

On-line Table 1: Comparison of the outcomes of different types of surgical procedures for IIH

	ONSF	CSFD	Venous Stenting
No. of cases	712	435	136
No. of eyes	1153	NR	NR
% of female	82%	85%	88%
% of male	18%	15%	12%
Mean age (range)	32.4 (4.4–74)	31.9 (6–68 mo)	34.5 (10–64)
Mean CSF pressure (range)	29.3 (13–70)	41.4 (29–60)	34.3 (22–73)
Mean BMI	NR	30.99 (23–52.5)	34 (22–73)
% of primary surgery	89%	86%	73%
Presenting symptoms			
Headache (P)	155/259 (60%)	346/435 (80%)	121/136 (89%)
Papilledema (P)	278/279 (100%)	277/380 (73%)	108/121 (89%)
Visual changes ^a	1066/1153 (92%)	215/370 (58%)	78/120 (65%)
Visual field changes (E)	380/442 (86%)		
Others		79/435 (18%)	
Symptom Resolution			
Headache	56/127 (44%)	231/287 (80%)	101/121 (83%)
Papilledema	76/95 (80%)	107/153 (70%)	104/108 (98%)
Visual changes	I, 152/257 (59%); S/I, 1011/1066 (95%) ^b	104/193 (54%)	40/51 (78%)
Visual field changes	470/688 (68%)		
Mean follow-up (mo)	21.0 (0–160)	41 (1–278)	22.9 (1–136)
No. of repeat/subsequent procedures	100/712 (14.86%)	428	14/136 (10.3%)
Complication rates	128/712 (18%)	176/435 (40.5%)	10/136 (7.4%)
Major	11/712 (1.5%)	33/435 (7.6%)	4/136 (2.9%)
Minor	117/712 (16.4%)	143/435 (32.9%)	6/136 (4.4%)
Revision reasons			
Shunt failure		46 (11%)	
Shunt obstructions		175 (41%)	
Shunt infections		25 (6%)	
Low-pressure headache		64 (15%)	
Radicular pain		11 (3%)	

Note:—CSFD indicates CSF-diversion procedure; P, patients; E, eyes; NR, not reported.

^a Visual changes are calculated in terms of eyes for ONSF and in terms of patients for CSFD and stenting.

^b I indicates improved, S/I, stable or improved; improved on the basis of eyes with vision <20/20 for ONSF.

On-line Table 2: ONSF summary

Studies	No. of Cases (M/F)	Mean Age (Range), y	Follow-Up (Range), mo	Mean BMI, kg/m ²	CSF Opening Pressure, cm H ₂ O			Surgery		Post-ONSF Symptoms				Subsequent Procedures (n)				
					No. of Eyes	Range	Mean	Bilateral	Unilateral	Primary	Presenting Symptoms	HA	PAP		VAC			
															Improved	Stable		
Brouman et al., 1988 ²³	6 (0/6)	10	38.5 (28–62)	(4–11)	NR	NR	NR	4	2	4	HA, NR; PAP, 6; VAC, 10; VFC, NR	NR/NR	4/6	3/10	10/10	NR/NR	Transient diplopia (1); transient atonic pupil (1)	NR
Corbett et al., 1988 ²⁴	28 (8/20)	40	29.3 (14–62)	26.9 (0–90)	NR	NR	NR	12	16	26	HA, 17; PAP, 28; VAC, 40; VFC, 38	11/17	24/28	12/40	34/40	21/38	CSF diversion (2)	
Sergott et al., 1988 ²⁵	23 (0/22)	29	38.1 (18–63)	21.5 (3–45)	NR	NR	NR	6	17	17	HA, 17; PAP, 23; VAC, 29; VFC, 29	13/17	12/23	21/29	28/29	29/29	Repeat ONSD (2)	
Spoor et al., 1991 ²⁶	35 (4/31)	69	32.3 (6–72)	18.1 (2–48)	NR	NR	NR	21	14	33	HA, 7; PAP, 35; VAC, 69; VFC, 69	NR/7	NR/35	29/69	69/69	68/69	Repeat ONSD (6)	
Chronic cases	18 (5/13)	32	32.7 (7–57)	14.6 (3–46)	NR	NR	NR	13	5	13	HA, 3; PAP, 18; VAC, 32; VFC, 24	NR/3	NR/18	9/32	32/32	7/24	Repeat ONSD (1)	
Kelman et al., 1991 ²⁷	12 (1/11)	15	38 (31–48)	31 (3–72)	NR	NR	NR	3	9	0	HA, 7; PAP, 12; VAC, 24; VFC, 24	6/7	NR/12	15/24	24/24	21/24	Repeat ONSD (1)	
Kelman et al., 1992 ²⁸	17 (2/15)	21	40 (16–73)	17 (11–26)	NR	NR	NR	4	13	13	HA, 10; PAP, 17; VAC, 21; VFC, 21	9/10	7/17	14/21	20/21	20/21	None	
Acheson et al., 1994 ²⁹	11 (4/7)	15	37.1 (23–53)	24 (12–84)	NR	NR	NR	4	7	7	HA, NR; PAP, NR; VAC, 15; VFC, 15	NR/NR	NR/NR	8/15	13/15	8/15	CSF diversion (4), subtemporal decompression (1)	
Goh et al., 1997 ²⁰	19 (6/13)	29	33.1 (16–52)	15.7 (1–50)	NR	NR	NR	10	9	19	HA, NR; PAP, NR; VAC, 29; VFC, 21	NR/NR	NR/NR	4/29	26/29	10/21	Repeat ONSD (4)	
Banta and Farris, 2000 ³¹	86 (13/73)	158	32.1	20 (1–108)	NR	NR	NR	72	14	86	HA, 6; PAP, 86; VAC, 158; VFC, 81	8/61	NR/86	NR/158	148/158	71/81	Repeat ONSD + CSF diversion (4), CSF diversion (1), presumed traumatic optic neuropathy (1)	
Thuente and Buckley, 2005 ³²	12 (6/6)	17	10.1 (4.4–16)	39.6 (2.4–105.3)	NR	33 (13–47)	NR	5	7	12	HA, 8; PAP, 12; VAC, 17; VFC, 17	5/8	12/12	7/17	17/17	6/17	None	
Knapp and Sampath, 2005 ³³	13 (4/9)	23	26.5 (14–49)	9.6 (1–32)	NR	NR	NR	10	3	11	HA, NR; PAP, NR; VAC, 27; VFC, 24	NR/NR	NR/NR	4/27	27/27	18/24	None	
Chandrasekaran et al., 2006 ³⁴	32 (3/29)	51	33.4 (17–65)	27.6 (0–120)	NR	NR	NR	18	14	25	HA, NR; PAP, 32; VAC, 31; VFC, 39	NR/NR	NR/32	13/31	30/31	13/39	Transient diplopia (3), anisocoria (2), disc hemorrhage (1)	
Gupta et al., 2007 ³⁵	18 (4/14)	NR	35.8 (30–42)	(3–45)	24.4	26.8 (25–70)	NR	0	18	15	HA, 18; PAP, NR; VAC, 36; VFC, NR	NR/18	NR/NR	30/36	36/36	NR/NR	Synechiae (2)	
Nithyanandam et al., 2008 ³⁶	21 (6/15)	41 ^a	29.5 (18–48)	(3–29)	NR	NR	NR	19	2	21	HA, NR; PAP, NR; VAC, 34; VFC, 34	NR/NR	NR/NR	17/34	32/34	22/34	Transient pupillary atony (3), transient diplopia (1), orbital cellulitis (1)	
Alsuhaibani et al., 2011 ²²	78 (12/56)	88	32 (13–57)	12 (2 wk–12 mo)	NR	NR	NR	10	68	78	HA, NR; PAP, NR; VAC, NR; VFC, NR	NR/NR	NR/NR	NR/NR	NR/NR	NR/NR	Transient diplopia (3), large cyst formation at the site of the surgery (1)	
Moreau et al., 2014 ³⁷	236 (NR)	455	NR	18.7 (1 wk–120 mo)	NR	NR	NR	NR	NR	NR	HA, NR; PAP, NR; VAC, 448; VFC, 227	NR/NR	NR/NR	75/448	429/448	142/227	Diplopia (15), dellien (2), esotropia (4), exotropia (2)	
Pineles and Volpe, 2013 ³⁸	37 (5/32)	50	33 (19–74)	48.2 (1–160)	NR	NR	NR	13	24	–	HA, NR; PAP, NR; VAC, 37; VFC, 16	NR/NR	NR/NR	8/37	28/37	6/16	Tonic pupil (2), conjunctival abscess (1), diplopia (1)	
Sencer et al., 2014 ³⁹	10 (1/9)	10	34.1 (9–49)	28.4 (8–55)	NR	NR	NR	0	10	9	HA, 7; PAP, 9; VAC, 9; VFC, 9	4/7	7/9	7/9	8/9	8/9	None	

Note:—HA, indicates headache; PAP, papilledema; VAC, visual acuity changes; VFC, visual field changes; M, male; F, female; NR, not reported; ONSD, optic nerve sheath decompression. ^a Seven eyes were excluded from analysis due to no light perception.

On-line Table 3: CSF diversion summary

Studies	No. of Cases (M/F)	Mean Age (Range or SD), y	Follow-Up (Range or SD), mo	Mean BMI, kg/m ² (Range)	CSF Opening Pressure, cm H ₂ O (Range)	Primary Surgery	Presenting Symptoms			Post-CSF Diversion Symptoms			Type of Shunt	Subsequent Procedures	No. of Patients with Revisions	Complications		
							HA	PAP	VAC	HA	PAP	VAC				Shunt Revision Reasons	Others	
Johnston et al, 1988 ⁴⁰	36 (10/26)	24.7 (6 mo–54 y)	NR	NR	NR	NR	NR/29	NR/34	NR/24	NR/24	NR/24	LPS + VPS	50 Revisions	18	SO, 24; SI, 8; LPH, 14; RP, 1	Others, 3		
Rosenberg et al, 1993 ⁴¹	37 (NR)	NR	30.9 (1–180)	NR	NR	NR	NR/7	NR/NR	13/34	13/34	13/34	LPS + VPS	56 Revisions	19	SF, 31; SI, 3; LPH, 14; RP, 2	AP, 3; OC, 2; CSF leak, 1		
Eggenberger et al, 1996 ⁸	27 (3/24)	28 (8–51)	77 (21–278)	NR	NR	NR	18/18	9/14	10/NR	10/NR	10/NR	LPS	66 Revisions	15	SO, 43; SI, 1; LPH, 10; RP, 3	AP, 1; CM, 3		
Burgett et al, 1997 ⁴²	30 (2/28)	32.9 (10–68)	34.9 (0–143)	NR	NR	NR	14/17	15/16	6/10	6/10	6/10	LPS	126 Revisions	19	SF, 13; SI, 1; LPH, 2; RP, 1	CSF fistula, 1		
Tulipan et al, 1998 ⁴³	7 (NR)	NR	9 (4–17)	NR	NR	5	6/7	5/7	NR/NR	NR/NR	NR/NR	S-VPS	None	None	None	None		
Maher et al, 2001 ⁴⁴	13 (3/10)	31.5 (6–54)	12.4 (1–38)	NR	NR	0	0/4	NR/NR	5/11	5/11	5/11	S-VPS	3 Revisions	3	SO, 3	None		
McGinn et al, 2004 ⁴⁵	42 (10/32)	37 (±10)	49 ± 31	NR	NR	NR	40/42	NR/25	NR/15	NR/15	NR/15	LPS + VPS	84 Revisions	NR	SO, 55; SI, 4; LPH, 16; RP, 4	CM, 5; TH, 3		
Bynke et al, 2004 ⁵⁴	17 (5/12)	34 (13–63)	78 (216–153.6)	30.99 (23–52.5)	39.4	16	15/15	16/16	3/8	3/8	3/8	VPS	9 Revisions	7	SO, 6; SI, 2	SM, 1		
Woodworth et al, 2005 ⁵⁸	21 (4/17)	42 (±10)	20 ± 17	NR	NR	NR	21/21	NR/8	NR/5	NR/5	NR/5	VPS	32 Revisions	8	SO, 21; LPH, 6	CM, 1; CSF leak, 1		
Abu-Serieh et al, 2007 ⁵⁵	9 (4/5)	26.4 (4–63)	44.3 (6–110)	NR	NR	9	9/9	3/5	2/2	2/2	2/2	S-VPS	9 Revisions	6	SO, 1; SI, 5	SM, 1; VD, 2		
Thambisetty et al, 2007 ⁴⁷	16 (0/16)	23.8 (14–39)	NR	NR	54.1 (29–60)	16	16/16	NR/16	14/16	14/16	14/16	LPS, VPS, + ONSF	NR	None	None	None		
Tarnaris et al, 2011 ⁴⁸	34 (2/32)	35 (27.1–42.9)	28.9 (±31.8)	NR	39.4 (29.1–49.7)	29	20/29	10/24	12/29	12/29	12/29	LPS + VPS	NR	12	SO, 1; SI, 1; LPH, 2	AP, 1; SM, 1; CSF leak, 1		
Abubaker et al, 2011 ⁴⁶	18 (NR)	avail/NR(25–65)	48 (6–96)	NR	NR	NR	11/18	11/17	11/11	11/11	11/11	LPS	12 Revisions	10	SO, 3	SM, 3; CM, 6		
Abubaker et al, 2011 ⁴⁶	10 (NR)	avail/NR(25–65)	48 (6–96)	NR	NR	NR	9/10	6/7	4/4	4/4	4/4	VPS	3 Revisions	2	NR	CM, 3		
Sinclair et al, 2011 ⁵⁹	53 (3/50)	30.3 (±8.5)	(6–24)	NR	39.5 (±8.2)	53	8/35	14/27	15/33	15/33	15/33	LPS + VPS	74 Revisions	27	SO, 12	CM, 2; SD, 5; others, 8		
El-Saadany et al, 2012 ⁵⁷	22 (4/18)	28.5 (20–38)	(1–12)	NR	NR	22	22/22	18/20	NR/NR	NR/NR	NR/NR	LPS	6 Revisions	6	SO, 6	None		
Yadav et al, 2012 ⁵⁶	24 (2/22)	39 (7–58)	51 (18–137)	NR	NR	NR	22/24	NR/24	10/18	10/18	10/18	LPS	2 Revisions	2	SF, 2	None		
Huang et al, 2014 ⁶⁰	19 (1/18)	29 (±13)	21.2 (1–44)	NR	NR	14	NR/2	NR/NR	9/17	9/17	9/17	VPS	4 VPS revisions, 3 replacements, 1 ONSF	NR	NR	NR		

Note:—LPS indicates lumboperitoneal shunt; VPS, ventriculoperitoneal shunt; S-VPS, stereotactic ventriculoperitoneal shunt; SF, shunt failure; SO, shunt obstruction; SI, shunt infection; LPH, low-pressure headache; RP, radicular pain; AP, abdominal pain; CM, catheter migration; OC, operative complications; TH, tonsillar herniation; SM, shunt malposition; VD, valve dysfunction; SD, shunt disconnection; HA, headache; PAP, papilledema; VAC, visual acuity changes; VFC, visual field changes; M, male; F, female; NR, not reported.

On-line Table 4: Venous stenting summary

Studies	No. of Stenting Cases (n)	M/F	Mean Age (Range), y	Follow-Up (Range), mo	Mean BMI, kg/m ² (Range)	CSF Opening Pressure, cm H ₂ O (Range)	Primary Surgery	Pre-stent Symptoms		Poststenting Symptoms		Mean Pressure Gradient, mm Hg (Range)		Location of Stent Placement	Complications (n)	Subsequent Procedure (n)	
								HA	PAP	VAC	VFC	Pre-stent	Post-stent				
Owler et al, 2003 ¹⁶	4 (9)	1/3	27.3 (7–38)	9.25 (5–12)	30 (23–38)	28.7 (22–35); NR in 1	1	HA, 4; PAP, 4; VAC, 4; VFC, 3	4/4	4/4	4/4	3/3	18.8 (12–25)	0.25 (0–1)	RTS, 3; LTS, 1	None	None
Higgins et al, 2003 ¹⁷	12	0/12	33 (19–52)	14.1 (2–26)	36.9 (29–45)	33.7 (25–46)	7	HA, 12; VFC, 8; VAC, 12; VFC, NR	7/12	5/8	7/12	NR/NR	18.9 (8–37)	5.75 (2–15)	NR	None	Contralateral stents (2)
Donnet et al, 2008 ⁷	10	2/8	41.8 (28–60)	17 (6–36)	27.3 (22–37)	40.2 (29–59)	10	HA, 10; PAP, 10; VAC, 10; VFC, NR	8/10	10/10	NR/10	NR/NR	19.1 (12–34)	NR	RTS, 7; LTS, 2; B/L, 1	None	Contralateral stents (1)
Bussière et al, 2010 ¹⁸	10 (13)	0/10	(16–65)	20.1 (4–60)	35.9 (27.2–47.4)	(25–50)	10	HA, 10; PAP, 9; VAC, 8; VFC, 4	10/10	9/9	7/8	NR/4	28.3 (11–50); >10 in 2 cases	11.25 (2–23); NR in 2	RTS, 8; LTS, 2	None	CSF diversion [VPS] (1)
Ahmed et al, 2011 ¹⁹	52	5/47	34 (10–64)	24 (2–108)	>30 in 47	32.2 (25–73); NR in 9	43	HA, 43; PAP, 46; VAC, 13; VFC, 30	40/43	46/46	9/13	23/30	19.1 (4–41)	0.6 (0–14)	RTS, 36; LTS, 16; NR, 4	Subdural hematoma (2), transient hearing loss (2)	Repeat stent (6)
Albuquerque et al, 2011 ²⁰	15 (18)	3/12	31 (12–51)	20 (2–40)	NR	NR	NR	HA, 15; PAP, NR; VAC, NR; VFC, NR	12/15	NR/NR	NR/NR	NR/NR	NR	NR	RTS, 9; LTS, 6	Retropertoneal hematoma (1)	None
Kumpe et al, 2012 ²¹	18	6/12	37.9 (16–62)	43.7 (1–136)	31.6 (22.6–38)	37.9 (25–55); NR in 6	8	HA, 12; PAP, 16; VAC, 17; VFC, NR	10/12	15/16	NR/17	NR/NR	21.1 (10.5–39)	2.5 (0–7)	RTS, 12; LTS, 7	Subdural hematoma (2), UTI (1), syncope (1)	Repeat stent (2)
Fields et al, 2013 ⁵	15	0/15	34 (20–56)	14 (1–49)	39 (30–73)	NR	9	HA, 15; PAP, 15; VAC, 14; VFC, NR	10/15	15/15	13/14	NR/NR	24 (13–40)	4 (0–9)	RTS, 8; LTS, 4; B/L, 3	Femoral pseudoaneurysm (1)	CSF diversions [VPS] (2)

Note:—M indicates male; F, female; HA, headache; PAP, papilledema; VAC, visual acuity changes; VFC, visual field changes; RTS, right transverse sinus; B/L, bilateral; LTS, left transverse sinus; NR, no data; UTI, urinary tract infection; VPS, ventriculoperitoneal shunt.