Systematic Review and Meta-Analysis

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Intrafascial nerve-sparing radical prostatectomy improves patients' postoperative continence recovery and erectile function

A pooled analysis based on available literatures

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Abstract

Background: Intrafascial nerve-sparing prostatectomy has been currently applied based on the updated anatomic understanding of periprostatic cavernous nerves, in order to provide patients better postoperative recovery of continence and potency. The aim of our study is to perform a pooled analysis of available literatures regarding the functional outcomes following intrafascial nerve-sparing technique.

Methods: The authors performed database searches of articles published till October 2017 on PubMed using following keywords across the "title" and "abstract" field of the records: intrafascial, veil, curtain dissection, high anterior release, incremental nerve sparing, and radical prostatectomy. Fulfilled papers were screened and data were extracted independently by 3 reviewers. Main outcome was the postoperative continence and potency rate stratified by follow-up durations. Both 1-arm and comparative meta-analyses were performed and meta-regression models were conducted to evaluate the confounding factors.

Results: Using the electronic search strategy, a total of 71 records were retrieved and 20 studies were finally included, of which 6 were surgical series and 14 were controlled studies. Our 1-arm meta-analysis summarized the pooled continence rates after intrafascial prostatectomy were 59.4%, 76.2%, 89.9%, and 92.2% at postoperative follow-up of 1, 3, 6, and 12 months, respectively. Regardless of the variance in potency definition, the pooled potency rates after intrafascial prostatectomy were 42.2%, 54.2%, and 72.2% at 3, 6, and 12 months, respectively. Comparative analysis showed that the intrafascial group offered better continence rates at 1, 3, and 6 months with an odds ratio (OR) of 2.38 (95% confidence interval [CI]: 1.73–3.26), 1.82 (95% CI: 1.18–2.82), and 2.19 (95% CI: 1.43–3.34) as compared with the interfascial group. Moreover, potency rate in the intrafascial group was higher at 12 months than in the interfascial group, with an OR of 2.44 (95% CI: 1.35–4.42).

Conclusion: Based on the limited evidence, our study demonstrated that intrafascial nerve-sparing prostatectomy could provide patients with earlier recovery of continence and better erectile function compared with conventional interfascial approach, but physiological mechanisms about this technique still need further study.

Abbreviations: CI = confidence interval, D-fascia = Denonvilliers fascia, DVC = dorsal venous complex, LRP = laparoscopic radical prostatectomy, NVB = neurovascular bundle, OR = odds ratio, RALRP = robot-assisted laparoscopic radical prostatectomy, RRP = retropubic radical prostatectomy, VIP = Vattikuti Institute Prostatectomy.

Keywords: continence, erectile function, intrafascial nerve-sparing, radical prostatectomy, systematic review

1. Introduction

Radical prostatectomy is recognized as an effective cure for clinically localized prostate cancer,[1,2] and is recommended in patients with low–intermediate risk of disease and a life expectancy >10 years.[3] However, the procedure may be associated with postoperative morbidities, mainly including urinary incontinence and erectile dysfunction. Walsh and Donker initially described the dorsolateral location of the neurovascular bundle (NVB) and proposed its contribution to potency in 1982,[4] and subsequently developed the technique of anatomic nerve-sparing radical prostatectomy to preserve postoperative potency in patients.[5] Recently, many anatomic studies have updated understanding of cavernous nerves and the classically described NVB, given that periprostatic nerves disperse on the ventrolateral and dorsal surfaces of the prostate, instead of in a confined single dorsolateral "bundle."[6–8] Such dispersion of periprostatic nerve fibers can range up to the 2 o'clock and 10 o'clock positions over the lateral prostate[9]; therefore, preservation of these fibers is considered, by some surgeons, to have a positive effect not only on preservation of the patient's erectile

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function, but also on recovery of continence following prostatectomy.[10–12]

With advances in the current understanding of neurovascular anatomy, conventional nerve-sparing radical prostatectomy has undergone many modifications and refinements, developed by numerous groups to maximize preservation of periprostatic nerves, and consequently, enhance the potential for recovery of continence and potency. The intrafascial nerve-sparing technique was one of these modifications, characterized by dissecting closer to the prostate capsule and medially and internally to the prostatic fascia, thus maximally preserving periprostatic nerve fibers within or lateral to the prostatic fascia. This technique was first reported by the Vattikuti Institute Prostatectomy (VIP) team under the robot-assisted laparoscopic system and composed a component of the modifications of the VIP technique, named as "Veil of Aphrodite."[13] Moreover, this technique was also applied to conventional laparoscopy prostatectomy[11] and open retropubic prostatectomy,[14] although it differed specifically by different procedures.

Obvious variations exist among the functional results reported after intrafascial nerve-sparing prostatectomy which may be affected by surgeon characteristics, surgical procedures, patient inclusion criteria, methods for evaluation of outcomes, and so on. Despite the variations, the specific superiority of this technique compared with the conventional approach was controversial, as some scholars argued that the distribution of nerve fibers on ventrolateral prostate was rare and the definitive function of these fibers was unclear.[9,15,16] The aim of our study was to summarize the outcomes of available clinical trials and to provide a detailed evaluation about the functional results of the intrafascial technique, aiming to guide urologists in the selection of an appropriate prostatectomy technique.

2. Methods

2.1. Inclusion criteria

This study was approved by the Ethics Committee of Renmin Hospital of Wuhan University. Articles included in this review were designed as surgical series or prospective/retrospective controlled studies. The surgical procedure should have included at least 1-arm performed with intrafascial techniques, including Veil, Leipzig, curtain dissection, or other techniques approaching fascial planes on the surface of the prostatic capsule or medial/internal to the prostatic fascia, regardless of surgery types including retropubic radical prostatectomy (RRP), laparoscopic radical prostatectomy (LRP), and robot-assisted laparoscopic radical prostatectomy (RALRP). Only studies paralleling conventional interfascial nerve-sparing prostatectomy as controlled groups were included as comparative studies. Studies with controlled group involving extrafascial or wide-dissection or nonnerve-sparing prostatectomy were excluded from comparative analysis and, for these studies, only data from the intrafascial group were extracted.

2.2. Data sources and searches

We performed database searches of articles published till October 2017 on PubMed using the following keywords across the "Title" and "Abstract" field of the records: "intrafascial," "veil," "curtain dissection," "high anterior release," "incremental nerve sparing," and "radical prostatectomy." There was no limitation on publication status or language. Reference lists of the included studies were checked manually for further identification of other related studies. Three reviewers (JG, HC, and XW) independently screened the title, abstract, and keywords of each article that was retrieved. Full-text papers were screened for further assessment if the information given suggested that the study fulfilled inclusion criteria. We excluded studies that were repeated publications or only reported superficially, such as in the form of an abstract. Where differences in opinion existed, they were resolved through open discussion.

2.3. Data extraction and synthesis

Data were extracted independently by 3 reviewers (JG, HC, and XW) using a standard form, including study characteristics (title, publication time, study design, and sample size), patient characteristics (age, clinical stage of prostate cancer, preoperative serum prostate-specific antigen, Gleason score, invaded biopsy cores percentage, and preoperative potency), surgery information (surgery date, surgery type, surgery procedure, nerve-sparing sides, and preservation technique), and outcomes (postoperative continence rate at 1, 3, 6, and 12 months, postoperative potency rate at 3, 6, and 12 months, and data collection methods). Discrepancies, if any, were resolved by discussion. The authors of original studies were consulted for missing data as needed.

2.4. Bias assessment

The methodological quality of included controlled studies was appraised with the Cochrane Collaboration bias appraisal tool. In particular, the following factors were evaluated: Adequate sequence generation?, Allocation concealment?, Binding?, Incomplete outcome data addressed?, Free of selective reporting?, and Free of other bias? Every question was answered with "low risk," "high risk," or "unclear" and 3 reviewers (JG, HC, and XW) assessed each trial. Publication biases were assessed with funnel plots. In case of disagreement, judgment was made through open discussion.

2.5. Data analysis

All data of results from the intrafascial group were pooled together using the Open Meta-analyst software, stratified by different surgical types. Random-effect models were applied and heterogeneity among studies was assessed with the chi-squared test and the I^2 index statistic. Meta-regression was conducted, including patient age and preservation technique (including Denonvilliers fascia [D-fascia] preservation, puboprostatic ligament sparing, selective or no ligation of dorsal venous complex [DVC]) as covariate variables.

Comparative effects were analyzed by meta-analysis using Cochrane Collaboration review manager. Heterogeneity among studies was assessed with the chi-squared test and the I^2 index statistic. If $P > .1$ and $I^2 < 50\%$, it meant homogeneity existed among studies. Fixed-effect models were applied for the calculation of pooled effect index and only if $P < .1$ and $I^2 > 50\%$ was the random-effect models applied.

3. Results

Using the electronic search strategy, a total of 117 records were retrieved, of which 20 studies[14,17–35] were finally included. Figure 1 showed a flowchart of literature searches and Table 1 provided details of the studies included. Among the 20 studies

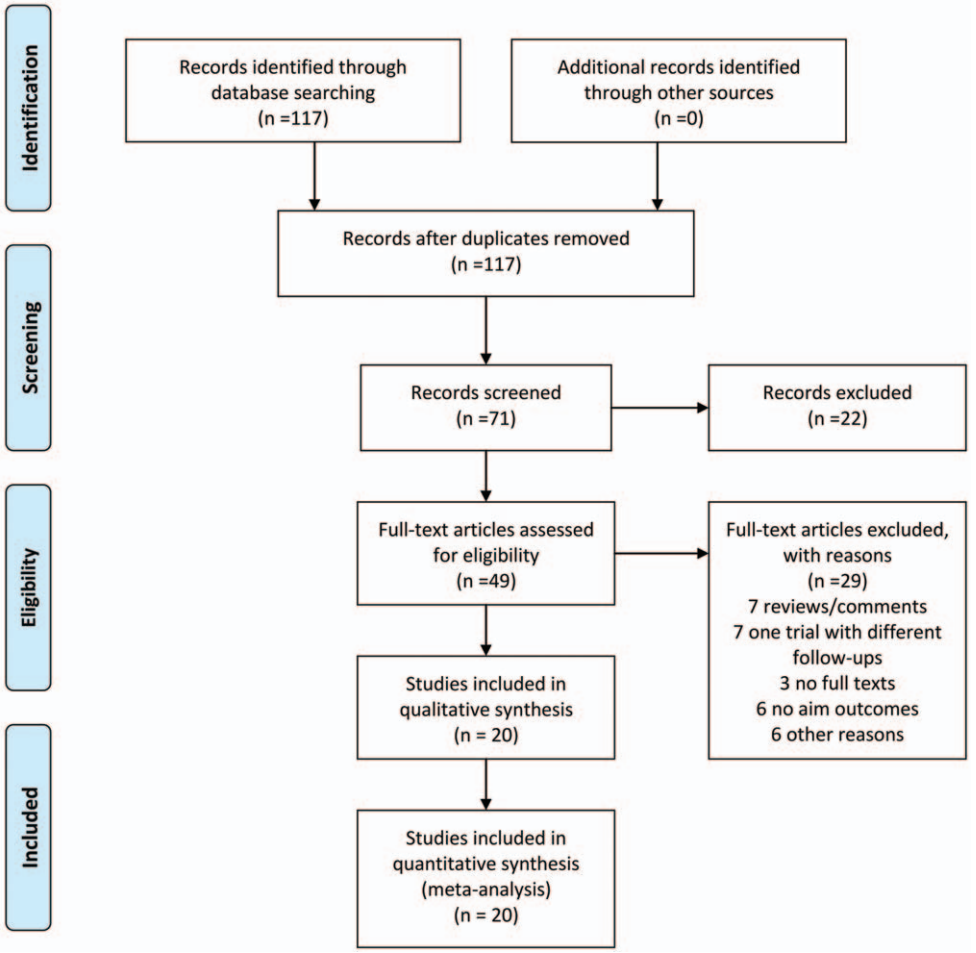

Figure 1. PRISMA flowchart for identification and selection of studies for this systematic review.

included, 6 were surgical series and 14 were controlled studies; of which 8 studies paralleled conventional interfascial nerve-sparing prostatectomy as controlled groups and were included for comparative meta-analysis. Table 2 showed the risk of bias in individual studies.

3.1. One-arm meta-analysis

According to the continence definition of no pad or 1 safety pad regardless of data collection methods, Fig. 2 demonstrates that the pooled continence rate was 92.2% (1992/2186, 95% confidence interval [CI]: 89.3–95.1) at postoperative follow-up of 12 months and the pooled continence rates at 1, 3, and 6 months were 59.4% (503/941, 95% CI: 41.3–77.4), 76.2% (1470/1943, 95% CI: 70.2–82.3), and 89.9% (941/1040, 95% CI: 86.3–93.4), respectively (see Supplemental Fig. S1, http://links.lww.com/MD/C333). There was no obvious difference estimated among the 3 subgroups of LRP, RRP, and RALRP, with the exception of continence rate at 1 month, which showed that the RRP subgroup had a significantly lower continence rate compared with the LRP and RALRP subgroups.

With regard to postoperative erectile function, the definition of potency used in the included studies varied considerably. In general, most studies defined potency as erection sufficient for intercourse with or without drug administration, but with some difference in the detailed description. As described in Table 1, several studies used a cutoff value of the Sexual Health Inventory for Men questionnaire, also known as the International Index of Erectile Function-5, to define potency. Regardless of the variance in potency definition, Fig. 3 presents the pooled potency rate after intrafascial prostatectomy was 72.2% (1028/1499, 95% CI: 63.7–80.6) at 12 months follow-up and that at 3 and 6 months were 42.2% (295/795, 95% CI: 20–64.3) and 54.2% (454/883, 95% CI: 43.4–64.9), respectively (see Supplemental Fig. S2, http://links.lww.com/MD/C333). Obvious heterogeneity could be observed among the included studies. At 6 months, RALRP showed a significantly better potency rate in comparison with LRP; however, at 12 months, only a trend in favor of RALRP could be identified.

3.2. Comparative meta-analysis

According to the continence rates (see Fig. 4), the intrafascial group showed significant advantages at 1, 3, and 6 months with odds ratios (ORs) of 2.38 (95% CI: 1.73–3.26), 1.82 (95% CI: 1.18–2.82), and 2.19 (95% CI: 1.43–3.34) as compared with the interfascial group, but this advantage was not present at 12 months with an OR of 1.33 (95% CI: 0.83–2.13). The I^2 standing for heterogeneity among these studies were 89%, 65%, 0%, and 0%, respectively. Contrary to the results for continence rate,

Table 1

Characteristics of the included studies in meta-analysis.

								Continence assessment			Potency assessment		
First author	Study design	Country	Surgery data	Sample size for intra-RP	Surgical type	Mean age in intra-RP	PSM reported	Continence reported	Continence definition	Data collection	Potency reported	Potency definition	Data collection
Curto 2006	Surgical series	France	2003.5–2005.3	425	LRP	62.0	√	√	No pads	ICS questionnaire	√	ESI	Unclear questionnaire
Budaus 2009	Surgical series	Germany	2005.4–2007.12	1150	RRP	63	√	√	0–1 pad	ICS questionnaire	√	ESI	IIEF
Stolzenburg 2008	Surgical series	Germany	2001.12–2007.11	150	LRP	60.2	√	√	No pads	ICS questionnaire	√	ESI	IIEF
Xylinas 2010	Surgical series	France	2007.12–2008.6	50	RALRP	60.8	√	√	No pads	ICS questionnaire	√	ESI	IIEF
Asimakopoulos 2010	Surgical series	Italy	2007.10–2009.3	30	RALRP	52		√	No pads	ICS questionnaire	√	ESI	IIEF; EHS
Khoder 2012	Surgical series	Germany	2007.1–2009.12	231	RRP	63.3	√	√	No pads	Unclear questionnaire			
Greco 2010	Controlled	Germany	2005.1–2007.11	300	LRP vs RRP	61	√	√	No pads	ICIQ-UI	√	ESI	IIEF
Greco 2011	Controlled	Germany	2005.1–2009.5	250	LRP	59	√	√	No pads	ICIQ-UI	√	ESI	IIEF
Asimakopoulos 2011	Randomized controlled	Italy	2007.10–2008.10	128	LRP vs RALRP	60.4	√	√	No pads	ICS	√	ESI	IIEF
Hoshi 2013	Controlled	Japan	2009.1–2011.10	44	LRP	65.7	√	√	0–1 Pad	EPIC			
Stewart 2011	Controlled	UK	2006.2–2009.12	102	LRP	61.5	√	√	No pads or 1 safety pad	Interview	√	ESI	Interview
Mortezavi 2012	Controlled	Switzerland	2006.5–2008.8	80	RALRP		√						
VIP 2005	Controlled	USA	2003.1–2003.12	35	RALRP	58.6	√				√	ESI	SHIM
Neill 2009	Controlled	UK	2000.3–2007.10	240	LRP	59	√	√	No pads	Unclear	√	IIEF ≥ 17	IIEF
Potdevin 2009	Controlled	New Jersey	2006.1–2007.12	70	RALRP	58.63	√	√	No pads	EPIC	√	ESI more than half the time	EPIC
Stolzenburg 2010	Randomized controlled	Germany	2004.6–2008.6	200	LRP	61	√	√	No pads or 1 safety pad	ICS questionnaire	√	Positive to SEP2, SEP3, and SEP5	IIEF; SEP
Choi 2012	Controlled	Korea	2011.11–2012.4	50	LRP	66.5	√	√	No pads	Unclear			
Zheng 2013	Controlled	China	2010.3–2011.8	65	LRP	65	√	√	0–1 Pad	Unclear questionnaire	√	SHIM ≥ 22	SHIM
Ko 2013	Controlled	USA	2008.6–2009.5	9	RALRP	57.6					√	ESI	Unclear
Khoder 2014	Controlled	Germany	2009.1–2010.1	241	RRP	67.1	√	√	No pads	Unclear questionnaire	√	IIEF ≥ 15; positive to IIEF3, IIEF4	IIEF

EHS = Erection Hardness Score, EPIC = Expanded Prostate Cancer Index Composite, ESI = erection sufficient for intercourse, ICIQ-UI = International Consultation of Incontinence Questionnaire-Urinary Incontinence, ICS = International Continence Society, IIEF = International Index of Erectile Function, LRP = laparoscopic radical prostatectomy, PSM = positive surgical margin, RALRP = robot-assisted laparoscopic radical prostatectomy, RP = radical prostatectomy, RRP = retropubic radical prostatectomy, SEP = Sexual Encounter Profile, SHIM = Sexual Health Inventory for Men, VIP = Vattikuti Institute Prostatectomy.

Table 2

Risk of bias summary.

Study ID	Adequate sequence generation?	Allocation concealment?	Blinding of participants and personnel?	Blinding of outcome assessment?	Incomplete outcome data addressed?	Free of selective reporting?	Free of other bias?
VIP 2005	H	H	U	U	L	L	L
Neill 2009	H	H	U	U	U	L	L
Potdevin 2009	H	H	U	U	L	L	L
Stolzenburg 2010	L	U	U	U	L	L	L
Choi 2012	H	H	U	U	U	L	L
Ko 2013	H	H	U	L	U	L	L
Zheng 2013	H	H	U	U	H	L	L
Khoder 2014	H	H	U	U	U	L	L

Review authors' judgments about each risk of bias item for included study.
H = high risk, L = low risk, U = unclear.

Fig. 5 demonstrated that the potency rate in the intrafascial group was higher at postsurgical 12 months than in the interfascial group, with an OR of 2.44 (95% CI: 1.35–4.42), but the difference was not statistically significant at 3 months, with an OR of 1.31 (95% CI: 0.98–1.75). The OR of potency at 6 months was 2.05 (95% CI: 1.07–3.95) in favor of the intrafascial group. Supplemental Fig. S3, http://links.lww.com/MD/C333 and S4, http://links.lww.com/MD/C333 showed the funnel plots for assessing the publication biases.

3.3. Meta-regression analysis

Table 3 demonstrated the results of meta-regression models. With regard to the continence rate, age was negatively associated with continence rate at 1 and 3 months, but this effect of age could not be observed in the later follow-up notes. Meanwhile, preservation of D-fascia could increase the continence rate, but statistical significance could be tested only at 1 month. For potency rate, all of the included factors had no significant association with the potency rate.

4. Discussion

This study conducted an original systematic review and meta-analysis of functional outcomes following intrafascial nerve-sparing prostatectomy. From an electronic literature search, this technique was noted to have been applied worldwide in combination with different surgical techniques and approaches. Moreover, detailed procedures of intrafascial dissection vary slightly, probably due to surgeon preferences and training. The VIP team tended to approach the intrafascial plane through dissecting between the prostatic fascia and prostatic capsule posterolaterally up to the anterior pubourethral ligament,[36] whereas Stozenburg et al developed a ligament-sparing intrafascial dissection technique, with bilateral incision of the superficial fascia medial to the puboprostatic ligaments on the

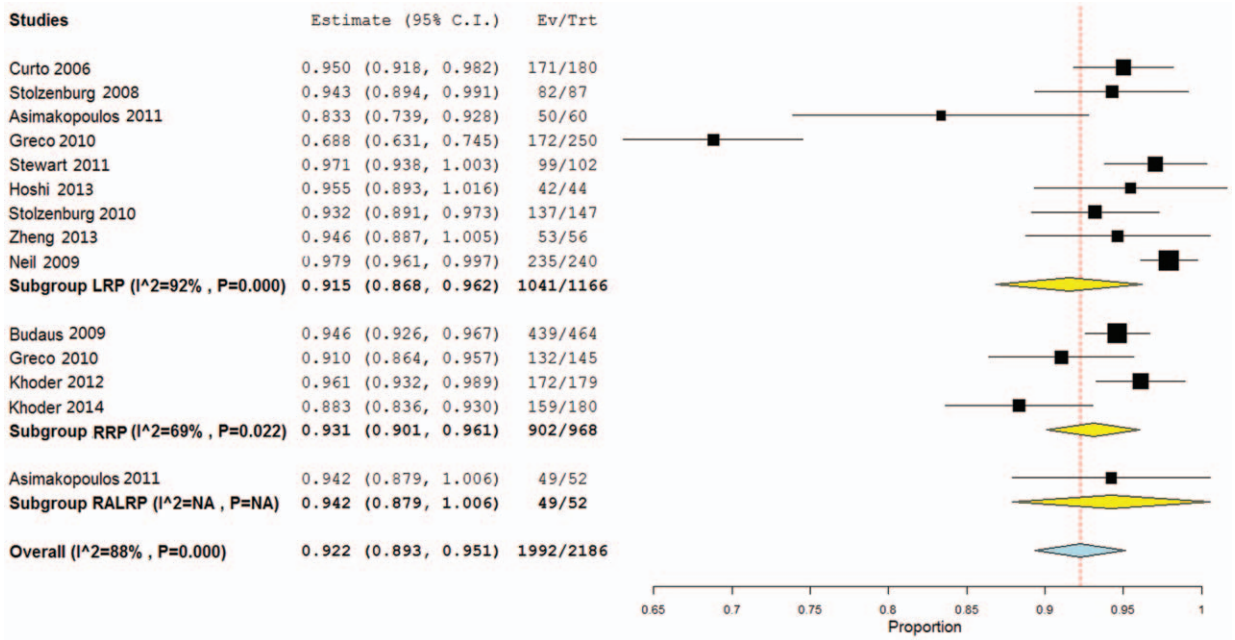

Figure 2. Forest plot for 1-arm meta-analysis of studies adopting the intrafascial technique in terms of continence rate at 12 months stratified by surgical types. LRP = laparoscopic radical prostatectomy, RALRP = robot-assisted laparoscopic radical prostatectomy, RRP = retropubic radical prostatectomy.

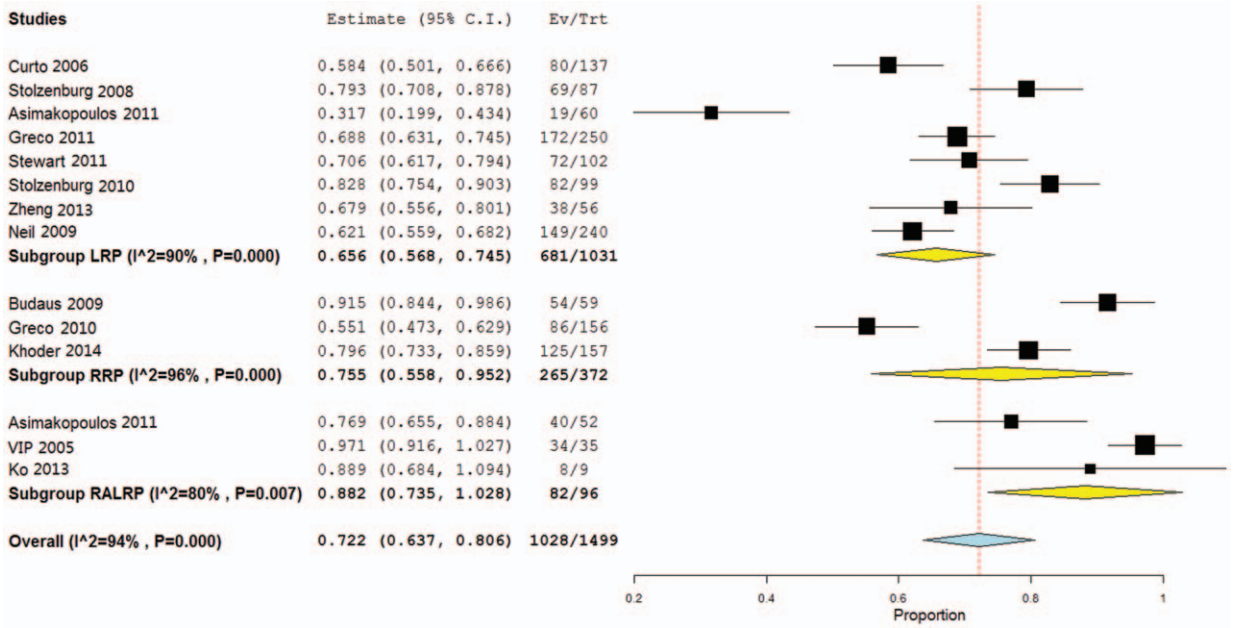

Figure 3. Forest plot for 1-arm meta-analysis of studies adopting the intrafascial technique in terms of potency rate at 12 months stratified by surgical types. LRP = laparoscopic radical prostatectomy, RALRP = robot-assisted laparoscopic radical prostatectomy, RRP = retropubic radical prostatectomy, VIP = Vattikuti Institute Prostatectomy.

anterior surface of the prostate initially.[32] According to our experience, after transecting the bladder neck and stripping down the D-fascia from the posterior surface of the prostatic capsule, we entered the plane between the lateral prostatic fascia and the prostatic capsule using blunt dissection on the anterolateral surface at the 10 or 2 o'clock position cranially, which was on the underneath of the puboprostatic ligament and medial to fascial tendinous arch of pelvis.[9] This dissection was performed toward the intrafascial plane until the smooth and reflecting prostatic capsule could be recognized. The plane was then developed and dissection descended down to the prostatic pedicles (see Supplemental Fig. S5, http://links.lww.com/MD/C333, which illustrates schematic of different procedures to approach the intrafascial plane).

Our present review indicated that 92.2% of patients regained urinary continence by the 12-month follow-up after intrafascial prostatectomy, regardless of the different surgical types. This continence rate was comparable with that reported in Ficarra's review,[37] wherein the investigators summarized the studies reporting continence recovery after RALRP and concluded a continence rate of 91% at 12 months using a no pad or safety pad definition. However, our comparative meta-analysis revealed that the intrafascial technique was associated with an earlier recovery of continence as compared with the interfascial approach, whereby statistically significant differences could be identified in favor of the intrafascial group with regard to continence rate at 1, 3, and 6 months. This advantage, however, was not present at 12 months. Based on cumulative analysis, Ficarra et al identified a better continence rate at 12 months after RALRP, in comparison with RRP or LRP[37]; however, this superiority of continence recovery could not be estimated in our meta-analysis. We could only detect that RRP was associated with a lower continence rate at 1 month as compared with LRP and RALRP; however, since only 1 study was included in the RRP subgroup, this result may be biased. In terms of postoperative erectile function, our meta-analysis showed a pooled potency rate of 42.2%, 54.2%, and 72.2% at 3, 6, and 12 months after intrafascial prostatectomy, respectively. Moreover, RALRP seemed to result in a better recovery of potency than LRP at 6 months, but this advantage became minimal at 12 months. This result was consistent with that from Ficarra's review,[38] wherein they reported a nonstatistically significant trend in favor of RALRP in comparison with LRP. According to our comparative analysis, intrafascial prostatectomy led to a statistically higher postoperative potency rate at 6 and 12 months, compared with the interfascial technique. However, this difference was not detected in the early days and up to 3 months postoperatively. With regard to the impact of confounding factors on functional outcomes, our regression model only identified that age could negatively affect the postoperative continence rate at 1 and 3 months. Based on the results of regression in the present study, there was no obvious evidence to confirm the effect of preservation techniques on recovery of postoperative continence and potency. In a retrospective controlled study reported by Hoshi et al in 2013,[21] intrafascial dissection together with a DVC-preserving technique could provide earlier recovery from incontinence as compared with conventional intrafascial prostatectomy; however, this advantage could not be reconfirmed by our regression analysis.

To our knowledge, this is an original systematic review and meta-analysis of the available literature indicating that the intrafascial nerve-sparing technique could contribute to earlier continence recovery and higher potency rate postoperatively as compared with the conventional interfascial nerve-sparing approach. The mechanisms underlying this advantage have not been clearly identified. A pathological study by Ko et al demonstrated that fascia width in prostatectomy specimens was significantly correlated with the surgical technique, and the intrafascial technique led to narrowest fascia width when compared with wide and interfascial dissection.[20] Moreover,

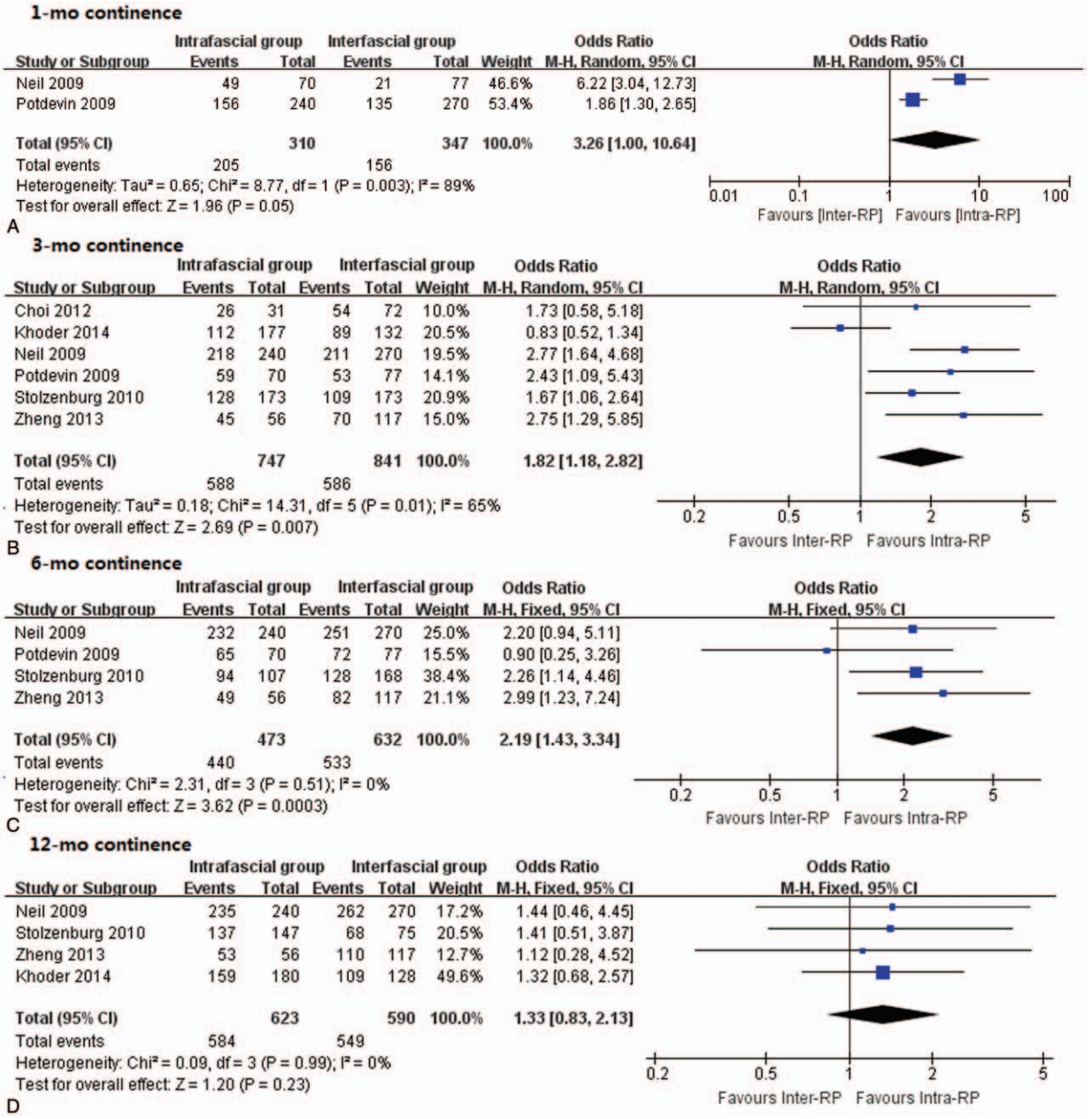

Figure 4. Forest plots for comparative meta-analysis of studies comparing the intrafascial with the interfascial technique in terms of continence rate at (A) 1 month, (B) 3 months, (C) 6 months, and (D) 12 months.

the VIP team provided histological evidence confirming that the Veil technique ensured enhanced nerve sparing at the anterolateral zone of the prostate as compared with the standard technique.[39] However, it remains controversial whether the advantage of the intrafascial technique is attributable to these preserved additional nerve fibers on the anterolateral surface of the prostate, and the explicit function of these fibers is still unclear. Takenaka et al demonstrated that the pelvic splanchnic nerve joined the NVB in a spayed distribution at multiple levels, and fibers from the hypogastric nerve, providing sympathetic enervation, is located more ventrally than the cavernous nerve.[40,41] This was reconfirmed by a microdissected anatomical study by Costello et al[10] wherein they indicated that cavernosal nerves from the mid-prostatic level to the prostate apex were positioned posterior to the capsular vessels and nerves of the prostate, but these nerves were medial to the nerves and vessels of the rectum and levator ani. Thus, some scholars argue that intrafascial dissection may preserve more number of sympathetic fibers, which are of minor importance for a patient's functional outcomes following radical prostatectomy.[15,16] However, in an anatomical study of autonomic ganglionic cells by Takenaka et al,[42] every ganglion cell cluster in neural components contained TH-positive cells for the sympathetic neuron, coexisting with cells stained for PHI representing the parasympathetic neuron; thus, it seems misleading to merely classify pelvic nerve components as sympathetic or parasympathetic. There was no functional evidence on nerve fibers over the anterolateral surface of the prostate until 2009 when an

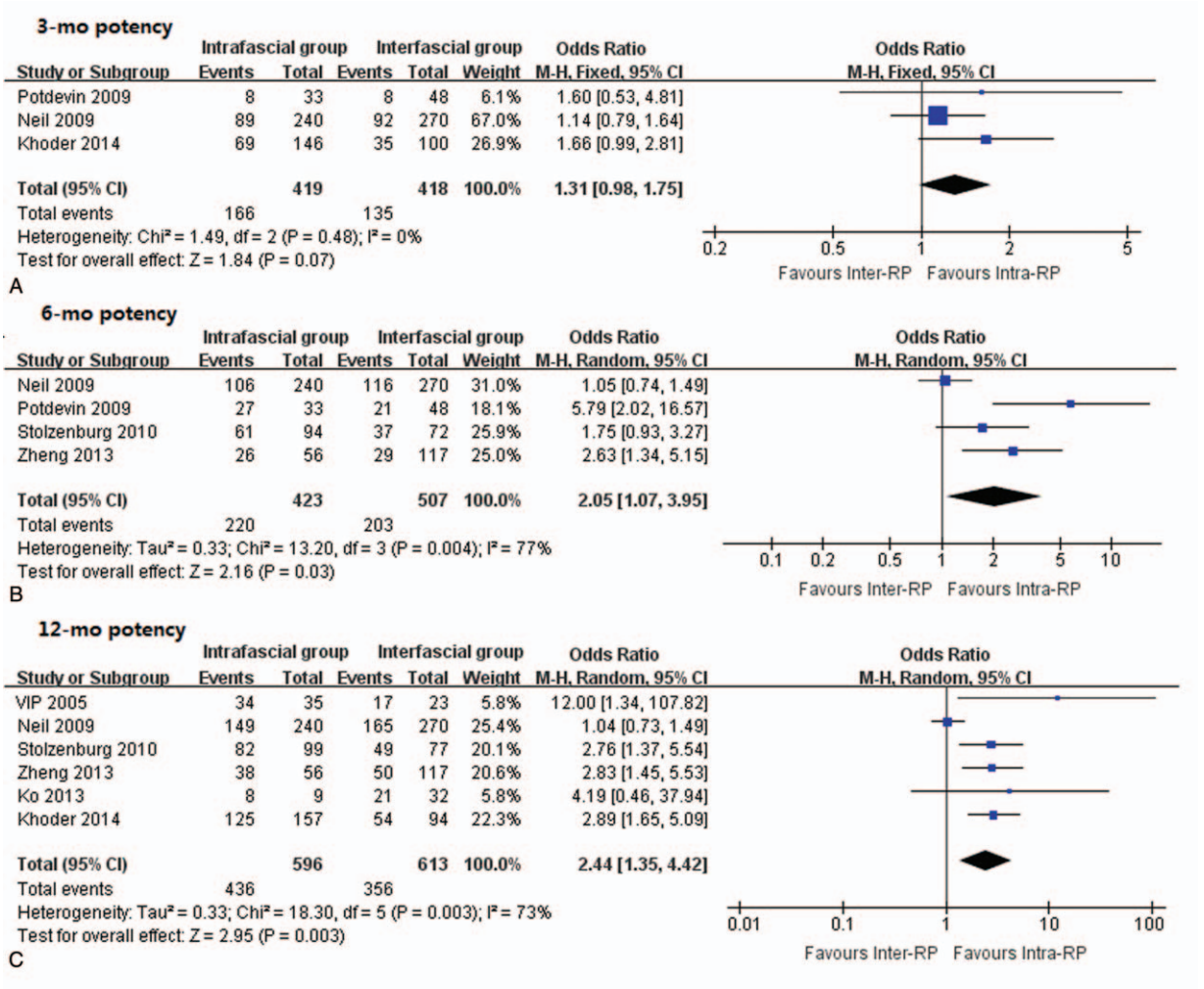

Figure 5. Forest plots for comparative meta-analysis of studies comparing the intrafascial with the interfascial technique in terms of potency rate at (A) 3 months, (B) 6 months, and (C) 12 months. VIP = Vattikuti Institute Prostatectomy.

electrophysiological study among humans was reported from Japan,[43] where investigators stimulated periprostatic nerve fibers located in the periprostatic soft tissue using bipolar electrodes in 12 patients during open retropubic prostatectomy. Every stimulus in all positions between 1 and 5 o'clock evoked an increase in cavernosal pressure and this response decreased with stimulation of points further from the NVB position, precluding the possibility that the responses evoked by ventral electrical stimulations were induced by conveyed simulation from the position of the NVB through the prostate. However, this result has not been reconfirmed by other investigators so far. As hypothesized by the VIP team,[33] the faster recovery of erectile

Table 3

Meta-regression models evaluating the influence of the confounded factors to the positive surgical margin, continence and potency rate.

	Age		D-fascia preservation		Puboprostatic ligament sparing		Selective/no ligation of DVC	
Factors	β ± SE	*P*	β ± SE	*P*	β ± SE	*P*	β ± SE	*P*
1-mo continence	**−0.038 ± 0.014**	**.006**	**0.234 ± 0.112**	**.037**	0.109 ± 0.152	.472	0.115 ± 0.123	.349
3-mo continence	**−0.018 ± 0.006**	**.004**	0.054 ± 0.056	.338	−0.047 ± 0.072	.514	0.041 ± 0.062	.509
6-mo continence	−0.001 ± 0.008	.859	0.013 ± 0.034	.697	−0.036 ± 0.035	.298	−0.041 ± 0.039	.294
12-mo continence	0.006 ± 0.007	.392	−0.066 ± 0.036	.065	−0.035 ± 0.044	.429	0.006 ± 0.042	.892
3-mo potency	−0.036 ± 0.019	.062	−0.154 ± 0.174	.377	0.199 ± 0.201	.323	0.258 ± 0.166	.119
6-mo potency	−0.030 ± 0.031	.344	0.014 ± 0.115	.900	−0.036 ± 0.121	.769	−0.079 ± 0.135	.556
12-mo potency	−0.001 ± 0.018	.965	−0.076 ± 0.084	.362	−0.130 ± 0.084	.123	−0.059 ± 0.105	.572

Each of the confounded factors including patients' age, preservation technique (D-fascia preservation, puboprostatic ligament sparing, and selective/no ligation of DVC) was included, respectively, in the meta-regression models to assess the influence of the confounded factors to the continence and potency rate.

β = coefficient, D-fascia = Denonvilliers fascia, DVC = dorsal venous complex, SE = standard error.

function after intrafascial prostatectomy may be attributable to the fact that surgeons approached the intrafascial plane far from the putative NVB and consequently decreased traction or thermal injury to the nerves, or that preservation of the prostatic fascia ensured an uninterrupted additional blood supply to cavernous tissue. Therefore, additional studies investigating the physiological mechanisms involved in the functional and therapeutic outcomes are necessary. In addition, the main limitation of our study concentrated at the quality of the original studies. As showed in Table 2, most studies were nonrandomized and this maybe influences the grade of evidence. Thus, more randomized, controlled trials with high-quality are still needed in the future.

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