Appendix 6

Table S10.1: Distal shunt procedures in ischaemic priapism

Study	N: (shunt/ Shunt + tunnelling)	Duration of priapism (shunt/shunt + tunnelling)	Type of surgery	Detumescence rate (shunt/shunt + tunnelling)	Post-operative ED rate (shunt/shunt + tunnelling)
Ercole *et al*. [1]	7 (7/0)	2.6 d / NA	Al-Ghorab	100% / NA	57% / NA
Macaluso *et al.* [2]	12 (12/0)	58 h / NA	Winter	100% / NA	17% / NA
Nixon *et al.* [3]	14 (14/0)	42 h / NA	Winter	14% / NA	90% / NA
Lund *et al.* [4]	18 (18/0)	20 h to 8 months / NA	Ebbehoj	61% / NA	39% / NA
Brant *et al.* [5]	13 (6/7)	50 h / 80 h	T-shunt/ T-shunt +tunnelling	46% / 92%	16% / 57%
Segal *et al.* [6]	10 (0/10)	NA / 60 h	Al-Ghorab + tunnelling	NA / 80%	NA / 40%
Zacharakis *et al.* [7]	45 (0/45)	NA / 96 h	T-shunt + tunnelling	NA / 64%	NA / 93%
Ortaç *et al.* [8]	19 (6/13)	48h / 70h	T-shunt/ T-shunt + tunnelling	31% / 94%	83% / 85%
Summary	138 (63/75)	52h / 76h		60% / 82%	50% / 68%

ED = erectile dysfunction; h = hours; d = days.

Table S10.2 in non-surgical and surgical interventions for ischaemic priapism

Study	n	Non-Surgical Intervention (%)	Surgical Intervention (n/ %)	Resolution of priapism (%)	Sexual function	Surgical adverse event
Kumar et al 2019	71	Penile aspiration +/- alpha adrenergic agonist irrigation n=24 (33%)	Distal shunt n=38(53%) [Winter shunt (n=30), Ebbehoj (n=6), Al-Ghorab (n=2)] Proximal shunt n=9(12%) [Quackle(n=6,) Grayhack (n=3)]	Distal shunt 42.01% Proximal shunt 55.55% Penile aspiration 21.12%	21 (29.57%) patients followed up at 6 months n=15 (71.4%) reported moderate to severe ED	Complication following shunts (n=20, 42.5%) [Wound infection n=5, Shunt site bleeding n=14, skin necrosis n=1]
Lian et al 2010	12	-	Corporospongiosal shunt with intracorporeal tunnelling (n=12)	100%	Average FU 21.6+/-10.1 months IIEF5 score 11.7+/-6.3 post treatment (vs 23.7+/- 1.1 prior to priapism)	No severe complications noted
Macaluso et al 1985	34	n=29 (85.2%) had initial conservative treatment	12/29 patients (41.3%) required	100% with Winter's shunt	-	Overall complications from surgery 5/12 (41.6%) [Urethral injury (n=1),

			surgery with Winter's shunt			Penoscrotal haematoma (n=3), Epididymitis (n=1)]
Moloney et al 1975	11	-	Saphenocavernous bypass (n=12)	100%	70% 'good' if functional outcome' and 30% 'fair functional outcome'	-
Muneer et al 2008	60 (stuttering)	100% initial non-surgical treatment	Surgical procedures in n=12 [Penile prosthesis n=3, embolisation n=5, Winter shunt n=1. El-Ebbehoj n=1, Cavernosal ligation n=1)	Success rate 100% for Penile prosthesis, 20% for embolisation and 0% for other surgical therapies	-	-
Nelson et al 1976	48	-	Winter's shunt (n=8) Saphenocavernous bypass (n=3)	Shunt success 10/11 (failed in single case when done in priapism due to sickle cell disease)	50% potency rate in patients treated by aspiration followed by shunting	-
Nixon et al 2003	28	-	Winter's shunt (n=14) Al Ghorab Shunt(n=13) Quackle shunt (n=1)	Winters shunt 14.2% (n=12 required reoperation) Al Ghorab 92% (n=1 required reoperation) Quackle 100% success	2/20 available patients for FU (10%) had preserved erectile function following shunt surgery	-
Pantaleo-Gandais et al 1984	35	100% had initial conservative management	Surgery required in 31 cases (88.57%)	Overall 85.7% success across all shunts	100% preservation of sexual function	-

			[corporocavernosal incision n=8, cavernous spongiosum shunt n=9, cavernous-saphenous shunts n=4, Ebbehoj n=9, Winters n=1)		if priapism <3 days duration (n=17) 11.1% preservation of sexual function if priapism>3days	
Ugwumba et al 2015	15	13/15 (86.6%) had initial conservative treatment prior to shunting	Glanulo-cavernous (Al-Ghorab) shunt n=15 (100%)	Immediate detumescence (n=14,93.3%) Delayed detumesence (n=1, 6.7%)	46.7% ED ED increased if presentation was >24h	
LAwani et al 1999	66	100% had initial conservative treatment	Surgical procedures in 53/66 (80.3%) [bilateral cavernotomies n=23, cavernoglandular shunt n=11, cavernospongiosal shunt n=18, cavernosaphenous shunt n=1]	100% immediate detumesence post-surgery	50% ED rate in 12 patients who had follow-up	-
Pal et al 2016	19	100% had aspiration prior to surgery	16/19 (84%) had surgery [Winter's shunt (n=16) Al Ghorab shunt (n=6) Quackle shunt (n=5)]	18.7% Winter's shunt 66.7% Al Ghorab shunt 62.5% Corporal snake 60% Quackle's shunt	Preservation of erectile function 66.7% for aspiration only 18.1% for proximal shunts 20% for distal shunts	N=3 (15.7%) had complications [urethral injury n=1, cavernositis n=1, skin necrosis n=1)

Wendel et al 1981	8	-	Corporo cavernosa –glans penis shunt (n=8)	87.5% success rate	-	-
Kihl et al 1980	31	-	Saphenocavernous shunting (n=26)	76.9% initial success 23.1% required further shunting	7/26 (26.9%) potent at months – 10 yrs	N=5 (19.2%) complication rate [Urethrocutaneousfistula n=1, haematoma n=2, thrombophlebitis n=1, altered sensation n=1]
Kilinc et al 2009	15		Cavernosal-cephalic vein shunt (n=15)	86.6% success (n=2 required further saphenocavernosal shunt)	3/13 (23) reported ED at 12 months	No major complications reported
Klufio et al 1991	20		Al Ghorab shunt (n=20)	All had immediate detumescence (100%)	39% potency rate	10% complication rate (post operative bleeding n=2)
Adeyato et al 2009	54	N=19 (35%)	N= 35 (65%) Ebbhoj's shunt	2/35 (5.7%) had recurrence in the immediate postop period	Potency rate 47.37% conservative vs 70.37% for shunt	-
Aghagi et al 2000	35	All had prior conservative treatment	N=35 had surgery [Perineal cavernospongiosal shunt (n=14), modified corporospongiosal shunt (n=21)]	100% detumesence postop	8/35 (22.8%) had absent erections post surgery	-
Brant et al 2009	13	All had prior conservative treatment	T shunt (n=13)	12/13 (92%) had resolution (n=1 required further T shunt)	84.6% erectile function	No major surgical complications
CAnguven et al 2013	15	-	Transient distal penile shunt	10/15 (66% success rate)	-	-

Carter et al 1976	12	-	Corporosaphenous shunt (n=2) Cavernospongiosum shunt (n=10)	Not clear	100%ED in corporosaphenous shunt 4/7 (57.1%) potency rate following cavernospongiosus shunt	
Chary et al 1981	8	-	Caverno-glandular shunt (n=8)	100% success	50% potency rate	(n=1 cavernositis,12.5%)
Klein et al 1972	9	-	Corpus saphenous shunt (n=9)	22.2% (n=2) had partial response immediately	11.1% potency rate	

Table S10.3 on penile prosthesis insertion for ischaemic priapism

Study	**n**	**Non-Surgical Intervention (%)**	**Surgical Intervention (n/ %)**	**Resolution of priapism (%)**	**Sexual function**	**Surgical adverse event**
Rees et al 2002	8	All had prior conservative treatment	Penile prosthesis n=8 (4 had prior shunt)	All implants successful (mean duration of priapism at presentation 91h)	7/8 (87.5%) sexually active 100% satisfaction in those sexually active	N=1 penile deformity for revision due to fibrosis around cylinder
Zacharakis et al 2014	95	All had prior conservative treatment	N=68 penile implants (early median 7 days) vs n=27 delayed implants (median of 5 months)	100%	25/95 (26.3%) able to have intercourse Satisfaction 96% for immediate	13/95 (13.6%) required revision surgery due to complications

					implant vs. 60% for delayed group	
Salem et al 2010	12	All had prior conservative treatment	12 acute	100%	100% achieved intercourse	No revision surgery required No postoperative complications noted
Sedigh et al 2011	20	N=6 non-surgical treatment	N=10 shunts (n=5 of those had early penile prosthesis)	100%	100% satisfaction with prosthesis 100% of penile prosthesis group sexually active	No complications from prosthesis insertion
Zacharakis et al 2015	10	-	N=10, malleable penile prosthesis	100%	80% satisfaction as per IIEF at 3 months	No erosion or urethral injury noted

Table S10.4 on series of early and delayed penile prosthesis implantation secondary to priapism

Study	**n: early/ delayed**	**n: priapism/ total**	**n: malleable/ inflatable**	**Technique**	**Mean follow-up (months)**	**Complications**	**Outcomes**
Small	0/4	4/4	3/0	Sharp dissection	38	inability (1)	Success (3)
Bertram et al	0/6	6/6	4/1	Sharp dissection	N/A	inability (1)	Success (5)
Kelami	0/12	12/12	12/0	N/A	N/A	N/A	N/A
Mireku-Boateng	2/0	2/2	2/0	N/A	36	-	Success (2)
Douglas et al	0/5	5/5	5/0	Excavation	48	Urethral erosion (2), revision (1)	Success (4)

Kabalin	0/1	1/1	1/0	corporotomy	N/A	İnability to insert inflatable prosthesis	Success (1)
Knoll et al	0/20	2/20	0/20	Downsized device	20	İnfection (1), mechanical failure (1), hypoesthesia (2)	Success (19)
Herschorn et al	0/11	2/11	2/9	PTFE graft	46	Revision (3)	Success (8)
George et al	0/12	2/12	7/5	Scar excision (12), PTFE graft (1)	22	Perforation (1), malfunction (1)	Success (11)
Sundaram	1/0	1/1	0/1	N/A	8	-	Success (1)
Upadhyay et al	1/0	1/1	1/0	N/A	6	-	Success (1)
Rajpurkar et al	0/34	4/34	11/23	Multiple incisions+scar excision	23.7	Perforation (1), malfunction (1)	Success (34)
Mooreville et al	0/16	3/16	0/16	Cavernotom+ Downsized (14)	N/A	Perforation (6), crossover (3)	Success (16)
Ghanem et al	0/17	5/17	10/7	Corporal counter incision	N/A	Perforation (1)	Success (17)
Park et al	0/1	1/1	0/1	Narrow base, evaporisation	12	-	Success (1)
Montague et al	0/9	4/9	0/9	Excavation, downsized (7)	44	Malfunction (1)	Success (9)
Shaeer	0/12	4/12	8/4	Shaeer excavation	N/A	-	Success (12)
Durazi et al	0/17	17/17	11/6	Corporotomy + partial excavation	22.7	Urethral injury (2)	Success (17)
Lopes et al	0/8	3/8	8/0	Bovine pericardium graft	32	-	Success (5)
Ralph et al	50/0	50/50	50/0	Hegar dilator	16	Infection (3), revision for erosion (3), cylinders too short (2), autoinflation (1), penile curvature (1)	Success (48)

Salem et al	12/0	12/12	12/0	N/A	15	Corporal perforation (1)	Success (12)
Stember et al	0/1	1/1	0/1	Narrow base, sharp corporal excision	3	Significant penile shortening	Success (1)
Sedigh et al	5/0	5/5	1 /4	N/A	N/A	Urethral injury (1)	Success (5)
Bella et al	0/5	5/5	0/5	Rosello dilator	N/A	Urethral injury (1)	Success (5)
Egydio et al	0/69	24/69	57/12	Double-windsocks	22.5	Urethral injury (4)	Success (42), Somewhat satisfaction (19)
Razzaghi et al	14/0	14/14	14/0	N/A	14	-	Success (14)
Zacharakis et al	68/27	95/95	76/19	Downsized (15 in delayed group)	17	Infection (5), penile curvature (1)	96% success in early group / 60% success in delayed group
Tausch et al	14/0	14/14	14/0	N/A	N/A	Infection (1), distal extrusion (1) Urethral injury (1)	Success (14)
Faddan et al	1/0	1/1	1/0	N/A	N/A		Success (1)
Bozkurt et al	0/2	1/2	1/1	Use of microdebrider for excavation	12	-	Success (2)
Tsambarlis et al	0/13	2/13	0/13	use vacuum device preoperatively	N/A	Infection (1), revision (1)	Success (12)
Hebert et al	30/42	14/72	0/72	Rosello dilator, downsized (63)	12	urethral injury (2), corporal perforation (15), cross-over (5), inability to dilate (1), infection (3),	87% success in early group / 67% success in delayed group

						urethral erosion (2), glans erosion (7)	
Summary	198/344	317/542	311/229	excavation, Shaeer technique, Rosello cavernotome, excision of scar, downsized prosthesis with grafting	22.4	Infection: early 1-10% / delayed 3-20% Perforation, crossover or erosion: early 11% / delayed 13% Urethral injury: early 1% / delayed 3%	Success rate: early 87-100% / delayed 60-100%

Table S10.5 on embolisation for non-ischaemic priapism

Study	**n**	**Non-Surgical Intervention (%)**	**Surgical Intervention (n/ %)**	**Resolution of priapism (%)**	**Sexual function**	**Surgical adverse event**
Bastuba et al 1994	7	-	Embolisation (n=7) post traumatic	100% resolution between 4 – 126 days	Full erectile function return at 2weeks-5months	-
Bartsch et al 2004	9	-	Embolisation (n=9) post trauma	8/9 (88.8%) success; once case required repeat embolisation	100% potency at 4 weeks	Coil displacement in1 case requiring repeat procedure
Baba et al 2007	6	-	Embolisation (n=9) with gelatine sponge or microcoil	Detumesence achieved in 83.3% at 1 months and 100% within 'few months'	100% normal erectile function at 5 years	-
Liu et al 2008	8	-	Embolisation with gelatine (n=2, 25%) Embolisation with microcoil(n=6, 75%)	100% redo embolisation in gelatine group at 1 week		-

				100% success rate from microcoil embolisation	Mean IIEF 22.2 at 6 months post embolisation	
Miller et al 1995	5	-	Embolisation with gelatine (n=4) Embolisation with autologous clot (n=1)	100%	-	-
Numan et al 2008	11	-	Embolisation with autologous clot (n=11)	100% initial success Repeat embolisation required in 27.2% (n=3)	100% erectile function restoration at 6 weeks	-
Kim et al 2007	27	-	Embolisation (autologous clot n=12, gelatine sponge n=12, microcoil and Sponge n=1, polyvinyl n=1, Nbutylcyanoacrylate n=1)	89% following first embolisation 7% required repeat embolisation 4% subsequent shunt surgery	No change in premorbid erectile function (78%)	
Cantasdemir et al 2010	7	-	Embolisation (n=7)	6/7 (85.7%) complete detumescence (n=1 required redo embolisation)	No signs of ED detected at mean FU of 6 years	-
Chick et al 2018	20	-	Embolisation using autologous clot, micocoil, polyvinyl or combination (n=20)	18/20 (90%) success	Mean IIEF score post embolisation 25.8	-
Ciampalini et al 2002	10	-	Embolisation (n=9, 90%) Artery ligation (n=1, 10%)	44% recurrence rate following first embolisation	Sexual function preserved in 80%	-

DeMagistris et al 2020	9	-	Embolisation with microcoils,microparticles or spingostran (n=11)	100% immediate detumescence 2/9 (22% required retreatment at 1-2 weeks)	Erectile function preserved compared to premorbid state	No major complications
Gorich et al 2002	6	-	Embolisation with gelatine (n=3) and microcoil (n=3)	100% success	100% potency	-

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