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Obstructive lower urinary tract symptoms (LUTS) as the initial presentation of penile paraffinoma: a case report and literature review

Annex 1: studies reporting on penile paraffinoma cases

Author, year	Number	Nationality	Age, mean (range), years	Substance /Injected by	Purpose	Latent phase	Clinical Presentation	Common Sites involved	Management (C/Surg.)	Procedure	Treatment outcome
Svensøy et al., 2017 ⁴	680	Thai and Burmese ^	32 (17-68)	Mineral oil/ S	Penile augmentation	Within 1 year to more than 4 years	Penile pain (intermittent pain, pain during erection, and chronic pain) (571), Swelling (561), Induration (292), Severe induration (292), Purulent	Penis	Surg. (507), C (173)	Complete excision followed by a STSG from the anterior thigh after 3 to 10 days (503), Circumcision (4)	Good graft survival

							secretion (148), Ulcerations (87), Penile erythema (57), Pale penile skin colour changes (35), Voiding complaints (28), Necrosis (11), Atrophy of the skin (9), Recurrent bleeding (3)				
Ahmed et al., 2017 ⁹	5	n.a	42.4 (28-61)	Baby oil (2), Silicone (2), Mechanical oil (1)/ S	Penile augment ation	1 day to over 26 years	Indurated or fibrotic nodular masses in the penis (3) and scrotum (2), penile shaft (2) and scrotal (1) oedema, difficulty having sexual intercourse due to penile deformity (2), overnight history of urinary retention and abdominal discomfort (1), phimosis (1), penile and scrotal cellulitis (1), several areas of penile shaft necrosis (1), oedematous and partially retractile foreskin (1), pain after intercourse (1), unhappy with the appearance of genitalia (1)	Penile shaft, scrotum, foreskin, suprapubic region	Surg. (3), C (2)	Circumcision with excision of fibrotic penile masses & full-thickness skin graft from the remaining inner prepuce (1), Complete excision of silicone nodules (2), Further procedure needed (3): to excise residual fibrosis on proximal penile shaft (1) and residual silicone nodules in the penis and scrotum (2), Previous procedures(2): a previous circumcision to remove a lymphoedematous prepuce (1) and a previous partial excision of the foreign material but without significant	Patient unhappy with the cosmetic appearance of the penis and requiring further corrective procedure (2), patient satisfied with the final cosmetic result (1), resolution of erythema and lymphoedema after treatment with intravenous hydrocortisone and antibiotics but development of several areas of skin necrosis on the penile shaft (1)

										reduction in penile girth (1)	
Francis et al., 2014 ⁸	4	Singaporean ^	22.5 (17-27)	Jamaica oil/ S	Penile augmentation	6 months to 4 years	Penile shaft swelling (3), induration of penile shaft (3), anterior abdominal wall (2), scrotum (1); penile shaft superficial ulcer (2), painful erection (2), penile and scrotal erythema (1), penile shaft pain (1), induration of anterior abdominal wall (1), skin tightening (1), progressive deformity (1)	Penile shaft, scrotum, spermatic cords, penile base, suprapubic region, lower anterior abdominal wall	Surg. (2), C (1), N.a (1)	Excision and bipediced scrotal flap reconstruction. Eventually the patient underwent debridement and degloving of penile shaft skin and skin grafting due to complications after the first procedure (1), Surgical debridement of an infected superficial ulcer and excision of scar tissue(1)	n.a
Kim et al., 2014 ¹¹	5	Korean ^	n.a	Paraffin/ n.a	Penile augmentation	2 months to 6 years	Skin necrosis and abcess (5), feeling of irritation and pruritus (4), erectile pain (1), difficult vaginal penetration during intercourse (1), hardened and discolored nodules on penis	Penile shaft	Surg.	Complete excision and a bipediced scrotal flap with Y-V incision	All patients satisfied with the visual postoperative shape of the penis and able to achieve normal sexual function and intercourse within 3 months. No shortening in length of penis or reduction in girth and the resulting penis had no difference to the normal skin of the penis, with almost no

											contraction of the scrotum, and no incidence of dysuria.
Shin et al., 2013 ¹³	34	Korean ^	43.7 ± 9.6 (20) 51.1 ± 11.3 (14)	Paraffin (30), Vaseline (4)/ n.a	Penile shaft circumference increase	n.a	Severe penile deformity, severe necrosis and ulceration of the penile skin from infection (8)	Penis, scrotum, prepubic fat layer	Surg.	Complete excision and penile resurfacing with bilateral scrotal flap with T-style anastomosis (20), and inverted V-shape anastomosis (14) between the ventral coronal and scrotal flaps	All 14 flaps with inverted V-shape anastomosis survived completely, with immediate postoperative tactile sensibility. All patients reported ability to feel a gentle touch, temporary dyspareunia or a feeling of traction during erection and satisfactory sexual activity after 6 months.
Bayraktar et al., 2012 ¹²	2	Turkish	20.5 (19 - 22)	Paraffin/ NMP	Penile enlargement	5 to 6 days	Inflamed, irregular and nodular penile masses; amorphous skin changes; painful erections	Penis	Surg.	Excision of all masses without need for skin graft or flap	No evidence of recurrent lesions (except for one patient 8 weeks after surgery who was treated) or sexual dysfunction, no need for further medications over the 2-year follow-up
Inn et al., 2012 ²	3	Malaysian ^	45.6 (32-59)	Silicone (2) Paraffin oil (1)/ NMP	Penile enlargement	4 to 5 years *	Painful erection and sexual intercourse;	Penile shaft, scrotum	Surg.	Full skin excision and reconstruction with STSG,	Good graft survival, wounds fully healed at 1

							swollen, hard and disfigured shafts; irregular semi-mobile masses extending into the scrotum			harvested from the inner thigh	month follow-up, ability to achieve full erection with normal sexual intercourse
Manny et al., 2011 ³	3	Laotian	43.3 (39-47)	Mineral oil with tocopherol acetate (vitamin E) / S	Penile augmentation	2 months to 4 years	Penile swelling (2), phimosis (2), avoided intercourse due to embarrassment (2) scrotal pain (1), tender testicles (1), tender nodular shaft skin changes with patchy denudation (1), penile scarring (1), woody penile skin (1), split urinary stream (1), spraying of the stream when voiding (1), trouble voiding in standing position (1), inability to penetrate vaginally (1), bilateral inguinal lymphadenopathy (1)	Penile shaft, foreskin	Surg.	Excision of all affected tissue and reconstruction using STSG from left thigh (1), Z-plasty skin flap advancement using proximal shaft skin (1), and primary closure (1)	Acceptable cosmesis, Pain resolution, Sexual intercourse continuation and normal voiding
Nyirády et al., 2008 ¹⁰	16	Hungarian^	31.56 (22-44)	Vaseline/ S	Penile augmentation	1 day to 2 years	Swelling (8), phimosis (6), skin necrosis (5), pain (4), hard rigid penile skin (4), curvature (3), painful erection (3), fistula (3), painful prepuce	Penis, prepuce	Surg.	Complete (13) and partial (3) excision of the involved penile skin and penis coverage with prepuce skin flap (4), penile skin flap (1), penile and scrotal skin flap (2),	Cure and symptom resolution (16); Sexual habits and long-term results surveyed in 11/16 patients: minor aesthetic

							(2), scar (2), swollen prepuce (2), existing granulation (1), discharge (1), enlarged lymph node (1), stiffness (1), gangrene (1), difficulties during erection or sexual intercourse			scrotal flap (5), scrotal embedment (4)	dissatisfaction that did not require any further reconstruction (2), sexual intercourse at minimum 3 months after the last reconstruction (11); Long-term results regarding surgical correction but not sexual capability (5/16): none of the five patients needed further surgical correction
Pehlivanov et al., 2008 ¹	23	Gypsy origin (21/23), Bulgarian (2/23)	(19-40)	Paraffin (23)/ NMP (15/25), S (10/25) #	Penile enlargem ent (20/25), Increase the feelings of the sexual partners (15/25) Attractive ness (8/25) Demonstr ation of bravery (6/25)	6 months to 2 years	Ulceration (11/23), painful diffuse erythema and oedema of the penis (7/23), fistulization (3/23), phimosis (2/23)	Penile shaft, prepuce	Surg.	Circumcision (9/23); Simple excision with primary closure (5/23), scrotal flaps (5/23), split skin graft (4/23)	No complaints and erectile disturbance on the follow-up visit

					Imitation (4/25) #						
Rosenberg et al., 2007 ⁶	3	Thai	31 (28-35)	Oil/ n.a	Penile autoaug- mentatio n	1 year	Penile edema (2), penile pain (2), fever (2), inflammatory penile swelling (1), paraphimosis (1),phimosis (1)	Penis, prepuce	C [§]	n.a	Normal urination the following day (1), reduction of fever and swelling (2)
Steffens et al., 2000 ⁷	5	Russian	31.2 (27-40)	Vaseline/ S (1)	Penile augment- ation	2 years to 20 years	Penile edema (4), indurated penile skin (3), grotesque penile enlargement (2), penile skin necrosis (2), inability to have sexual intercourse (2), edematous prepuce (1), painful sexual intercourse (1), scrotal swelling(1), painful erection (1), ulcerations (1), palpable right lymph node (1)	Penile shaft, foreskin, scrotum	Surg.	Complete resection of tumor masses and penile skin reconstruction with mesh graft transplant (2), Excision of the subcutaneous tissue alone (dermis) with preservation of the top layer (1), Excision of the involved indurated tissues and a two- staged penile reconstruction (2)	Uneventful postoperative course (3), satisfactory cosmetic and functional result after reconstruction (3), inguinal lymph node remission (1), normal intercourse after 3 months (1), necrosis of epidermis when excision of subcutaneous tissue alone was performed (1)
Lee et al., 1994 ⁵	26	Korean ^	39.6 (19-77)	Paraffin or Vaseline/ NMP (>40%)	Penile augment- ation	mean 18.5 months	Pain at the site of injection (19/26): skin ulceration and purulent discharge (17/19); No specific symptoms except abnormal penile contour with skin discoloration (7/26), decreased potency and discomfort (7/26)	Penis	Surg.	Complete excision of masses followed by primary closure or scrotal flap supplied by the posterior branch of internal pudendal artery or two- staged Cecil's scrotal implantation or STSG (inner thigh)	Overall outcome of penoplasties successful except in 2 cases

^ : Patient nationality inferred from study location, * : They began to notice abnormal reactions to their penises, about 14 months after the injection (3), # : Data includes two patients of Gypsy origin who inserted plastic pellet in the prepuce (2/25), § : Incision of paraphimotic ring (1), S: Self-injected, NMP: Non-medical person, Surg: Surgery, C: Conservative, n/a: not applicable or not available