broad-spectrum antibiotics such as Piperacillin/Tazobactam (4,5 gr intravenous every 8 hours) and Metronidazole (500 mg intravenous every 8 hours) were administered. Ultrasound exam revealed a thickened, edematous scrotal wall containing hyperechoic foci. Computed Tomography (CT) was performed and it revealed a huge pelvic mass, that seemed to arise from prostate. A Magnetic Resonance Imaging (MRI) confirmed pelvic mass arising from prostate and involving sigmoid and rectal tract. The dosage of serum PSA level was 22.8 ng/ml. A quick evolution of the skin in necrosis led to the clinical diagnosis of FG and at 6 hours from the intake a prompt surgical treatment was proposed to the patient, who at first refused (Figure 1). Charlson Comorbidity Index and Fournier's Gangrene Severity Index (FGSI) were 8 and 7, respectively. After 84 hours from the hospitalization, a deterioration of clinical conditions occurred and the patient consented to the operation. Surgical debridement of genitalia and perineal region and the removal of necrotic left testis and spermatic cord were performed (Figure 2). Twenty-four hours after surgery the patient was discharged to a tertiary hospital centre to perform hyperbaric oxygen therapy. Unfortunately, he could not complete the treatment because claustrophobic and came back to our institution. We treated the wound with hydrogen peroxide, sodium hypochlorite, sterile gauze, iodoform gauze and paraffin gauze until the 34th postoperative day. On 18th postoperative day, the antibiotic therapy was switched to Daptomycin, Amikacin and Levofloxacin because a microbiology culture of the surgical wound was positive for Pseudomonas putida, Stenotrophomonas mal-

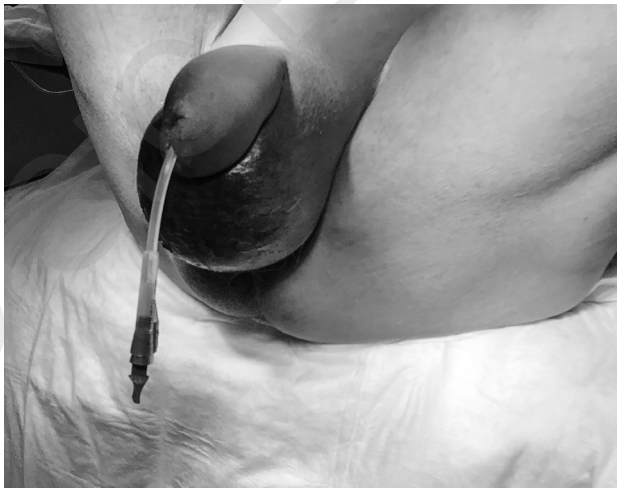

Figure 1 - Clinical situation at time of operative theatre.

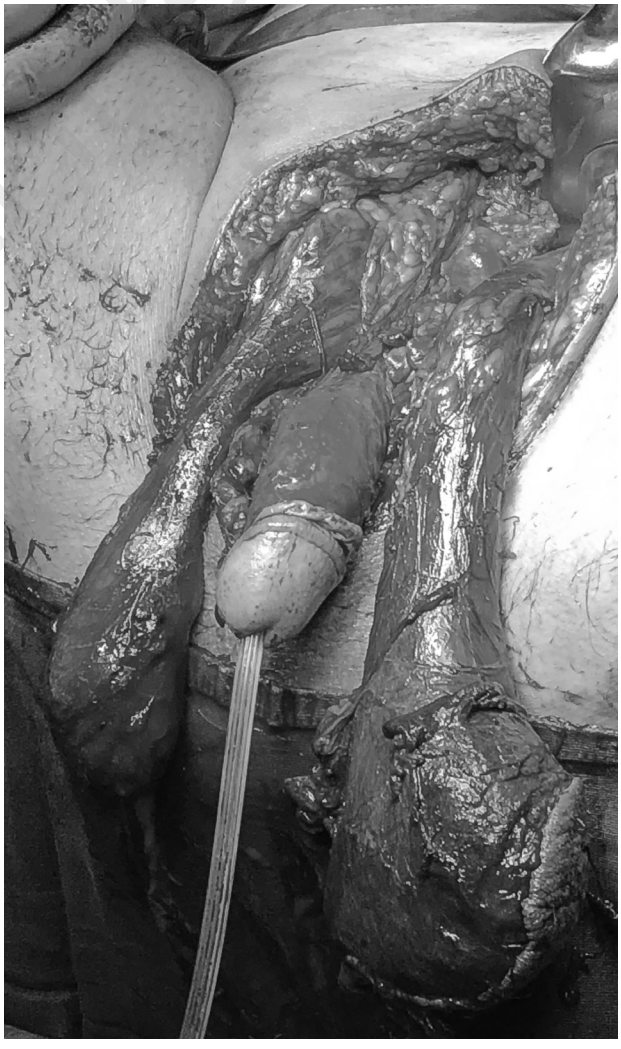

Figure 2 - Intraoperative field.

tophilia, Staphylococcus haemolyticus and Staphylococcus Warneri. On the 27th postoperative day, after performing a colonoscopy that excluded primary colon neoplasm, a trans-perineal biopsy of prostate and pelvic mass was performed and the histologic exam detected prostatic adenocarcinoma Gleason Score 6. After five weeks from hospitalisation, the right testis was placed in a contralateral inguinal pouch (Figure 3) and androgen deprivation therapy (ADT) was started. After six months follow-up, the patient is in good condition, PSA level and testosterone are 1.2 ng/dl and 0,1 ng/dl, respectively (Figure 4).

Discussion

FG is necrotising fasciitis characterised by progressive necrosis of the skin, subcutaneous tissues, and fascia caused by infection. The males-females ratio is 10:1. Data reported in Literature concerning the most involved age are discordant. Rodriguez et al. reported the decade between 60s-70s (6), Agostini et al. the 40s-50s (7), while from our revision the mean age of onset appears to range from 50 to 60 years with a mean age of 54 years. In our case, the patient was 76 years old.

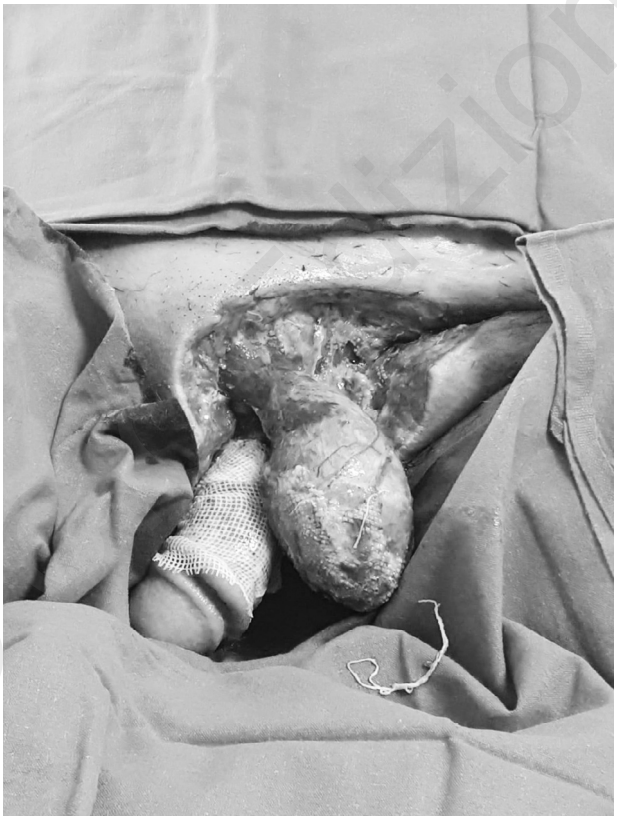

Figure 3 - Clinical condition before reconstructive surgery.

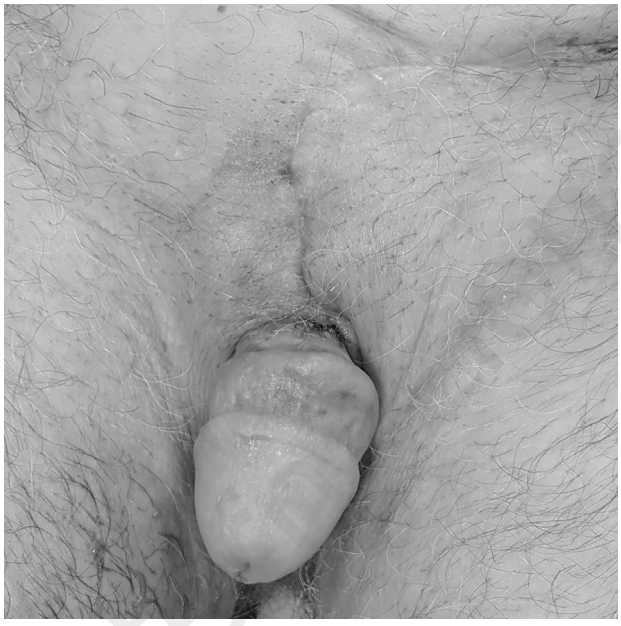

Figure 4 - Clinical status at patient discharge.

Typically, at the diagnosis signs and symptoms are fever, pain, tenderness, erythema of the involved area which put this severe condition in differential diagnosis with scrotal cellulitis, acute orchi-eididimitys, inguino-scrotal strangulated hernia, testicular torsion, abscess, hematoma, vasculitis, polyarteritis nodosum (3, 7, 9). In our case, the patient showed only scrotal and perineal oedema and dyschromia.

Previously described as an idiopathic process, this necrotising fasciitis is secondary to infection, and in 95% of cases the cause is identifiable (9). Usually, the primary site of infection is ano-rectum (30-50%), uro-genitalia (20-40%) or genital skin (20%) (3). Commonly, the infection is due to polymicrobial flora and it led to an obliterating endarteritis with subsequent thrombosis of subcutaneous vessels and ischemia causing necrosis (10). Both aerobic and anaerobic usually involved bacteria are not aggressive when alone, but in FG they develop a synergism resulting in the production of various exotoxins and enzymes (11). Nevertheless, multi-drug-resistant organisms are present in 20% of cases as reported by Chia et al. (12).

In our case, according to MRI imaging, the

necrotising fasciitis seemed to be related to prostate cancer involving sigmoid and rectal tract. For this reason, we performed a transperineal biopsy that revealed a Gleason Score 6 prostate cancer. To our knowledge, this is the first case of FG due to locally advanced prostate cancer. In literature, only Paonam et al. reported a case of FG in patient affected by metastatic prostate cancer, but the necrotising fasciitis was related to the presence of the catheter that caused a periurethral abscess with penile necrosis and gangrene of scrotum extending to suprapubic region. In our case, there were no common predisposing factors, and we feel that prostatic cancer caused a compromised host immunity that is a frequent predisposing factor to FG. Diabetes, alcoholism, human immunodeficiency syndrome (HIV), lymphoproliferative diseases, arterial hypertension, renal and hepatic failure, obesity, dementia, tobacco consumption, chronic steroid abuse, cancer, chemo and radiotherapy and surgical treatment, are all conditions linked to FG (13-20).

In the last decades, the mortality related to FG decreased from 20%-80% to 10% (21). In our review of the literature, mortality is about 15% and it depends on the timing of surgical treatment. For this reason, it becomes clear that prompt intervention is mandatory. The management is compound of fluid resuscitation, board-spectrum antibiotics and surgical debridement (4). In our case, when we proposed the surgical treatment to the patient, the left testis was still in good condition with normal ultrasound vascular signs. Conversely, during intervention we found a necrotic testis and we should perform an orchiectomy. Often more than one surgical debridement is needed as reported in the Table.

The management of subsequent wound care include either Vacuum Assisted Closure (VAC) and Hyperbaric oxygen therapy (HBOT). VAC reduces oedema of the tissues, increases blood flow and thereby promotes healing and debridement (3). HBOT has bactericide and bacteriostatic effects in particular on anaerobic pathogens, it also improves bacterial lysis by leukocytes, stimulates collagen formation and superoxide dismutase with tissue survival (11, 14). In the reported case the patient stopped HBOT because he was affected by claustrophobia. Plastic surgeons treated the wound with hydrogen peroxide, sodium hypochlorite, sterile gauze, iodoform gauze and paraffin gauze until an excellent reduction of wound margins. Finally, they placed the right testis in a contralateral inguinal pouch and closed the skin.

Conclusion

To our knowledge, we reported the first case in the Literature of FG secondary to locally advanced prostate cancer without common predisposing factors. Our case highlights that compromised host immunity related to cancer is a main factor leading to FG.

Abbreviations

FG, Fournier's gangrene; CT, computed tomography; MRI, magnetic resonance imaging; VAC, vacuum-assisted closure; HBOT, hyperbaric oxygen therapy.

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