Supplemental Online Content

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This supplemental material has been provided by the authors to give readers additional information about their work.

eTable 1. Variables included in the systematic review

Domain	Variables
Study characteristics	Authors, affiliations, SIH diagnostic criteria, study design
	(prospective/retrospective, observational/interventional), number of patients.
Demographics	Age (mean, SD, range), sex (male/female).
Risk factors	Patients with connective tissue disorders, spinal pathologies, other risk factors.
Clinical presentation	Symptoms duration (mean, SD, range), headache (n. patients and characteristics),
	nausea/vomiting, neck pain/stiffness, hearing impairment, tinnitus, other ear
	signs/symptoms, dizziness, vertigo, photophobia, diplopia, other visual
	signs/symptoms, reduced level of consciousness, cognitive disturbances, back
	pain, movement disturbances, other signs/symptoms.
Brain MRI	N. of investigations performed, diffuse pachymeningeal enhancement, subdural
	collections, brain sagging, pituitary gland enlargement, venous engorgement, slit
	ventricles, tonsillar descent, normal brain MRI appearances, other findings.
Spinal imaging	For each type of spinal investigation: n. of investigations performed, n. of
	extradural CSF detection, type of leak detection (specific leak site, broad area,
	unspecified). Type of investigations: spine MRI, CT myelogram, radionuclide
	cisternography, MR myelography (with and without intrathecal gadolinium),
	other spinal investigations.
CSF leak location	N. of leaks identified, leaks location (cervical, cervico-thoracic, thoracic,
	thoraco-lumbar, lumbar, lumbo-sacral, sacral, multiple leaks).
CSF pressure	N. of lumbar punctures (or CSF pressure measurements), pressure findings: low
	(<60 mmH ₂ 0), normal (60-200 mmH ₂ 0), high (>200 mmH ₂ 0).
Treatments and	Conservative treatment: n. of patients treated, duration of treatment, outcomes,
outcomes	type (bed rest, hydration, caffeine, analgesia, steroids);
	EBP: n. of patients treated, duration of treatment, outcomes, n. of EBPs, type
	(targeted, nontargeted, large(>20ml), small);
	Other treatments.
CSF: Cerebrospinal Fluid: EBP:	Epidural Blood Patch: SD: Standard Deviation.

eTable 2. Inclusion criteria for meta-analyses

Metanalyses	Inclusion criteria for metanalyses
Age	Mean age and SD specified.
Sex	N. of males/females specified.
Symptoms duration	Mean duration and SD specified.
Sign/Symptoms	For each sign/symptom: n. of patients with the sign/symptom specified.
Brain MRI	N. of investigations, type of positive findings and proportion of positive findings specified.
Spinal imaging	N. of investigations, type of investigations and proportion of positive findings (extradural CSF) specified.
CSF pressure	N. of investigations and findings (n. low pressure, normal pressure and high pressure) specified. Studies in which all patients had low CSF opening pressure were excluded.
Outcomes of conservative treatment	N. of patients who received treatment and n. good outcomes specified. Studies in which all (or none) of the patients had good outcomes were excluded.
Outcomes of first EBP	N. of patients who received treatment and n. good outcomes after 1 st EBP
	excluded.
Outcomes of	N. of patients who received treatment, type of EBP (nontargeted or targeted) and
nontargeted/targeted	n. good outcomes after 1 st EBP specified. Studies in which all (or none) of the
EBP	patients had good outcomes were excluded.
Outcomes of small/large	N. of patients who received treatment, type of EBP (small or large) and n. good
EBP	outcomes after 1 st EBP specified. Studies in which all (or none) of the patients
	had good outcomes were excluded.
All	Studies with 0% or 100% proportion of findings were excluded.
	For each meta-analysis, if more than one study from the same author met the
	inclusion criteria, only the study reporting the largest number of patients was
	included.
CSF: Cerebrospinal Fluid; EBP: 1	Epidural Blood Patch; SD: Standard Deviation.

Reference	Author (year)	Quality grading ^a	Patients (n)	Meta-analyses
(1)	Cebeci et al (2020)	Fair	20	Age, sex, other symptoms, MRMG, leak location
(2)	Davies et al (2020)	Good	86	Sex, other symptoms, conservative treatment
(3)	Wang et al (2020)	Good	20	
(4)	Dobrocky et al (2019)	Good	56	Age, sex, brain MRI
(5)	Li et al (2019)	Fair	40	Age, sex, cinical presentation, brain MRI, LPOP
(6)	Levi et al (2019)	Good	101	Age, sex, headache, other symptoms, nontargeted EBP, small EBP
(7)	Kim et al (2019)	Good	43	Age, sex, symptoms duration, headache, other symptoms, brain MRI
(8)	Schievink et al (2019)	Good	113	Age, symptoms duration, headache
(9)	Schievink et al (2019)	Good	49	DSM
(10)	Pagani-Estévez et al (2019)	Fair	202	First EBP
(11)	Fichtner et al (2019)	Fair	27	LPOP, leak location
(12)	Martin et al (2019)	Fair	94	Other symptoms, first EBP
(13)	Kinsman et al (2019)	Fair	144	Sex
(14)	Farb et al (2019)	Fair	31	Sex, brain MRI, spine MRI, DSM, leak location
(15)	Griffin et al (2019)	Good	92	
(16)	Ohtonary et al (2018)	Fair	19	Age, sex, headache, other symptoms, LPOP, leak location, conservative,
(17)	Murakami et al (2018)	Good	38	Age, sex
(18)	Lee et al (2018)	Fair	62	Age, sex, leak location, first EBP, targeted EBP
(19)	Schievink et al (2018)	Good	29	Conservative treatment
(20)	Xia et al (2018)	Good	156	Conservative treatment
(21)	Ahn et al (2018)	Good	116	Sex, brain MRI, spine MRI, CTM, leak location, first EBP, nontargeted EBP, targeted EBP
(22)	Yagi et al (2018)	Fair	37	Sex, symptoms duration, other symptoms, brain MRI, leak location, conservative, first EBP, large EBP
(23)	Tsai et al (2018)	Fair	27	Symptoms duration, brain MRI
(24)	Takai et al (2018)	Fair	11	Symptoms duration, LPOP
(25)	Dobrocky et al (2018)	Fair	14	
(26)	Clark et al (2018)	Fair	101	
(27)	Ferrante et al (2018)	Fair	35	
(28)	Beck et al (2018)	Fair	47	
(29)	Schievink et al (2018)	Fair	15	
(30)	Yao et al (2017)	Fair	206	Age, sex, symptoms duration, headache, brain MRI, LPOP
(31)	Wu et al (2017)	Good	150	Age, sex, symptoms duration, headache, other symptoms, brain MRI, MRM, leak location, first EBP, targeted EBP
(32)	Beck et al (2017)	Good	31	Other symptoms
(33)	He et al (2017)	Good	165	Other symptoms, CTM, MRM, leak location, conservative, first EBP, targeted EBP, small EBP
(34)	Choi et al (2017)	Good	95	Sex, headache, other symptoms, brain MRI, leak location, first EBP, nontargeted EBP, targeted EBP, small EBP
(35)	Kim et al (2017)	Fair	128	Sex, headache, headache location, other symptoms, brain MRI, first EBP
(36)	Kranz et al (2017)	Good	22	
(37)	Chen et al (2017)	Good	19	
(38)	Chen et al (2017)	Good	23	
(39)	Chen et al (2016)	Fair	45	Age, sex, headache, other symptoms, conservative, first EBP
(40)	So et al (2016)	Fair	34	Age, sex, symptoms duration, headache, leak location, first EBP, small EBP
(41)	Amemiya et al (2016)	Good	15	Age, symptoms duration, other symptoms
(42)	Kranz et al (2016)	Good	99	СТМ
(43)	Schievink et al (2016)	Good	53	DSM
(44)	Ferrante et al (2016)	Fair	106	First EBP, large EBP

eTable 3. List of selected studies and inclusion for meta-analyses

Reference	Author (year)	Quality grading ^a	Patients (n)	Meta-analyses
(45)	Amrhein et al (2016)	Fair	35	First EBP, targeted EBP, small EBP
(46)	Fichtner et al (2016)	Good	39	Headache
(47)	Monteith et al (2016)	Fair	12	Headache, brain MRI, RIC
(48)	Schievink et al (2016)	Good	568	Sex
(49)	Hori et al (2016)	Good	22	Sex, brain MRI
(50)	Karm et al (2016)	Fair	104	Sex, brain MRI, first EBP, targeted EBP
(51)	Ansel et al (2016)	Fair	16	Sex, brain MRI, spine MRI, leak location, first EBP, nontargeted EBP, small EBP
(52)	Takahashi et al (2016)	Fair	169	Sex, headache, brain MRI, RIC, LPOP, leak location, conservative, first EBP
(53)	Capizzano et al (2016)	Fair	41	Sex, headache, other symptoms, brain MRI
(54)	Tanaka et al (2016)	Good	40	Sex, headache, other symptoms, brain MRI
(55)	Kim et al (2016)	Fair	140	Sex, headache, other symptoms, brain MRI, spine MRI, conservative, first EBP, small EBP
(56)	Choi et al (2016)	Fair	18	Sex, leak location, first EBP, targeted EBP
(57)	Kranz et al (2016)	Good	89	Symptoms duration
(58)	Ferrante et al (2016)	Good	28	Symptoms duration, headache location
(59)	Beck et al (2016)	Good	15	
(60)	Verdoorn et al (2016)	Fair	129	
(61)	Wan et al (2016)	Fair	15	
(62)	Kranz et al (2015)	Good	106	Age, sex, brain MRI, LPOP
(63)	Idrissi et al (2015)	Fair	24	Age, sex, headache, headache location, other symptoms, brain MRI, spine MRI, RIC, leak location, conservative, first EBP,
(64)	Thielen et al (2015)	Fair	14	Leak location
(65)	Joo et al (2015)	Fair	76	Leak location, small EBP
(66)	Feltracco et al (2015)	Fair	18	Sex, brain MRI, first EBP, nontargeted EBP
(67)	Schievink et al (2015)	Fair	13	
(68)	Schievink et al (2015)	Good	42	
(69)	Xia et al (2015)	Fair	93	
(70)	Yoshida et al (2014)	Fair	12	Age, sex, headache, other symptoms, brain MRI, leak location, first EBP, targeted EBP, small EBP
(71)	Chazen et al (2014)	Good	24	Sex, CTM, MRMG, LPOP
(72)	Pimienta et al (2014)	Fair	50	
(73)	Schievink et al (2014)	Fair	338	
(74)	Tung et al (2014)	Good	17	
(75)	Hashizume et al (2013)	Fair	29	Age, sex, other symptoms, brain MRI, RIC, LPOP, conservative, first EBP, targeted EBP
(76)	Schievink et al (2013)	Fair	24	Headache location
(77)	Hosoya et al (2013)	Fair	100	Spine MRI, MRM
(78)	Ferrante et al (2013)	Fair	10	
(79)	Franzini et al (2013)	Fair	80	
(80)	$\frac{\text{Kranz et al}(2013)}{\text{Reinstein et al}(2013)}$	Good	19	
(81)	Albes et al (2012)	Fair	26	Age, sex, CTM, leak location, first EBP, targeted EBP,
(83)	Hasiloglu et al (2012)	Good	25	Age sex headache I POP leak location
(84)	Hashizume et al (2012)	Fair	12	Leak location
(85)	Akhar et al (2012)	Fair	41	MRMG
(86)	Luetmer et al (2012)	Fair	151	Spine MRI
(87)	Balkan et al (2012)	Fair	11	Symptoms duration, other symptoms, brain MRI, first EBP, targeted EBP
(88)	Schievink et al (2012)	Good	33	
(89)	Schievink et al (2012)	Fair	20	
(90)	Takeuchi et al (2012)	Fair	15	
(91)	Yoon et al (2011)	Fair	30	LPOP
(92)	Cho et al (2011)	Good	56	Sex, headache, brain MRI, leak location, first EBP, nontargeted EBP, targeted EBP, small EBP
(93)	Bonetto et al (2011)	Fair	17	Sex, symptoms duration, headache, other symptoms, brain MRI, conservative, first EBP, nontargeted EBP
(94)	Watanabe et al (2011)	Fair	13	Symptoms duration, headache, small EBP
(95)	Franzini et al (2011)	Fair	74	

Reference	Author (year)	Quality grading ^a	Patients (n)	Meta-analyses
(96)	Liu et al (2011)	Good	55	
(97)	Franzini et al (2010)	Fair	28	Leak location
(98)	Medina et al (2010)	Fair	13	Sex headache spine MRI first EBP
(99)	Ferrante et al (2010)	Fair	42	Spine MRL MRM, RIC
(100)	Horikoshi et al (2010)	Fair	16	Targeted EBP
(100)	Adachi et al (2009)	Fair	10	Age sex headache other symptoms
(102)	Park et al (2009)	Fair	12	Age, sex, headache, other symptoms brain MRI, RIC,
(103)	Su et al (2009)	Fair	11	Age, sex, headache, other symptoms, brain MRI, spine MRI leak location first FBP nontargeted FBP
(104)	Mea et al (2009)	Good	90	Brain MRI
(104)	Wang et al (2009)	Fair	19	CTM
(105)	Shankar et al (2009)	Good	17	Say brain MRI
(100)	Mea et al (2009)	Fair	90	Sex, brain Mixi
(107)	Watanabe et al (2009)	Fair	18	Age headache spine MRL LPOP
(100)	Schievink et al (2008)	Fair	94	Brain MRL L POP
(10)	V_{00} at al (2008)	Fair	15	MDM DIC first EBD
(110)	Albeer at (2008)	Good	10	MRM, RIC, HISTEDI MPMC
(111)	Albaylani et al (2008)	0000	17	Say hadacha other symptoms brain MDL BIC
(112)	Hyun et al (2008)	Good	30	LPOP, leak location, conservative, first EBP, small EBP
(113)	Tomoda et al (2008)	Fair	27	Sex, other symptoms, conservative treatment, MRM, LPOP, first EBP
(114)	Fuh et al (2008)	Fair	53	
(115)	Mea et al (2008)	Fair	70	
(116)	Mea et al (2007)	Good	59	Sex
(117)	Chung et al (2007)	Fair	10	
(118)	Farb et al (2007)	Good	12	
(119)	Lai et al (2007)	Fair	40	
(120)	Schievink et al (2007)	Fair	11	
(121)	Schievink et al (2007)	Fair	80	
(122)	Tsai et al (2007)	Fair	17	
(123)	Wiesemann et al (2006)	Fair	10	Age, sex, symptoms duration, headache, other symptoms, brain MRI, LPOP, conservative
(124)	Chung et al (2006)	Fair	67	RIC
(125)	Hannerz et al (2006)	Fair	12	Sex, headache, other symptoms, brain MRI, conservative, first EBP, nontargeted EBP, large EBP
(126)	Cohen-Gadol et al (2006)	Fair	13	Sex, headache, other symptoms, brain MRI, leak location
(127)	Chung et al (2005)	Fair	53	Age, spine MRI, conservative treatment
(128)	Kong et al (2005)	Fair	13	Age, symptoms duration, spine MRI, CTM, RIC, LPOP, conservative
(129)	Schievink et al (2005)	Fair	33	Leak location
(130)	Schievink et al (2005)	Fair	20	
(131)	Ferrante et al (2004)	Fair	18	LPOP
(132)	Berrior et al (2004)	Fair	33	Sex, symptoms duration, headache, other symptoms, brain MRI, first EBP, nontargeted EBP
(133)	Ferrante et al (2004)	Fair	12	
(134)	Schievink et al (2004)	Good	18	
(135)	Schievink et al (2004)	Good	25	
(136)	Miyazawa et al (2003)	Fair	10	Age, headache, other symptoms, brain MRI, RIC, LPOP, leak location
(137)	Chen et al (2003)	Fair	13	
(138)	Schievink et al (2003)	Good	18	
(139)	Lin et al (2002)	Fair	15	LPOP
(140)	Schrijver et al (2002)	Good	20	
(141)	Chung et al (2000)	Fair	30	Headache location
(142)	Chen et al (1999)	Good	13	
(143)	Schievink et al (1998)	Good	10	
(144)	Schievink et al (1996)	Fair	11	Spine MRI, RIC
^a Based on NII	H Quality Assessment Tool for	Case Series Stu	idies	

CTM: CT myelography, EBP: Epidural Blood Patch, LPOP: Lumbar Puncture Opening Pressure, MRM: MR Myelography, MRMG: MR myelography with intrathecal Gadolinium, RIC: Radionuclide Cisternography

eFigure 1. Flowchart of the selection process for articles



eFigure 2. Age meta-analysis (mean years)

Article	Patients (n)	Mean age (years)			ES (95% CI)	% Weight
Adachi et al (2009)	10	39.9			39.90 (32.46, 47.34)	2.07
Albes et al (2012)	26	48.6			48.60 (43.68, 53.52)	3.10
Amemiya et al (2016)	15	44			44.00 (37.42, 50.58)	2.38
Cebeci et al (2020)	20	41.2	-		41.20 (36.25, 46.15)	3.09
Chen et al (2016)	45	42.5	•		42.50 (39.64, 45.36)	4.18
Chung et al (2005)	53	37	◆		37.00 (34.44, 39.56)	4.33
Dobrocky et al (2019)	56	44.8	+		44.80 (41.79, 47.81)	4.10
Hashizume et al (2013)	29	42.2	+		42.20 (38.52, 45.88)	3.75
Hasiloglu et al (2012)	25	40.8	-		40.80 (36.92, 44.68)	3.64
Idrissi et al (2015)	24	46	+		46.00 (42.00, 50.00)	3.57
Kim et al (2019)	43	43.6	+		43.60 (39.36, 47.84)	3.45
Kong et al (2005)	13	39.8	+		39.80 (36.32, 43.28)	3.85
Kranz et al (2015)	106	47.6	+		47.60 (45.09, 50.11)	4.35
Lee et al (2018)	62	40.6	+		40.60 (37.81, 43.39)	4.22
Levi et al (2019)	101	49.2	•		49.20 (46.53, 51.87)	4.27
Li et al (2019)	40	43			43.00 (38.35, 47.65)	3.24
Miyazawa et al (2003)	10	38.4	- ◆ ¦		38.40 (34.56, 42.24)	3.66
Murakami et al (2018)	38	43.2	+		43.20 (39.38, 47.02)	3.67
Ohtonary et al (2018)	19	43.3			43.30 (37.00, 49.60)	2.49
Park et al (2009)	12	40	+		40.00 (36.10, 43.90)	3.62
Schievink et al (2019)	113	45.9	•		45.90 (43.58, 48.22)	4.45
So et al (2016)	34	41			41.00 (36.85, 45.15)	3.50
Su et al (2009)	11	35.6	- -		35.60 (32.17, 39.03)	3.88
Watanabe et al (2008)	18	44.5	-		44.50 (38.59, 50.41)	2.65
Wiesemann et al (2006)	10	49.9			49.90 (40.73, 59.07)	1.58
Wu et al (2017)	150	39.6	•		39.60 (38.08, 41.12)	4.79
Yao et al (2017)	206	40.1			40.10 (38.76, 41.44)	4.85
Yoshida et al (2014)	12	43.3	-		43.30 (38.77, 47.83)	3.30
Overall (I-squared = 79	.3%, p = 0	.000)	Ŷ		42.49 (41.10, 43.89)	100.00
NOTE: Weights are from	n random e	ffects analysis	 			
		Г О	25 50	75 10	0	

eFigure 3. Sex meta-analysis (proportion of female patients)

Adachi et al (2009) Ahn et al (2018) Albes et al (2012) Ansel et al (2016) Berrior et al (2004) Bonetto et al (2011) Capizzano et al (2011) Cabeci et al (2020) Chazen et al (2020) Chazen et al (2014) Chen et al (2016) Choi et al (2011) Choi et al (2016) Choi et al (2017) Cohen–Gadol et al (2006) Davies et al (2020) Dobrocky et al (2019) Farb et al (2019) Feltracco et al (2015)	10 116 26 16 33 17 41 20 24 45 56 56 18 95 13 86 56 31 18 12	9 69 11 11 21 12 10 17 33 9 60 9 53 40 18			 0.90 (0.60, 0.98) 0.59 (0.50, 0.68) 0.42 (0.26, 0.61) 0.69 (0.44, 0.86) 0.64 (0.47, 0.78) 0.65 (0.41, 0.83) 0.63 (0.48, 0.76) 0.90 (0.70, 0.97) 0.42 (0.24, 0.61) 0.38 (0.25, 0.52) 0.59 (0.46, 0.71) 0.50 (0.29, 0.71) 0.63 (0.53, 0.72) 0.69 (0.42, 0.87) 0.62 (0.51, 0.71) 	1.46 3.11 1.42 1.09 1.72 1.09 1.96 2.23 1.35 2.06 2.28 1.06 2.93 0.93 2.80
Ahn et al (2018) Albes et al (2012) Ansel et al (2014) Berrior et al (2004) Bonetto et al (2011) Capizzano et al (2016) Cebeci et al (2020) Chazen et al (2014) Chen et al (2016) Cho et al (2016) Choi et al (2016) Choi et al (2017) Cohen–Gadol et al (2006) Davies et al (2020) Dobrocky et al (2019) Farb et al (2019) Feltracco et al (2015)	116 26 16 33 17 41 20 24 45 56 18 95 13 86 56 31 18 12	69 11 11 21 26 18 10 17 33 9 60 9 53 40 18			$\begin{array}{c} 0.59\ (0.50,\ 0.68)\\ 0.42\ (0.26,\ 0.61)\\ 0.69\ (0.44,\ 0.86)\\ 0.64\ (0.47,\ 0.78)\\ 0.65\ (0.41,\ 0.83)\\ 0.63\ (0.48,\ 0.76)\\ 0.90\ (0.70,\ 0.97)\\ 0.42\ (0.24,\ 0.61)\\ 0.38\ (0.25,\ 0.52)\\ 0.59\ (0.46,\ 0.71)\\ 0.50\ (0.29,\ 0.71)\\ 0.63\ (0.53,\ 0.72)\\ 0.69\ (0.42,\ 0.87)\\ 0.62\ (0.51,\ 0.71)\\ \end{array}$	3.11 1.42 1.09 1.72 1.09 1.96 2.23 1.35 2.06 2.28 1.06 2.93 0.93 2.80
Albes et al (2012) Ansel et al (2016) Berrior et al (2004) Bonetto et al (2011) Capizzano et al (2016) Cebeci et al (2020) Chazen et al (2014) Chen et al (2016) Choi et al (2016) Choi et al (2016) Choi et al (2017) Cohen–Gadol et al (2006) Davies et al (2020) Dobrocky et al (2019) Farb et al (2019) Feltracco et al (2015)	26 16 33 17 41 20 24 45 56 18 95 13 86 56 31 18 12	11 11 21 12 18 10 17 33 9 60 9 53 40 18			0.42 (0.26, 0.61) 0.69 (0.44, 0.86) 0.64 (0.47, 0.78) 0.65 (0.41, 0.83) 0.63 (0.48, 0.76) 0.90 (0.70, 0.97) 0.42 (0.24, 0.61) 0.38 (0.25, 0.52) 0.59 (0.46, 0.71) 0.50 (0.29, 0.71) 0.63 (0.53, 0.72) 0.69 (0.42, 0.87) 0.62 (0.51, 0.71)	1.42 1.09 1.72 1.09 2.23 1.35 2.06 2.28 1.06 2.93 0.93 2.80
Ansel et al (2016) Berrior et al (2004) Bonetto et al (2011) Capizzano et al (2016) Cebeci et al (2020) Chazen et al (2014) Chen et al (2016) Choi et al (2016) Choi et al (2016) Choi et al (2017) Cohen–Gadol et al (2006) Davies et al (2020) Dobrocky et al (2019) Farb et al (2019) Feltracco et al (2015)	16 33 17 41 20 24 45 56 18 95 13 86 56 31 18 12	11 21 26 18 10 17 33 9 60 9 53 40 18			0.69 (0.44, 0.86) 0.64 (0.47, 0.78) 0.65 (0.41, 0.83) 0.63 (0.48, 0.76) 0.90 (0.70, 0.97) 0.42 (0.24, 0.61) 0.38 (0.25, 0.52) 0.59 (0.46, 0.71) 0.50 (0.29, 0.71) 0.63 (0.53, 0.72) 0.69 (0.42, 0.87) 0.62 (0.51, 0.71)	1.09 1.72 1.09 2.23 1.35 2.06 2.28 1.06 2.93 0.93 2.80
Berrior et al (2004) Bonetto et al (2011) Capizzano et al (2016) Cebeci et al (2020) Chazen et al (2014) Chen et al (2016) Choi et al (2017) Choi et al (2017) Cohen–Gadol et al (2006) Davies et al (2020) Dobrocky et al (2019) Farb et al (2019) Feltracco et al (2015)	33 17 41 20 24 45 56 18 95 13 86 56 31 18 12	21 11 26 18 10 17 33 9 60 9 53 40 18			0.64 (0.47, 0.78) 0.65 (0.41, 0.83) 0.63 (0.48, 0.76) 0.90 (0.70, 0.97) 0.42 (0.24, 0.61) 0.38 (0.25, 0.52) 0.59 (0.46, 0.71) 0.50 (0.29, 0.71) 0.63 (0.53, 0.72) 0.69 (0.42, 0.87) 0.62 (0.51, 0.71)	1.72 1.09 1.96 2.23 1.35 2.06 2.28 1.06 2.93 0.93 2.80
Bonetto et al (2011) Capizzano et al (2016) Cebeci et al (2020) Chazen et al (2014) Chen et al (2016) Choi et al (2017) Cohen-Gadol et al (2006) Davies et al (2020) Dobrocky et al (2019) Farb et al (2019)	17 41 20 24 45 56 18 95 13 86 56 31 18 12	11 26 18 10 17 33 9 60 9 53 40 18			0.65 (0.41, 0.83) 0.63 (0.48, 0.76) 0.90 (0.70, 0.97) 0.42 (0.24, 0.61) 0.38 (0.25, 0.52) 0.59 (0.46, 0.71) 0.50 (0.29, 0.71) 0.63 (0.53, 0.72) 0.69 (0.42, 0.87) 0.62 (0.51, 0.71)	1.09 1.96 2.23 1.35 2.06 2.28 1.06 2.93 0.93 2.80
Capizzano et al (2016) Cebeci et al (2020) Chazen et al (2014) Chen et al (2016) Cho et al (2011) Choi et al (2016) Choi et al (2017) Cohen–Gadol et al (2006) Davies et al (2020) Dobrocky et al (2019) Farb et al (2019) Feltracco et al (2015)	41 20 24 45 56 18 95 13 86 56 31 18 12	26 18 10 17 33 9 60 9 53 40 18			0.63 (0.48, 0.76) 0.90 (0.70, 0.97) 0.42 (0.24, 0.61) 0.38 (0.25, 0.52) 0.59 (0.46, 0.71) 0.50 (0.29, 0.71) 0.63 (0.53, 0.72) 0.69 (0.42, 0.87) 0.62 (0.51, 0.71)	1.96 2.23 1.35 2.06 2.28 1.06 2.93 0.93 2.80
Cebeci et al (2020) Chazen et al (2014) Chan et al (2016) Cho et al (2011) Choi et al (2016) Choi et al (2017) Cohen-Gadol et al (2006) Davies et al (2020) Dobrocky et al (2019) Farb et al (2019) Feltracco et al (2015)	20 24 45 56 18 95 13 86 56 31 18 12	18 10 17 33 9 60 9 53 40 18	*		0.90 (0.70, 0.97) 0.42 (0.24, 0.61) 0.38 (0.25, 0.52) 0.59 (0.46, 0.71) 0.50 (0.29, 0.71) 0.63 (0.53, 0.72) 0.69 (0.42, 0.87) 0.62 (0.51, 0.71)	2.23 1.35 2.06 2.28 1.06 2.93 0.93 2.80
Chazen et al (2014) Chen et al (2016) Cho et al (2011) Choi et al (2016) Choi et al (2017) Cohen-Gadol et al (2006) Davies et al (2020) Dobrocky et al (2019) Farb et al (2019) Feltracco et al (2015)	24 45 56 18 95 13 86 56 31 18 12	10 17 33 9 60 9 53 40 18	-		0.42 (0.24, 0.61) 0.38 (0.25, 0.52) 0.59 (0.46, 0.71) 0.50 (0.29, 0.71) 0.63 (0.53, 0.72) 0.69 (0.42, 0.87) 0.62 (0.51, 0.71)	1.35 2.06 2.28 1.06 2.93 0.93 2.80
Chen et al (2016) Cho et al (2011) Choi et al (2016) Choi et al (2017) Cohen-Gadol et al (2006) Davies et al (2020) Dobrocky et al (2019) Farb et al (2019) Feltracco et al (2015)	45 56 18 95 13 86 56 31 18 12	17 33 9 60 9 53 40 18			0.38 (0.25, 0.52) 0.59 (0.46, 0.71) 0.50 (0.29, 0.71) 0.63 (0.53, 0.72) 0.69 (0.42, 0.87) 0.62 (0.51, 0.71)	2.06 2.28 1.06 2.93 0.93 2.80
Cho et al (2011) Choi et al (2016) Choi et al (2017) Cohen-Gadol et al (2006) Davies et al (2020) Dobrocky et al (2019) Farb et al (2019) Feltracco et al (2015)	56 18 95 13 86 56 31 18 12	33 9 60 9 53 40 18		* *	0.59 (0.46, 0.71) 0.50 (0.29, 0.71) 0.63 (0.53, 0.72) 0.69 (0.42, 0.87) 0.62 (0.51, 0.71)	2.28 1.06 2.93 0.93 2.80
Choi et al (2016) Choi et al (2017) Cohen-Gadol et al (2006) Davies et al (2020) Dobrocky et al (2019) Farb et al (2019) Feltracco et al (2015)	18 95 13 86 56 31 18 12	9 60 9 53 40 18		•	0.50 (0.29, 0.71) 0.63 (0.53, 0.72) 0.69 (0.42, 0.87) 0.62 (0.51, 0.71)	1.06 2.93 0.93 2.80
Choi et al (2017) Cohen-Gadol et al (2006) Davies et al (2020) Dobrocky et al (2019) Farb et al (2019) Feltracco et al (2015)	95 13 86 56 31 18 12	60 9 53 40 18	_		0.63 (0.53, 0.72) 0.69 (0.42, 0.87) 0.62 (0.51, 0.71)	2.93 0.93 2.80
Conen–Gadol et al (2006) Davies et al (2020) Dobrocky et al (2019) Farb et al (2019) Feltracco et al (2015)	13 86 56 31 18 12	9 53 40 18	_		0.69 (0.42, 0.87) 0.62 (0.51, 0.71)	0.93
Davies et al (2020) Dobrocky et al (2019) Farb et al (2019) Feltracco et al (2015)	86 56 31 18 12	53 40 18			0.62 (0.51, 0.71)	2.80
Farb et al (2019) Farb et al (2019) Feltracco et al (2015)	56 31 18 12	40 18			0.71 (0.50, 0.00)	2.00
Feltracco et al (2015)	18 12	18			0.71 (0.59, 0.82)	2.48
	18 12	7 4			0.58 (0.41, 0.74)	1.60
	12	14	_		0.78 (0.55, 0.91)	1.40
lachizuma at al (2006)	20	9			0.75 (0.47, 0.91)	1.50
lasiladu et el (2013)	29	10			0.45 (0.26, 0.62)	1.02
$\frac{1}{2}$	20	12			0.46 (0.30, 0.67)	1.30
$\frac{1}{2008}$	22	9 21			0.41 (0.23, 0.01)	1.27
drissi et al (2015)	24	16	_		0.70 (0.32, 0.83)	1.73
(arm et al (2016)	104	65			0.63 (0.53, 0.71)	3.02
(im et al (2016)	140	86			0.61 (0.53, 0.69)	3.32
(im et al (2017)	128	89		-	0.70 (0.61, 0.77)	3.34
(im et al (2019)	43	28			0.65 (0.50, 0.78)	2.04
Kinsman et al (2019)	144	83	-		0.58 (0.49, 0.65)	3.32
(ranz et al (2015)	106	69			0.65 (0.56, 0.73)	3.08
ee et al (2018)	62	41		—	0.66 (0.54, 0.77)	2.49
evi et al (2019)	101	56	_	•	0.55 (0.46, 0.65)	2.93
i et al (2019)	40	24			0.60 (0.45, 0.74)	1.90
lea et al (2007)	59	36	-	••	0.61 (0.48, 0.72)	2.36
/ledina et al (2010)	13	8			0.62 (0.36, 0.82)	0.86
lurakami et al (2018)	38	19	•		0.50 (0.35, 0.65)	1.80
Dhtonary et al (2018)	19	12		•	0.63 (0.41, 0.81)	1.17
Park et al (2009)	12	9	_		0.75 (0.47, 0.91)	0.97
Schievink et al (2016)	568	373		-	0.66 (0.62, 0.69)	4.28
Shankar et al (2009)	17	14			0.82 (0.59, 0.94)	1.51
So et al (2016)	34	22	-	• · · ·	0.65 (0.48, 0.79)	1.77
Su et al (2009)	11	7		-	0.64 (0.35, 0.85)	0.76
akahashi et al (2016)	169	94	-	◆-i	0.56 (0.48, 0.63)	3.46
anaka et al (2016)	40	28	_		0.70 (0.55, 0.82)	2.05
omoda et al (2008)	27	11			0.41 (0.25, 0.59)	1.47
Viesemann et al (2006)	10	8	-	•	0.80 (0.49, 0.94)	0.95
vu et al (2017)	150	104			0.69 (0.62, 0.76)	3.48
(2018)	37	24	-	•	0.65 (0.49, 0.78)	1.87
rao et al (2017)	206	145	-		0.70 (0.64, 0.76)	3.76
rosnida et al (2014)	12	6	•		0.50 (0.25, 0.75)	0.77
Jverall (1''2 = 52.44%, p = 0.0)	00)			Ŷ	0.03 (0.00, 0.66)	100.00

eFigure 4. Symptoms duration meta-analysis (mean days)

S (95% CI) 8.20 (38.03, 58.37) 2.00 (21.41, 22.59)	Weight 7.45
8.20 (38.03, 58.37) 2.00 (21.41, 22.59)	7.45
2.00 (21.41, 22.59)	
	8.92
0.00 (14.88, 25.12)	8.50
4.70 (8.95, 20.45)	8.39
8.60 (66.38, 130.82)	2.99
0.50 (8.08, 12.92)	8.83
07.30 (42.18, 172.42)	0.98
15.00 (365.69, 864.31)	0.07
242.00 (905.14, 1578.86)	0.04
.91 (2.93, 6.89)	8.86
6.00 (24.77, 47.23)	7.19
1.00 (11.76, 30.24)	7.67
2.90 (28.77, 57.03)	6.45
13.50 (37.33, 189.67)	0.74
5.10 (30.04, 60.16)	6.22
7.70 (29.81, 45.59)	7.97
7.10 (33.71, 40.49)	8.73
1.66 (24.84, 38.49)	100.00
3	15.10 (30.04, 60.16) 17.70 (29.81, 45.59) 17.10 (33.71, 40.49) 11.66 (24.84, 38.49)

eFigure 5a. Meta-analysis of proportions of patients with headache

Article	(n)	(n)	ES (95% CI)	Weight
Canizzano et al (2016)	41	40		14.61
Chen et al (2016)	45	35		3.68
Cho et al (2011)	56	55		19.31
Choi et al (2017)	95	94	 ◆ 0.99 (0.94, 1.00) 	25.58
Medina et al (2010)	13	11		1.52
Park et al (2009)	12	11		2.33
Su et al (2009)	11	10		2.00
Takahashi et al (2016)	169	167	 ◆ 0.99 (0.96, 1.00) 	27.34
Watanabe et al (2008)	18	16	→ 0.89 (0.67, 0.97)	2.67
Wiesemann et al (2006)	10	8	0.80 (0.49, 0.94)	0.97
Adachi et al (2009)	10	10	(Excluded)	
Berrior et al (2004)	33	33	(Excluded)	
Bonetto et al (2011)	17	17	(Excluded)	
Cohen–Gadol et al (2006)	13	13	(Excluded)	
Fichtner et al (2016)	39	39	(Excluded)	
Hannerz et al (2006)	12	12	(Excluded)	
Hasiloglu et al (2012)	25	25	(Excluded)	Ē
Hyun et al (2008)	30	30	(Excluded)	
Idrissi et al (2015)	24	24	(Excluded)	Ē
Kim et al (2016)	140	140	(Excluded)	Ē
Kim et al (2017)	128	128	(Excluded)	
Kim et al (2019)	43	43	(Excluded)	
Levi et al (2019)	101	101	(Excluded)	
Miyazawa et al (2003)	10	10	(Excluded)	
Monteith et al (2016)	12	12	(Excluded)	
Ohtonary et al (2018)	19	19	(Excluded)	
Schievink et al (2019)	113	113	(Excluded)	
So et al (2016)	34	34	(Excluded)	
Tanaka et al (2016)	40	40	(Excluded)	
Watanabe et al (2011)	13	13	(Excluded)	
Wu et al (2017)	150	150	(Excluded)	
Yao et al (2017)	206	206	(Excluded)	-
Yoshida et al (2014)	12	12	(Excluded)	
Overall (I^2 = 52.19%, p = 0	.03)		0.97 (0.94, 0.99)	100.00

eFigure 5b. Meta-analysis of proportions of patients without headache

	Dationto	Patients			0/
Article	(n)	headache (n)		ES (95% CI)	70 Weight
	()				
Capizzano et al (2016)	41	1	•	0.02 (0.00, 0.13)	14.61
Chen et al (2016)	45	10	<u> </u>	0.22 (0.13, 0.36)	3.68
Cho et al (2011)	56	1	+	0.02 (0.00, 0.09)	19.31
Choi et al (2017)	95	1	*	0.01 (0.00, 0.06)	25.58
Medina et al (2010)	13	2		0.15 (0.04, 0.42)	1.52
Park et al (2009)	12	1	*	0.08 (0.01, 0.35)	2.33
Su et al (2009)	11	1	<u>+</u>	0.09 (0.02, 0.38)	2.00
Takahashi et al (2016)	169	2	•	0.01 (0.00, 0.04)	27.34
Watanabe et al (2008)	18	2	•	0.11 (0.03, 0.33)	2.67
Wiesemann et al (2006)	10	2	i _	0.20 (0.06, 0.51)	0.97
Adachi et al (2009)	10	0		(Excluded)	
Berrior et al (2004)	33	0	i -	(Excluded)	
Bonetto et al (2011)	17	0		(Excluded)	
Cohen-Gadol et al (2006)	13	0		(Excluded)	
Fichtner et al (2016)	39	0		(Excluded)	
Hannerz et al (2006)	12	0		(Excluded)	
Hasiloglu et al (2012)	25	0		(Excluded)	
Hyun et al (2008)	30	0		(Excluded)	
Idrissi et al (2015)	24	0		(Excluded)	
Kim et al (2016)	140	0		(Excluded)	
Kim et al (2017)	128	0		(Excluded)	
Kim et al (2019)	43	0		(Excluded)	
Levi et al (2019)	101	0		(Excluded)	
Miyazawa et al (2003)	10	0	i i i i i i i i i i i i i i i i i i i	(Excluded)	
Monteith et al (2016)	12	0		(Excluded)	
Ohtonary et al (2018)	19	0	i i i i i i i i i i i i i i i i i i i	(Excluded)	
Schievink et al (2019)	113	0		(Excluded)	
So et al (2016)	34	0		(Excluded)	
Tanaka et al (2016)	40	0		(Excluded)	
Watanabe et al (2011)	13	0	i i	(Excluded)	
Wu et al (2017)	150	0		(Excluded)	
Yao et al (2017)	206	0	i i	(Excluded)	
Yoshida et al (2014)	12	0		(Excluded)	
Overall (1^2 = 52.19% p =	0.03)	-	8	0.03 (0.01, 0.06)	100.00
(= · o =· · o , p = ·	,		Ţ		

eFigure 6a. Meta-analysis of proportions of patients with orthostatic headache

(n) 40 35 13 128 19 113 167 8	headache (n) 33 24 11 127 13 109	ES (95% Cl) • 0.82 (0.68, 0.91) • 0.69 (0.52, 0.81) • 0.85 (0.58, 0.96) • 0.99 (0.96, 1.00) • 0.68 (0.46, 0.85)	Weight 9.96 6.94 4.76 25.22
40 35 13 128 19 113 167 8	33 24 11 127 13 109	● 0.82 (0.68, 0.91) ● 0.69 (0.52, 0.81) ● 0.85 (0.58, 0.96) ● 0.99 (0.96, 1.00) ● 0.68 (0.46, 0.85)	9.96 6.94 4.76 25.22
35 13 128 19 113 167 8	24 11 127 13 109	→ 0.69 (0.52, 0.81) → 0.85 (0.58, 0.96) → 0.99 (0.96, 1.00) → 0.68 (0.46, 0.85)	6.94 4.76 25.22
13 128 19 113 167 8	11 127 13 109	● 0.85 (0.58, 0.96) ● 0.99 (0.96, 1.00) ● 0.68 (0.46, 0.85)	4.76 25.22
128 19 113 167 8	127 13 109	 ◆ 0.99 (0.96, 1.00) → ○ 0.68 (0.46, 0.85) 	25.22
19 113 167 8	13 109		
113 167 8	109		4.29
167 8	101	• 0.96 (0.91, 0.99)	22.84
8	161	 0.96 (0.92, 0.98) 	23.72
	6		2.27
10	10	(Excluded)	
33	33	(Excluded)	
17	17	(Excluded)	
55	55	(Excluded)	
94	94	(Excluded)	
39	39	(Excluded)	
12	12	(Excluded)	
25	25	(Excluded)	
30	30	(Excluded)	
24	24	(Excluded)	
140	140	(Excluded)	
43	43	(Excluded)	
101	101	(Excluded)	
11	11	(Excluded)	
10	10	(Excluded)	
12	12	(Excluded)	
11	11	(Excluded)	
34	34	(Excluded)	
10	10	(Excluded)	
40	40	(Excluded)	
16	16	(Excluded)	
13	13	(Excluded)	_
150	150	(Excluded)	
206	206	(Excluded)	
12	12	(Excluded)	-
		0.92 (0.87 0.96)	100.00
		0.02 (0.07, 0.00)	100.00
	94 39 12 25 30 24 140 43 101 11 10 12 11 34 10 40 16 13 150 206 12	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	94 94 (Excluded) 39 39 (Excluded) 12 12 (Excluded) 25 25 (Excluded) 30 30 (Excluded) 24 24 (Excluded) 140 140 (Excluded) 143 43 (Excluded) 101 101 (Excluded) 11 11 (Excluded) 12 12 (Excluded) 10 10 (Excluded) 11 11 (Excluded) 12 12 (Excluded) 14 14 (Excluded) 150 10 (Excluded) 16 16 (Excluded) 13 13 (Excluded) 12 12 12 (Excluded) 12 12 0.92 (0.87, 0.96)

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eFigure 6b. Meta-analysis of proportions of patients with non-orthostatic headache

	Headache	Patients with non-orthostatic		%
Article	(n)	headache (n)	ES (95% CI)	Weight
Capizzano et al (2016)	40	7	0.17 (0.09, 0.32)	9.96
Chen et al (2016)	35	11 🖌	- 0.31 (0.19, 0.48)	6.94
Cohen–Gadol et al (2006)	13	2 🗕	0.15 (0.04, 0.42)	4.76
Kim et al (2017)	128	1 🔸	0.01 (0.00, 0.04)	25.22
Ohtonary et al (2018)	19	6	- 0.32 (0.15, 0.54)	4.29
Schievink et al (2019)	113	4	0.04 (0.01, 0.09)	22.84
Takahashi et al (2016)	167	6	0.04 (0.02, 0.08)	23.72
Wiesemann et al (2006)	8	2	- 0.25 (0.07, 0.59)	2.27
Adachi et al (2009)	10	0	(Excluded)	-
Berrior et al (2004)	33	0	(Excluded)	-
Bonetto et al (2011)	17	0	(Excluded)	-
Cho et al (2011)	55	0	(Excluded)	-
Choi et al (2017)	94	0	(Excluded)	
Fichtner et al (2016)	39	0	(Excluded)	
Hannerz et al (2006)	12	0	(Excluded)	
Hasiloglu et al (2012)	25	0	(Excluded)	
Hyun et al (2008)	30	0	(Excluded)	
drissi et al (2015)	24	0	(Excluded)	-
Kim et al (2016)	140	0	(Excluded)	
Kim et al (2019)	43	0	(Excluded)	
Levi et al (2019)	101	0	(Excluded)	
Medina et al (2010)	11	0	(Excluded)	
Miyazawa et al (2003)	10	0	(Excluded)	
Monteith et al (2016)	12	0	(Excluded)	
Park et al (2009)	11	0	(Excluded)	
So et al (2016)	34	0	(Excluded)	
Su et al (2009)	10	0	(Excluded)	
Tanaka et al (2016)	40	0	(Excluded)	
Watanabe et al (2008)	16	0	(Excluded)	
Watanabe et al (2011)	13	0	(Excluded)	
Wu et al (2017)	150	0	(Excluded)	
Yao et al (2017)	206	0	(Excluded)	
Yoshida et al (2014)	12	0	(Excluded)	-
Overall (I^2 = 80.95%, p = 0.0	00)	0	0.08 (0.04, 0.13)	100.00

0 25 5 75 1



eFigure 7a. Meta-analysis of proportions of headache location (diffuse)

eFigure 7b. Meta-analysis of proportions of headache location (occipital)



eFigure 7c. Meta-analysis of proportions of headache location (frontal)



eFigure 7d. Meta-analysis of proportions of headache location (fronto-occipital)



eFigure 7e. Meta-analysis of proportions of headache location (temporal)



eFigure 8a. Meta-analysis of proportions of patients with nausea/vomiting

Article	Patients (n)	Nausea/Vomiting (n)		ES (95% CI)	% Weight
Adaphi at al (2000)	10	0		0.20 (0.06, 0.51)	2.02
Amomivo et al (2016)	10	2		0.20(0.06, 0.51)	2.93
Allenitya et al (2010) Rolkon et al (2012)	10	10		0.07 (0.42, 0.03)	3.00
Balkall et al (2012)	21	10 6	_	0.91(0.02, 0.96)	3.47
Beck et al (2017)	01 00	0		0.19(0.09, 0.30)	3.07
Bendto et al (2004)	17	23		0.70(0.53, 0.63)	3.50
$\begin{array}{c} \text{Bolletto et al (2017)} \\ \text{Choi at al (2017)} \end{array}$	17	1 I 6 4		0.65(0.41, 0.63)	3.08
Chor et al (2017)	95	64		0.67 (0.57, 0.76)	3.92
Conen-Gadoi et al (2006)	13	9		0.69(0.42, 0.87)	2.91
Davies et al (2020)	80	32		0.37 (0.28, 0.48)	3.88
Hashizume et al (2013)	29	24		0.83 (0.65, 0.92)	3.68
He et al (2017)	165	65		0.39 (0.32, 0.47)	4.00
Hyun et al (2008)	30	23		0.77 (0.59, 0.88)	3.60
Idrissi et al (2015)	24	18		0.75 (0.55, 0.88)	3.45
Kim et al (2016)	140	71		0.51 (0.43, 0.59)	3.97
Kim et al (2017)	128	100		0.78 (0.70, 0.84)	4.01
Kim et al (2019)	43	29	-	0.67 (0.53, 0.80)	3.67
Levi et al (2019)	101	53		0.52 (0.43, 0.62)	3.90
Li et al (2019)	40	25		0.63 (0.47, 0.76)	3.60
Martin et al (2019)	94	28		0.30 (0.21, 0.40)	3.93
Miyazawa et al (2003)	10	3		0.30 (0.11, 0.60)	2.69
Ohtonary et al (2018)	19	7		0.37 (0.19, 0.59)	3.15
Park et al (2009)	12	9		0.75 (0.47, 0.91)	2.95
Su et al (2009)	11	7		0.64 (0.35, 0.85)	2.69
Tanaka et al (2016)	40	10		0.25 (0.14, 0.40)	3.70
Tomoda et al (2008)	27	9		0.33 (0.19, 0.52)	3.42
Wiesemann et al (2006)	10	5		0.50 (0.24, 0.76)	2.52
Wu et al (2017)	150	110		0.73 (0.66, 0.80)	4.02
Yagi et al (2018)	37	9		0.24 (0.13, 0.40)	3.68
Yoshida et al (2014)	12	3		0.25 (0.09, 0.53)	2.95
Overall (I^2 = 89.92%, p =	: 0.00)		\diamond	0.54 (0.46, 0.62)	100.00
		l (I I I I D .25 .5 .75 1		

eFigure 8b. Meta-analysis of proportions of patients with neck pain/stiffness

Article	Patients (n)	Neck pain/stiffness (n)	ES (95% Cl)	% Weight
Adachi et al (2009)	10	1 -	0.10 (0.02, 0.40)	3.95
Amemiya et al (2016)	15	12 —	0.80 (0.55, 0.93)	3.86
Balkan et al (2012)	11	5	0.45 (0.21, 0.72)	3.33
Berrior et al (2004)	33	16	- 0.48 (0.33, 0.65)	4.03
Bonetto et al (2011)	17	9	0.53 (0.31, 0.74)	3.66
Choi et al (2017)	95	40	0.42 (0.33, 0.52)	4.34
Cohen–Gadol et al (2006)	13	4	0.31 (0.13, 0.58)	3.58
Davies et al (2020)	86	22	0.26 (0.18, 0.36)	4.36
Hashizume et al (2013)	29	11	0.38 (0.23, 0.56)	4.00
He et al (2017)	165	113	0.68 (0.61, 0.75)	4.42
Hyun et al (2008)	30	10	0.33 (0.19, 0.51)	4.04
ldrissi et al (2015)	24	17 —	0.71 (0.51, 0.85)	3.97
Kim et al (2016)	140	9 🛨	0.06 (0.03, 0.12)	4.48
Kim et al (2017)	128	49	0.38 (0.30, 0.47)	4.39
Levi et al (2019)	101	65 —	• 0.64 (0.55, 0.73)	4.36
Li et al (2019)	40	19	- 0.47 (0.33, 0.63)	4.11
Martin et al (2019)	94	35	0.37 (0.28, 0.47)	4.34
Miyazawa et al (2003)	10	2	0.20 (0.06, 0.51)	3.60
Ohtonary et al (2018)	19	2	0.11 (0.03, 0.31)	4.19
Park et al (2009)	12	5	- 0.42 (0.19, 0.68)	3.42
Su et al (2009)	11	9 —	0.82 (0.52, 0.95)	3.72
Tanaka et al (2016)	40	27 —	•••••••••••••••••••••••••••••••••••••••	4.15
Tomoda et al (2008)	27	5	0.19 (0.08, 0.37)	4.15
Yagi et al (2018)	37	13	0.35 (0.22, 0.51)	4.11
Yoshida et al (2014)	12	7	0.58 (0.32, 0.81)	3.42
	0.00)	$\langle \rangle$	0.43 (0.32, 0.53)	100.00

eFigure 8c. Meta-analysis of proportions of patients with tinnitus

Articlo	Patients	Tinnitus (n)		% Woight
	(1)	(1)	EG (83 % OI)	weigh
Adachi et al (2009)	10	1	0.10 (0.02, 0.4	0) 3.89
Amemiya et al (2016)	15	4	- 0.27 (0.11, 0.5	2) 3.33
Balkan et al (2012)	11	3	— 0.27 (0.10, 0.5	7) 2.82
Bonetto et al (2011)	17	1	0.06 (0.01, 0.2	7) 5.14
Choi et al (2017)	95	20	0.21 (0.14, 0.3	0) 5.61
Cohen–Gadol et al (2006)	13	1	0.08 (0.01, 0.3	3) 4.58
Davies et al (2020)	86	31	0.36 (0.27, 0.4	7) 5.31
He et al (2017)	165	31	0.19 (0.14, 0.2	5) 5.91
Hyun et al (2008)	30	4	0.13 (0.05, 0.3	0) 4.98
Kim et al (2016)	140	10	0.07 (0.04, 0.1	3) 6.09
Kim et al (2017)	128	24	0.19 (0.13, 0.2	6) 5.81
Levi et al (2019)	101	38	0.38 (0.29, 0.4	7) 5.42
Martin et al (2019)	94	41	- 0.44 (0.34, 0.5	4) 5.33
Miyazawa et al (2003)	10	1	0.10 (0.02, 0.4	0) 3.89
Ohtonary et al (2018)	19	3	0.16 (0.06, 0.3	8) 4.25
Su et al (2009)	11	1	0.09 (0.02, 0.3	8) 4.15
Tanaka et al (2016)	40	14	0.35 (0.22, 0.5	0) 4.53
Tomoda et al (2008)	27	3	0.11 (0.04, 0.2	8) 5.03
Wiesemann et al (2006)	10	1	0.10 (0.02, 0.4	0) 3.89
Wu et al (2017)	150	62	0.41 (0.34, 0.4	9) 5.66
Yoshida et al (2014)	12	1	0.08 (0.01, 0.3	5) 4.38
	0.00)		0 20 (0 14 0 2	6) 100.00

eFigure 8d. Meta-analysis of proportions of patients with dizziness



eFigure 8e. Meta-analysis of proportions of patients with hearing disturbances

	Patients	Hearing						%
Article	(n)	impairment (n)					ES (95% CI)	Weight
				1				
Adachi et al (2009)	10	2		1			0.20 (0.06, 0.51)) 5.28
Amemiya et al (2016)	15	11		i I		•	0.73 (0.48, 0.89	5.63
Berrior et al (2004)	33	14		•			0.42 (0.27, 0.59	6.45
Bonetto et al (2011)	17	3					0.18 (0.06, 0.41	6.26
Choi et al (2017)	95	13		1			0.14 (0.08, 0.22)	7.67
Cohen-Gadol et al (2006	6)13	1	•				0.08 (0.01, 0.33)	6.79
Hashizume et al (2013)	29	22				•	0.76 (0.58, 0.88	6.64
Hyun et al (2008)	30	3	-•	1			0.10 (0.03, 0.26	7.28
ldrissi et al (2015)	24	11			•		0.46 (0.28, 0.65	5.99
Kim et al (2017)	128	22					0.17 (0.12, 0.25	7.70
Levi et al (2019)	101	3	◆	1			0.03 (0.01, 0.08	7.90
Miyazawa et al (2003)	10	1	•				0.10 (0.02, 0.40)	6.19
Tanaka et al (2016)	40	24		1	•	_	0.60 (0.45, 0.74	6.69
Wu et al (2017)	150	31					0.21 (0.15, 0.28	7.70
Yoshida et al (2014)	12	2					0.17 (0.05, 0.45	5.82
Overall (I^2 = 92.75%, p	= 0.00)		<	\triangleright			0.28 (0.18, 0.38	100.00
				1				
		I 0	2!	- 5	.5	.75	1	
		•		-			-	





eFigure 8g. Meta-analysis of proportions of patients with cognitive symptoms

	Patients	Cognitive						%
Article	(n)	(n)					ES (95% CI)	Weight
Beck et al (2017)	31	1	•	-			0.03 (0.01, 0.16)	17.66
Bonetto et al (2011)	17	1	-				0.06 (0.01, 0.27)	9.93
Capizzano et al (2016)	41	11			-		0.27 (0.16, 0.42)	7.65
Cohen–Gadol et al (2006)	13	1	-				0.08 (0.01, 0.33)	6.95
ldrissi et al (2015)	24	1	•	_			0.04 (0.01, 0.20)	14.39
Levi et al (2019)	101	2	•				0.02 (0.01, 0.07)	24.60
Martin et al (2019)	94	8	•	-			0.09 (0.04, 0.16)	18.83
Amemiya et al (2016)	15	15					(Excluded)	
Overall (I^2 = 62.22%, p =	0.01)		\diamond				0.06 (0.02, 0.11)	100.00
						1	[
			0	.25	.5	.75	1	



eFigure 8h. Meta-analysis of proportions of patients with diplopia

eFigure 8i. Meta-analysis of proportions of patients with other ear-related symptoms





eFigure 8l. Meta-analysis of proportions of patients with vertigo

eFigure 8m. Meta-analysis of proportions of patients with movement disorders



eFigure 8n. Meta-analysis of proportions of patients with back pain



eFigure 80. Meta-analysis of proportions of patients with other visual symptoms

Article	Patients	Other visual	ES (05% CI)	% Weight
Antole	(1)		23 (33 /8 01)	Weight
Balkan et al (2012)	11	6 -	0.55 (0.28, 0.79)	3.96
Beck et al (2017)	31	3	0.10 (0.03, 0.25)	10.13
Capizzano et al (2016)	41	6	0.15 (0.07, 0.28)	9.95
Cohen–Gadol et al (2006)	13	2	0.15 (0.04, 0.42)	6.46
Davies et al (2020)	86	18	0.21 (0.14, 0.31)	10.90
Hashizume et al (2013)	29	9	0.31 (0.17, 0.49)	7.45
Kim et al (2017)	128	1 🖝	0.01 (0.00, 0.04)	12.96
Martin et al (2019)	94	15	0.16 (0.10, 0.25)	11.39
Park et al (2009)	12	1	0.08 (0.01, 0.35)	7.91
Su et al (2009)	11	1 -	0.09 (0.02, 0.38)	7.39
Tomoda et al (2008)	27	1	0.04 (0.01, 0.18)	11.49
Overall (I^2 = 85.19%, p =	0.00)	\diamond	0.14 (0.07, 0.21)	100.00

eFigure 8p. Meta-analysis of proportions of patients with reduced consciousness

	Patients.	Consciousness	S ,					%.
Article	(n) <u>.</u>	(n) <u>.</u>					ES (95% CI)	Weight
Beck et al (2017).	31.	3.	•				0.10 (0.03, 0.25).	23.14
Chen et al (2016)	45.	13.			-		0.29 (0.18, 0.43)	17.82
Idrissi et al (2015)	24	3,					0.13 (0.04, 0.31) <u>.</u>	17.84
Wiesemann et al (2006).	10.	2.		 			0.20 (0.06, 0.51).	7.12
Yagi et al (2018).	37.	3.	•	1 1 1			0.08 (0.03, 0.21)	26.83
Yoshida et al (2014).	12.	3,	_	•			0.25 (0.09, 0.53)	7.26
Overall (I^2 = 39.59%, p	= 0.14)		<	\Rightarrow			0.15 (0.08, 0.22) <u>.</u>	100.00
			0	.25	.5	.75	1	

eFigure 9a. Meta-analysis of proportions of diffuse pachymeningeal enhancement (DPE) in brain MRI

	Patients	DPE			%
Article	(n)	(n)		ES (95% Cl)	Weight
Ahn et al (2018)	94	29		0.31 (0.22, 0.41)	3.78
Ansel et al (2016)	15	2	•	0.13 (0.04, 0.38)	3.21
Berrior et al (2004)	31	19		0.61 (0.44, 0.76)	3.21
Bonetto et al (2011)	17	16	•	0.94 (0.73, 0.99)	3.66
Capizzano et al (2016)	41	32		0.78 (0.63, 0.88)	3.56
Cho et al (2011)	56	48	·•	0.86 (0.74, 0.93)	3.79
Choi et al (2017)	95	76	<u>+ •</u>	0.80 (0.71, 0.87)	3.85
Cohen–Gadol et al (2006)	13	12		0.92 (0.67, 0.99)	3.42
Hashizume et al (2013)	29	27		0.93 (0.78, 0.98)	3.79
Hori et al (2016)	22	21		0.95 (0.78, 0.99)	3.82
Hyun et al (2008)	30	24		0.80 (0.63, 0.90)	3.43
ldrissi et al (2015)	23	20	••••	0.87 (0.68, 0.95)	3.47
Karm et al (2016)	104	61		0.59 (0.49, 0.68)	3.77
Kim et al (2016)	140	70	—	0.50 (0.42, 0.58)	3.84
Kim et al (2017)	128	82		0.64 (0.55, 0.72)	3.84
Kranz et al (2015)	99	77		0.78 (0.69, 0.85)	3.84
Mea et al (2009)	90	77		0.86 (0.77, 0.91)	3.89
Monteith et al (2016)	12	7	•	0.58 (0.32, 0.81)	2.37
Park et al (2009)	12	10		0.83 (0.55, 0.95)	2.89
Schievink et al (2008)	94	53	—	0.56 (0.46, 0.66)	3.74
Shankar et al (2009)	17	12		0.71 (0.47, 0.87)	2.85
Su et al (2009)	7	6		0.86 (0.49, 0.97)	2.52
Tanaka et al (2016)	40	37		0.93 (0.80, 0.97)	3.85
Tsai et al (2018)	27	21		0.78 (0.59, 0.89)	3.33
Wiesemann et al (2006)	10	7		0.70 (0.40, 0.89)	2.34
Wu et al (2017)	150	103		0.69 (0.61, 0.76)	3.88
Yagi et al (2018)	37	28		0.76 (0.60, 0.87)	3,47
Yao et al (2017)	206	169		0.82 (0.76, 0.87)	3,98
Yoshida et al (2014)	12	9	•	0.75 (0.47, 0.91)	2.63
Balkan et al (2012)	11	11		(Excluded)	
Feltracco et al (2015)	18	18	i i	(Excluded)	
Hannerz et al (2006)	10	10		(Excluded)	
Miyazawa et al (2003)	10	10	i I	(Excluded)	
Takahashi et al (2016)	54	54		(Excluded)	
Overall $(1^2 = 90.85\%)$ p = 0	.00)		· · ·	0.73 (0.67, 0.80)	100.00
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eFigure 9b. Meta-analysis of proportions of subdural collections (SDC) in brain MRI

	Patients	SDC		%
Article	(n)	(n)	ES (95% CI)	Weight
Ahn et al (2018)	94	36	0.38 (0.29, 0.48)	3.77
Ansel et al (2016)	15	3	0.20 (0.07, 0.45)	2.97
Balkan et al (2012)	11	2	0.18 (0.05, 0.48)	2.76
Berrior et al (2004)	31	11	0.35 (0.21, 0.53)	3.25
Bonetto et al (2011)	17	7	0.41 (0.22, 0.64)	2.72
Capizzano et al (2016)	41	16	0.39 (0.26, 0.54)	3.40
Cho et al (2011)	56	13	0.23 (0.14, 0.36)	3.69
Choi et al (2017)	95	48	0.51 (0.41, 0.60)	3.75
Cohen–Gadol et al (2006)	13	2	0.15 (0.04, 0.42)	3.02
Feltracco et al (2015)	18	4	0.22 (0.09, 0.45)	3.05
Hannerz et al (2006)	10	3	0.30 (0.11, 0.60)	2.34
Hashizume et al (2013)	29	9	0.31 (0.17, 0.49)	3.25
Hori et al (2016)	22	14	0.64 (0.43, 0.80)	2.98
Hyun et al (2008)	30	8	0.27 (0.14, 0.44)	3.33
ldrissi et al (2015)	23	17	•	3.16
Karm et al (2016)	104	11	• 0.11 (0.06, 0.18)	3.98
Kim et al (2016)	140	34	0.24 (0.18, 0.32)	3.92
Kim et al (2017)	128	20	0.16 (0.10, 0.23)	3.96
Mea et al (2009)	90	65	0.72 (0.62, 0.80)	3.80
Miyazawa et al (2003)	10	1	0.10 (0.02, 0.40)	3.10
Park et al (2009)	12	2	0.17 (0.05, 0.45)	2.90
Schievink et al (2008)	94	34	0.36 (0.27, 0.46)	3.78
Shankar et al (2009)	17	11	0.65 (0.41, 0.83)	2.77
Su et al (2009)	7	3	0.43 (0.16, 0.75)	1.82
Tanaka et al (2016)	40	17	0.43 (0.29, 0.58)	3.37
Tsai et al (2018)	27	7	0.26 (0.13, 0.45)	3.27
Wiesemann et al (2006)	10	4	0.40 (0.17, 0.69)	2.20
Wu et al (2017)	150	54	0.36 (0.29, 0.44)	3.89
Yagi et al (2018)	37	19	0.51 (0.36, 0.67)	3.31
Yao et al (2017)	206	38	0.18 (0.14, 0.24)	4.00
Yoshida et al (2014)	12	8	0.67 (0.39, 0.86)	2.47
Takahashi et al (2016)	54	54	(Excluded)	
Overall (I^2 = 88.45%, p = 0	.00)		0.35 (0.28, 0.42)	100.00
		(0 .25 .5 .75 1	

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Article	(n)	sagging (n)			
Ahn et al (2018)		ougging (II)		ES (95% CI)	Weight
/ inf ct al (2010)	94	14	- - -	0.15 (0.09, 0.23)	4.91
Balkan et al (2012)	11	9		0.82 (0.52, 0.95)	4.14
Berrior et al (2004)	31	12		0.39 (0.24, 0.56)	4.48
Bonetto et al (2011)	17	7		0.41 (0.22, 0.64)	4.10
Cho et al (2011)	56	18		0.32 (0.21, 0.45)	4.73
Cohen–Gadol et al (2006)	13	11	• • • • • • • • • • • • • • • • • • •	0.85 (0.58, 0.96)	4.33
Feltracco et al (2015)	18	2	-	0.11 (0.03, 0.33)	4.62
Hashizume et al (2013)	29	15		0.52 (0.34, 0.69)	4.42
Hori et al (2016)	22	6		0.27 (0.13, 0.48)	4.39
Hyun et al (2008)	30	3		0.10 (0.03, 0.26)	4.79
Idrissi et al (2015)	23	20	•	0.87 (0.68, 0.95)	4.66
Karm et al (2016)	104	22	—	0.21 (0.14, 0.30)	4.89
Kim et al (2016)	140	19	—	0.14 (0.09, 0.20)	4.95
Kim et al (2017)	128	31	_ _	0.24 (0.18, 0.32)	4.91
Kranz et al (2015)	99	60	—	0.61 (0.51, 0.70)	4.83
Mea et al (2009)	90	78		0.87 (0.78, 0.92)	4.92
Schievink et al (2008)	94	48		0.51 (0.41, 0.61)	4.82
Shankar et al (2009)	17	12	• • • • • • • • • • • • • • • • • • •	0.71 (0.47, 0.87)	4.21
Su et al (2009)	7	2		0.29 (0.08, 0.64)	3.44
Wiesemann et al (2006)	10	4		0.40 (0.17, 0.69)	3.64
Wu et al (2017)	150	62		0.41 (0.34, 0.49)	4.89
Yao et al (2017)	206	58		0.28 (0.22, 0.35)	4.94
Overall (I^2 = 95.78%, p =	0.00)			0.43 (0.32, 0.54)	100.00
•				. ,	
		Ĩ		[

eFigure 9d. Meta-analysis of proportions of enlarged pituitary gland (EPG) in brain MRI



eFigure 9e. Meta-analysis of proportions of venous engorgement in brain MRI



eFigure 9f. Meta-analysis of proportions of normal brain MRI



eFigure 10. Meta-analysis of proportions of positive findings in spinal MRI



eFigure 11. Meta-analysis of proportions of positive findings in CT myelography (CTM)





eFigure 12. Meta-analysis of proportions of positive findings in MR myelography

eFigure 13. Meta-analysis of proportions of positive findings in MR myelography with intrathecal gadolinium



eFigure 14. Meta-analysis of proportions of positive findings in radionuclide cisternography



eFigure 15. Meta-analysis of proportions of positive findings in digital subtraction myelography



The two studies by Schievink *et al.* have clearly been reported to come from different groups of patients, therefore, they were both eligible for the meta-analysis.

eFigure 16. Meta-analysis of proportions of positive findings in digital subtraction myelography performed in lateral decubitus position



Article	Leaks (n)	Cervical (n)	ES (95% CI)	% Weight
Ahn et al (2018)	87	5		6 12
Albes et al (2012)	81	12		5 14
Ansel et al (2016)	3	1		0.38
Cebeci et al (2020)	18	6		1.80
$\frac{2020}{10}$	30	6		3 03
Choi et al (2016)	22	2		3 73
Choi et al (2010)	11/	20		5.05
Cobon Gadol et al (2006)	10	23		2.65
Earb at al (2010)	19 07	1		5.36
Fightpor of al (2019)	27	י ס		1 40
Fronzini et al (2019)	20	2		4.40
Hanzini et al (2010)	20	1		2.46
	20	4		3.40 4 15
Hasilogiu et al (2012)	20	۲ 41		4.15
Here $ar(2017)$	354	41		4 90
Hyun et al (2008)	31	2		4.02
Idrissi et al (2015)	/			1.37
Joo et al (2015)	126	35		5.11
Lee et al (2018)	62	11	0.18 (0.10, 0.29)	4.52
Miyazawa et al (2003)	10	2		1.48
Ontonary et al (2018)	19	4	0.21 (0.09, 0.43)	2.30
Schievink et al (2005)	65	23	0.35 (0.25, 0.48)	3.84
Su et al (2009)	12	1	• 0.08 (0.01, 0.35)	2.81
Takahashi et al (2016)	110	15	••• 0.14 (0.08, 0.21)	5.61
Thielen et al (2015)	14	3	0.21 (0.08, 0.48)	1.84
Wu et al (2017)	150	7	← 0.05 (0.02, 0.09)	6.56
Yagi et al (2018)	18	3	0.17 (0.06, 0.39)	2.50
Overall (I^2 = 70.67%, p =	= 0.00)		• 0.14 (0.10, 0.17)	100.00
			1 I I I 0 .25 .5 .75 1	

eFigure 17a. Meta-analysis of proportions of leak location (cervical)

	Leaks	Cervico-thoracic		%
Article	(n)	(n)	ES (95% CI)	Weight
Ahn et al (2018)	87	17	0.20 (0.13, 0.29)	6.15
Ansel et al (2016)	3	1	- 0.33 (0.06, 0.79)	1.61
Cebeci et al (2020)	18	1	0.06 (0.01, 0.26)	5.89
Cho et al (2011)	39	15	0.38 (0.25, 0.54)	5.27
Choi et al (2016)	22	2	0.09 (0.03, 0.28)	5.71
Farb et al (2019)	27	2	0.07 (0.02, 0.23)	5.97
Fichtner et al (2019)	27	1 🗕	0.04 (0.01, 0.18)	6.26
Franzini et al (2010)	20	5	0.25 (0.11, 0.47)	4.75
Hashizume et al (2012)	28	6	0.21 (0.10, 0.40)	5.28
Hasiloglu et al (2012)	25	5	0.20 (0.09, 0.39)	5.21
He et al (2017)	354	131	0.37 (0.32, 0.42)	6.43
Hyun et al (2008)	31	7 •	0.23 (0.11, 0.40)	5.35
Joo et al (2015)	126	31 -	0.25 (0.18, 0.33)	6.23
Lee et al (2018)	62	21	0.34 (0.23, 0.46)	5.74
Miyazawa et al (2003)	10	8	• 0.80 (0.49, 0.94)	3.96
Ohtonary et al (2018)	19	2	0.11 (0.03, 0.31)	5.47
So et al (2016)	23	5	0.22 (0.10, 0.42)	5.05
Su et al (2009)	12	1	0.08 (0.01, 0.35)	5.22
Yoshida et al (2014)	12	10	• 0.83 (0.55, 0.95)	4.45
Cohen–Gadol et al (2006)	19	0	(Excluded)	
Overall (I^2 = 87.99%, p = 0	.00)	\diamond	0.25 (0.17, 0.32)	100.00
		T I		
			I	
		0 .25 .5 .7	5 1	

eFigure 17b. Meta-analysis of proportions of leak location (cervico-thoracic)

eFigure 17	/c. Meta-analysis	of proportions	of leak location	(thoracic)
		· · · · · · · ·		()

A .: 1	Leaks	Thoracic		%
Article	(n)	(n)	ES (95% CI)	Weight
Ahn et al (2018)	87	4	• 0.05 (0.02, 0.11)	4.15
Albes et al (2012)	81	25	0.31 (0.22, 0.42)	4.05
Cebeci et al (2020)	18	5	0.28 (0.12, 0.51)	3.68
Cho et al (2011)	39	8	0.21 (0.11, 0.36)	3.97
Choi et al (2016)	22	8	0.36 (0.20, 0.57)	3.70
Choi et al (2017)	114	49	0.43 (0.34, 0.52)	4.07
Cohen–Gadol et al (2006)	19	9	0.47 (0.27, 0.68)	3.60
Farb et al (2019)	27	20	0.74 (0.55, 0.87)	3.84
Fichtner et al (2019)	27	22	0.81 (0.63, 0.92)	3.91
Franzini et al (2010)	20	5	0.25 (0.11, 0.47)	3.75
Hashizume et al (2012)	28	5	0.18 (0.08, 0.36)	3.93
Hasiloglu et al (2012)	25	11	0.44 (0.27, 0.63)	3.73
He et al (2017)	354	25	• 0.07 (0.05, 0.10)	4.17
Hyun et al (2008)	31	14	0.45 (0.29, 0.62)	3.81
ldrissi et al (2015)	7	4		2.93
Joo et al (2015)	126	44	0.35 (0.27, 0.44)	4.09
Lee et al (2018)	62	25	0.40 (0.29, 0.53)	3.99
Ohtonary et al (2018)	19	11	0.58 (0.36, 0.77)	3.61
Schievink et al (2005)	65	21	0.32 (0.22, 0.44)	4.01
So et al (2016)	23	1	• 0.04 (0.01, 0.21)	4.09
Su et al (2009)	12	7	0.58 (0.32, 0.81)	3.35
Takahashi et al (2016)	110	29	—— 0.26 (0.19, 0.35)	4.09
Thielen et al (2015)	14	11	0.79 (0.52, 0.92)	3.64
Wu et al (2017)	150	127		4.13
Yagi et al (2018)	18	15	0.83 (0.61, 0.94)	3.82
Yoshida et al (2014)	12	1	0.08 (0.01, 0.35)	3.88
Overall (I^2 = 97.26%, p =	= 0.00)		0.41 (0.29, 0.52)	100.00
(· · · ·) P	,			
		(0 .25 .5 .75 1	

	Leaks	Thoraco-lumb	bar					%
Article	(n)	(n)					ES (95% CI)	Weight
Ahn et al (2018)	87	15	-	•			0.17 (0.11, 0.2	7) 9.74
Choi et al (2016)	22	1	•	_			0.05 (0.01, 0.2	2) 8.43
Cohen-Gadol et al (200	6)9	2	-				0.11 (0.03, 0.3 ⁻	1) 3.82
Farb et al (2019)	27	2	-				0.07 (0.02, 0.23	3) 6.85
Fichtner et al (2019)	27	2	-				0.07 (0.02, 0.23	3) 6.85
Hashizume et al (2012)	28	5	-	•			0.18 (0.08, 0.30	6) 3.63
Hasiloglu et al (2012)	25	4	+	•			0.16 (0.06, 0.3	5) 3.55
Hyun et al (2008)	31	3	-				0.10 (0.03, 0.2	5) 6.28
Joo et al (2015)	126	5	-				0.04 (0.02, 0.09	9) 26.01
Lee et al (2018)	62	4	+	-			0.06 (0.03, 0.1	5) 14.15
Ohtonary et al (2018)	19	2	-				0.11 (0.03, 0.3 [.]	1) 3.82
So et al (2016)	23	3	-	<u> </u>			0.13 (0.05, 0.3	2) 3.84
Su et al (2009)	12	1	-				0.08 (0.01, 0.3	5) 3.03
He et al (2017)	354	0					(Excluded)	
Overall (I^2 = 19.99%,	p = 0.24)	\$				0.08 (0.06, 0.1	1) 100.00
			Ţ					
				-				
			0	.25	.5	.75	1	

eFigure 17d. Meta-analysis of proportions of leak location (thoraco-lumbar)

eFigure 17e. Meta-analysis of proportions of leak location (lumbar)

	Leaks	Lumbar				%
Article	(n)	(n)			ES (95% CI)	Weight
Ahn et al (2018)	87	17			0.20 (0.13, 0.29)	5.37
Albes et al (2012)	81	21	· · · · ·		0.26 (0.18, 0.36)	4.93
Ansel et al (2016)	3	1	•		0.33 (0.06, 0.79)	0.44
Cebeci et al (2020)	18	5	•		0.28 (0.12, 0.51)	2.18
Cho et al (2011)	39	10			0.26 (0.15, 0.41)	3.62
Choi et al (2016)	22	3			0.14 (0.05, 0.33)	3.45
Choi et al (2017)	114	11			0.10 (0.05, 0.16)	6.41
Cohen–Gadol et al (2006	5)19	1			0.05 (0.01, 0.25)	4.76
Farb et al (2019)	27	2	•		0.07 (0.02, 0.23)	4.81
Franzini et al (2010)	20	2			0.10 (0.03, 0.30)	3.78
Hashizume et al (2012)	28	4			0.14 (0.06, 0.31)	3.83
Hasiloglu et al (2012)	25	2			0.08 (0.02, 0.25)	4.56
He et al (2017)	354	8	•		0.02 (0.01, 0.04)	7.38
Hyun et al (2008)	31	5			0.16 (0.07, 0.33)	3.83
ldrissi et al (2015)	7	2			0.29 (0.08, 0.64)	1.02
Joo et al (2015)	126	11			0.09 (0.05, 0.15)	6.57
Lee et al (2018)	62	1	←		0.02 (0.00, 0.09)	7.08
Schievink et al (2005)	65	2	-		0.03 (0.01, 0.11)	6.80
So et al (2016)	23	2	•		0.09 (0.02, 0.27)	4.27
Su et al (2009)	12	1	•		0.08 (0.01, 0.35)	3.13
Takahashi et al (2016)	110	36			0.33 (0.25, 0.42)	5.21
Wu et al (2017)	150	16	-		0.11 (0.07, 0.17)	6.57
Fichtner et al (2019)	27	0			(Excluded)	
Ohtonary et al (2018)	19	0			(Excluded)	
Overall (I^2 = 82.49%, p) = 0.00)		\diamond		0.12 (0.08, 0.16)	100.00
				75 1		
			0 .20 .0	.75 1		



eFigure 17f. Meta-analysis of proportions of leak location (sacral)

eFigure 17g. Meta-analysis of proportions of leak location (multiple)

	Leaks	Multiple			%
Article	(n)	sites (n)	ES (9	95% CI)	Weight
Albes et al (2012)	81	23	0.28	(0.20, 0.39)	9.76
Cebeci et al (2020)	18	1	0.06	(0.01, 0.26)	9.58
Choi et al (2016)	22	1	0.05	(0.01, 0.22)	10.00
Choi et al (2017)	114	24		(0.15, 0.29)	10.24
Cohen–Gadol et al (2006)	19	4	0.21	(0.09, 0.43)	7.63
Franzini et al (2010)	20	6	0.30	(0.15, 0.52)	7.19
He et al (2017)	354	149	0.42	(0.37, 0.47)	10.62
Schievink et al (2005)	65	19	0.29	(0.20, 0.41)	9.47
So et al (2016)	23	12	• 0.52	(0.33, 0.71)	7.11
Su et al (2009)	12	1	• 0.08	(0.01, 0.35)	8.33
Takahashi et al (2016)	110	30	0.27	(0.20, 0.36)	10.07
Farb et al (2019)	27	0	(Excl	uded)	•
Overall (I^2 = 88.75%, p =	= 0.00)		0.24	(0.15, 0.33)	100.00

eFigure 18a. Meta-analysis of proportions of lumbar puncture opening pressure (low)

	Patients	Low			%
Article	(n).	(n) <u></u>		ES (95% CI <u>)</u>	Weight
Chazen et al (2014)	9.	3,		0.33 (0.12, 0.65)	4.08
Ferrante et al (2004)	14	12		0.86 (0.60, 0.96)	4.84
Fichtner et al (2019)	23	8,	(0.35 (0.19, 0.55)	4.77
Hashizume et al (2013)	26	19,		0.73 (0.54, 0.86)	4.90
Hasiloglu et al (2012)	25	23,		0.92 (0.75, 0.98)	5.18
Hyun et al (2008)	30	23,		0.77 (0.59, 0.88)	5.00
Kong et al (2005)	13	11,	•	0.85 (0.58, 0.96)	4.77
Kranz et al (2015)	106	36,	_ _	0.34 (0.26, 0.43)	5.24
Li et al (2019),	40	37,		0.93 (0.80, 0.97)	5.26
Lin et al (2002),	6,	4		0.67 (0.30, 0.90)	3.65
Miyazawa et al (2003)	9,	7.		0.78 (0.45, 0.94)	4.32
Ohtonary et al (2018).	12	8.	(0.67 (0.39, 0.86).	4.35
Park et al (2009),	11,	9		0.82 (0.52, 0.95)	4.58
Schievink et al (2008)	75,	70,		0.93 (0.85, 0.97)	5.32
Takahashi et al (2016),	52	28,		0.54 (0.41, 0.67)	5.07
Takai et al (2018)	11,	10,		0.91 (0.62, 0.98)	4.91,
Tomoda et al (2008)	27,	2		0.07 (0.02, 0.23)	5.21,
Watanabe et al (2008)	17,	12		0.71 (0.47, 0.87)	4.65
Wiesemann et al (2006)	8,	5,		0.63 (0.31, 0.86)	3.91,
Yao et al (2017)	206	114	- -	0.55 (0.49, 0.62)	5.30
Yoon et al (2011)	18	13,	(0.72 (0.49, 0.88)	4.71,
Overall (I^2 = 94.75%, p	= 0.00)			0.67 (0.54, 0.80)	100.00
			+ 		
			0 .25 .5 .75 1		

eFigure 18b. Meta-analysis of proportions of lumbar puncture opening pressure (normal)

	Patients	Normal						%,
Article	(n).	(n) <u>.</u>					ES (95% CI <u>)</u>	Weight
Chazen et al (2014)	9	6		¦			0.67 (0.35, 0.88)	4 05
Entrante et al (2004)	5, 1 <i>1</i>	0, 2	_	1			0.07 (0.03, 0.00)	4.00, 1 81
Fightpor of al (2004)	22	2, 12	•	¦	•		0.14(0.04, 0.40)	4.72
Hashizuma at al (2013)	20,	13, 7			•		0.37 (0.37, 0.74)	4.73,
	20,	7, 0					0.27 (0.14, 0.40)	4.91, E 04
Hasilogiu et al (2012)	25,	Z, 7	-	1			0.08 (0.02, 0.25)	5.21,
Hyun et al (2008)	30,	7,	-	-			0.23 (0.12, 0.41)	5.01,
Kong et al (2005),	13,	2,	•	1			0.15 (0.04, 0.42)	4.77,
Kranz et al (2015)	106	65,			•		0.61 (0.52, 0.70)	5.26
Li et al (2019).	40.	3,	•				0.08 (0.03, 0.20)	5.30
Lin et al (2002)	6,	2,		•			0.33 (0.10, 0.70)	3.59
Miyazawa et al (2003)	9,	2	•	1			0.22 (0.06, 0.55)	4.29
Ohtonary et al (2018)	12	4,		•	_		0.33 (0.14, 0.61) <u>.</u>	4.32
Park et al (2009),	11,	2,	-				0.18 (0.05, 0.48)	4.57,
Schievink et al (2008),	75,	5,	-				0.07 (0.03, 0.15 <u>)</u>	5.36
Takahashi et al (2016),	52	22,			-		0.42 (0.30, 0.56)	5.09
Takai et al (2018) <u>.</u>	11,	1,	•	÷			0.09 (0.02, 0.38)	4.91,
Tomoda et al (2008)	27,	25,		i i			0.93 (0.77, 0.98)	5.24
Watanabe et al (2008),	17,	5,					0.29 (0.13, 0.53)	4.64
Wiesemann et al (2006).	8.	3,		<u> </u> ●			0.38 (0.14, 0.69)	3.86
Yao et al (2017)	206	90,					0.44 (0.37, 0.51)	5.34
Yoon et al (2011),	18,	5,	+	 			0.28 (0.12, 0.51)	4.70,
Overall (I^2 = 94.34%, p	= 0.00).		<	\rightarrow			0.32 (0.20, 0.44)	100.00
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			<u>г г</u>	i r		1 1		
			0.25	.5	.7	, 75 1		
						-		

eFigure 18c. Meta-analysis of proportions of lumbar puncture opening pressure (high)

Article	Patients <u>.</u> (n)	High <u>.</u> (n)	ES (95% C	% <u>,</u> il), Weight
Fichtner et al (2019)	23,	2	• 0.09 (0.02,	0.27), 5.01,
Kranz et al (2015)	106	5	• 0.05 (0.02,	0.11) 25.35
Takahashi et al (2016)	52	2	• 0.04 (0.01,	0.13), 18.30,
Yao et al (2017),	206	2	• 0.01 (0.00,	0.03) 51.33
Chazen et al (2014),	9,	0	(Excluded)	-
Ferrante et al (2004)	14,	0,	(Excluded)	-
Hashizume et al (2013).	26	0	(Excluded)	-
Hasiloglu et al (2012),	25	0	(Excluded)	-
Hyun et al (2008)	30	0,	(Excluded)	•
Kong et al (2005)	13	0,	(Excluded)	•
Li et al (2019 <u>)</u>	40.	0,	(Excluded)	•
Lin et al (2002) <u></u>	6,	0,	(Excluded)	-
Miyazawa et al (2003),	9,	0,	(Excluded)	-
Ohtonary et al (2018).	12	0,	(Excluded)	•
Park et al (2009)	11,	0	(Excluded)	-
Schievink et al (2008),	75,	0,	(Excluded)	•
Takai et al (2018),	11,	0,	(Excluded)	•
Tomoda et al (2008)	27,	0	(Excluded)	
Watanabe et al (2008)	17,	0,	(Excluded)	•
Wiesemann et al (2006).	8,	0,	(Excluded)	•
Yoon et al (2011)	18,	0	(Excluded)	
Overall (I^2 = 43.44%, p	= 0.15)		0.03 (0.00,	0.06) 100.00

eFigure 19a. Meta-analysis of proportions of successful conservative treatment



eFigure 19b. Meta-analysis of proportions of unsuccessful conservative treatment



eFigure 20a. Meta-analysis of proportions of successful first EBP

Article	Patients (n)	Successful (n)		ES (95% CI)	% Weigł
Ahn et al (2018)	116	82	<u>.</u>	0.71 (0.62, 0.78)	3.40
Albes et al (2012)	25	16	-	0.64 (0.45, 0.80)	2.95
Amrhein et al (2016)	35	16	i	0.46 (0.30, 0.62)	3.07
Ansel et al (2016)	13	7		0.54 (0.29, 0.77)	2.51
Balkan et al (2012)	11	9		0.82 (0.52, 0.95)	2.74
Berrior et al (2004)	30	17		0.57 (0.39, 0.73)	3.01
Bonetto et al (2011)	9	7	• • • • • • • • • • • • • • • • • • •	0.78 (0.45, 0.94)	2.51
Chen et al (2016)	35	22	_	0.63 (0.46, 0.77)	3.09
Cho et al (2011)	56	40		0.71 (0.59, 0.82)	3.28
Choi et al (2016)	17	14		0.82 (0.59, 0.94)	2.99
Choi et al (2017)	95	64		0.67 (0.57, 0.76)	3.37
Feltracco et al (2015)	18	16		0.89 (0.67, 0.97)	3.16
Ferrante et al (2016)	106	95		0.90 (0.82, 0.94)	3.47
Hannerz et al (2006)	10	7		0.70 (0.40, 0.89)	2.44
Hashizume et al (2013)	28	23	•	0.82 (0.64, 0.92)	3.18
He et al (2017)	165	145		0.88 (0.82, 0.92)	3.49
Hyun et al (2008)	17	8	•	0.47 (0.26, 0.69)	2.69
Idrissi et al (2015)	13	5	•	0.38 (0.18, 0.64)	2.54
Karm et al (2016)	104	37	—	0.36 (0.27, 0.45)	3.38
Kim et al (2016)	63	51		0.81 (0.70, 0.89)	3.36
Kim et al (2017)	126	67	_ _	0.53 (0.44, 0.62)	3.39
Lee et al (2018)	62	37		0.60 (0.47, 0.71)	3.26
Martin et al (2019)	94	27	—	0.29 (0.21, 0.39)	3.38
Medina et al (2010)	13	9		0.69 (0.42, 0.87)	2.62
Pagani-Estévez et al (2019)	202	56		0.28 (0.22, 0.34)	3.46
So et al (2016)	34	19		0.56 (0.39, 0.71)	3.06
Su et al (2009)	8	6		0.75 (0.41, 0.93)	2.35
Takahashi et al (2016)	25	18		0.72 (0.52, 0.86)	3.01
Tomoda et al (2008)	25	17		0.68 (0.48, 0.83)	2.98
Wu et al (2017)	150	88	- • !	0.59 (0.51, 0.66)	3.42
Yagi et al (2018)	28	21		0.75 (0.57, 0.87)	3.09
Yoo et al (2008)	13	6		0.46 (0.23, 0.71)	2.51
Yoshida et al (2014)	12	10		0.83 (0.55, 0.95)	2.83
Overall (I^2 = 93.01%, p = 0	.00)		\diamond	0.64 (0.56, 0.72)	100.0
Overail (I ⁿ 2 = 93.01%, p = 0	.00)	I		0.64 (0.56, 0.72)	



eFigure 20b. Meta-analysis of proportions of successful nontargeted EBP

eFigure 20c. Meta-analysis of proportions of successful targeted EBP

	Patients,	Successful						%,
Article,	(n).	(n) <u>.</u>					ES (95% CI)	Weight
Ahn et al (2018).	88.	62.				• •	0.70 (0.60, 0.79)	, 7.84,
Albes et al (2012)	25	16.				1	0.64 (0.45, 0.80)	6.52
Amrhein et al (2016).	35.	16			•		0.46 (0.30, 0.62)	6.88
Balkan et al (2012)	11,	9,				· •	0.82 (0.52, 0.95)	, 5.89,
Cho et al (2011).	31,	27,					0.87 (0.71, 0.95)	, 7.56,
Choi et al (2016).	17.	14.				•	0.82 (0.59, 0.94)	6.62
Choi et al (2017).	73,	49.					0.67 (0.56, 0.77)	, 7.69,
Hashizume et al (2013)), 28,	23,			-	•	0.82 (0.64, 0.92)	, 7.22,
He et al (2017).	165	145				-	0.88 (0.82, 0.92)	8.26
Horikoshi et al (2010).	15.	11.					0.73 (0.48, 0.89)	5.95
Karm et al (2016).	104	37,			-	1	0.36 (0.27, 0.45)	, 7.88,
Lee et al (2018),	62,	37,			•	 + 	0.60 (0.47, 0.71)	, 7.50,
Wu et al (2017).	150.	88.				1	0.59 (0.51, 0.66)	8.02
Yoshida et al (2014).	12	10,				•	0.83 (0.55, 0.95)	, 6.16,
Overall (I^2 = 90.50%,	p = 0.00).				<	\triangleright	0.70 (0.59, 0.80)	. 100.00.
		(1 D	.25	.5	.75	1	



eFigure 20d. Meta-analysis of proportions of successful small EBP

eFigure 20e. Meta-analysis of proportions of successful large EBP



eFigure 21. Epidural Blood Patches (EBPs) outcomes. Pooled estimates of proportions (95% CI) of successful EBP treatment stratified by EBP technique (non-targeted/targeted, small/large)



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