Title

Blind ending vessels on diagnostic laparoscopy for nonpalpable testis: Is a nubbin present?

Journal

Journal of pediatric urology, 13(4)

ISSN

1477-5131

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Publication Date

2017-08-01

DOI

10.1016/j.jpurol.2017.04.010

Peer reviewed

Elsevier Editorial System(tm) for Journal of Pediatric Urology

Manuscript Draft

Manuscript Number: JPUROL-D-19-00440R1

Title: Non-palpable testis: Is management consistent and objective?

Article Type: Original Research

Keywords: testis; laparoscopy; cryptorchidism; undescended testis

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Abstract: Summary

Introduction: Diagnostic laparoscopy is recommended for boys with non-palpable testis (NPT) by American and European guidelines with the decision to pursue inguinal exploration based upon testicular vessel appearance. We hypothesized that management decisions are not consistent with guidelines and that assessment of vessels is subjective.

Materials and Methods: Pediatric urologist management decisions were evaluated via electronic survey to determine impact of contralateral testicle size, sonographic findings, surgeon region and years in practice. In a digital image survey, surgeons were asked to interpret gonadal vessel status of 32 consecutive cases of NPT with absent abdominal testis as normal, atretic or blind-ending to determine intra- and inter-rater reliability.

Results: Of 339 participants more Europeans (49%) chose sonography as the first management step for NPT compared to U.S. surgeons (12%). Regardless of sonographic findings, over 80% chose laparoscopy as the first step. In the presence of normal, atretic and blind-ending vessels, the decisions to proceed with inguinal/scrotal exploration were 88%, 68% and 17%, respectively. Contralateral hypertrophy and sonography findings had no significant impact on decision to proceed with inguinal/scrotal exploration.

The visual gonadal vessel survey showed surgeon interpretation of normal or blind-ending vessels had moderate inter-rater reliability. Surgeons did not agree on normal status 37% of the time and did not agree on atretic status 66% of the time. There was no statistical difference between European and U.S. respondents (P = 0.23). Intra-rater reliability was fair for blind-ending vessels. When the first interpretation was blind-ending, the same surgeon changed interpretation of the same image 39% of the time. There was no statistical difference by years of practice.

Conclusions: Non-visualization of NPT on sonography and contralateral testis size had no significant impact upon management decisions. Surgeons chose to pursue inguinal/scrotal exploration based upon laparoscopic gonadal vessel status. However, these interpretations were subjective with low inter- and intra-rater reliability.

Suggested Reviewers:

Cover Letter Revision

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November 5, 2019

Anthony A. Caldamone, M.D., M.M.S., F.A.C.S., F.A.A.P.
Editor-in-Chief
Journal of Pediatric Urology

Dear Dr. Caldamone and reviewers,

Enclosed is our revised manuscript and reply to reviewers. We appreciate the helpful comments, recommendations and time spent by the reviewers to make this a better manuscript.

Thank you for considering our manuscript for publication in the Journal of Pediatric Urology titled “Non-palpable testis: Is management consistent and objective?” The manuscript reports our findings of management decisions of non-palpable testis by pediatric urologists belonging to the Societies for Pediatric Urology and European Association of Urology/European Society of Pediatric Urology.

All authors have participated in the research and writing of this manuscript and have approved the final version. This work was presented at Pediatric Urology Fall Congress as a podium presentation in October. There are no disclosures required from any of the authors. We look forward to your review.

Sincerely,

Eric A. Kurzrock

JPUROL-D-19-00440R1

Response to review

Reviewers' comments:

Reviewer 1:

Excellent work.

Reviewer 2:

This is an excellent survey study which shows the vagaries of visual inspection and the difficulty associated with utilizing techniques such as this that lack quantifiable measures.

The paper is well written.

A table with the kappa score and agreement levels should be provided to the reader who may not have expertise in this measure since the numbers are different between kappa and Cronbach alpha and this sometimes leads to confusion.

Reply:

Thank you for the suggestion. Due to the complex experimental design, with multiple raters reviewing multiple images with three categories, the raw agreement percentages are not easily summarized as a single number or few numbers. Indeed, Fleiss' kappa itself appears to be the best available summary of agreement given the design.

Per your suggestion, we have added Table 1 with above information. Of note, we placed this statement in the legend:

Table 1 Legend:

To determine inter- and intra-reader correlation, participants were asked to choose their interpretation of the NPT-side vessels from three possible descriptions: normal, atretic and blind-ending. Reliability was calculated using Fleiss' kappa coefficient. If there is perfect agreement, coefficient is 1; and complete disagreement produces a coefficient of zero.

In the table we did not list the commonly assigned terms of "moderate", "fair" and "poor" agreement as these are subjective valuations. We do use the term "moderate" in the Results section.

Reviewer 3:

The authors address an interesting topic. How do physicians make their subjective decision on non-palpable testis? Do they follow the guidelines recommendations? Furthermore, how do clinicians interpret intraoperative findings such as the vessel status and what conclusions do they draw? The decisional items they looked at were impact of contralateral testis size, intraoperative vessel findings, surgeons home continent and years in practice. 339 clinicians answered this survey. The principle treatment alternatives were already discussed extensively by J Elder 2016 as the "Bottom-up"* or the "Top down"* approach (Elder J, Eur J Pediatr Surg. 2016 Oct;26(5):418-426).

The vast majority of participants chose laparoscopy for the first step. Only 7 - 11% of participants changed their plan to an open inguinal procedure, when a large contralateral testis was sonographically confirmed. The intraoperative aspect of the testis vessel determined further inguinal surgery, however interrater agreement on vessel appearance was lower than expected and lowest for atretic vessels. Conclusions were that guidelines were mostly followed, however the use of ultrasound seems to indicate the wish for sophisticated decision making. No outcome data were available.

There are a some points to discuss:

1. I would not include "orchiopexy" in the keywords, as this might be misleading.

Reply: removed

2. Response rates were different in both European (20%) and American (40%) cohort. Please try to comment on that.

Reply: Respectfully, I cannot appropriately comment on the difference in response rates.

3. For me the study limitation section is missing completely. Please complete that point.

Reply: Thank you for pointing that out. We have added a better paragraph on limitations.

Despite 339 participants and a 28% response rate, this study is limited by participation bias inherent to voluntary surveys. This fact and the participation rate may influence and/or select for individuals with particular practice patterns. The survey was created to avoid any ambiguity in the patient status with an algorithm to allow assessment of distinct variables. Despite, some participants could misinterpret the intended scenario. As mentioned, the presentation of the gonadal vessel images were limited to a 2D format whereas during laparoscopy the surgeon has a 30 degree angulation for viewing.

4. I wonder why clinical palpation of a nubbin was not included in the decision making process of the study. Please comment on that.

Reply: Yes, this survey was to determine practice patterns when the testis was non-palpable without ambiguity. As the reviewer appreciates, patients with palpable "nubbins" are approached with either scrotal or inguinal exploration or laparoscopy. This has been investigated in detail in the literature. Our goal was to determine practice patterns for non-palpable and decision-making during that process.

5. I personally do agree with the statement: "The presumption has been that the appearance of the gonadal vessels is fact rather than an interpretation or opinion." Where there any advices given to participants for instance to compare both vessels with each other for decision making. Please comment on that.

Reply: Yes and No. The participants were told that the patient had a "normal" descended testis and that they were being shown the pair of gonadal vessels for analysis (not necessarily "comparison"). We did not specify whether the vessels going to the descended vessels represented "normal". The presumption by most of us is that the vessels going to the normal descended testis represent "normal". Yet, this may not be true but it is all the information that the patient provides to us at that moment. These were real consecutive cases imaged by the senior author. We did not pick and choose patients who had "better" or "more normal" index vessels. I hope this answers your question.

6. Page 16, 19 and 24 (most probably) can be deleted.

Reply: I'm sorry but we are not able to see the original submission page orders. For the revised manuscript pdf these appear to be blank pages.

7. Figure 2 appears twice (page 17 and 20), other tables are missing, please correct this.

Reply: The repeated Figure 2 is the Summary image.

Thank you to all the reviewers. We most appreciate the time spent on making this a better manuscript.

*Title Page (including authors and addresses)

Non-palpable testis: Is management consistent and objective?

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Keywords: testis, laparoscopy, orchiopexy, cryptorchidism

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Summary

Introduction: Diagnostic laparoscopy is recommended for boys with non-palpable testis (NPT) by American and European guidelines with the decision to pursue inguinal exploration based upon testicular vessel appearance. We hypothesized that management decisions are not consistent with guidelines and that assessment of vessels is subjective.

Materials and Methods: Pediatric urologist management decisions were evaluated via electronic survey to determine impact of contralateral testicle size, sonographic findings, surgeon region and years in practice. In a digital image survey, surgeons were asked to interpret gonadal vessel status of 32 consecutive cases of NPT with absent abdominal testis as normal, atretic or blind-ending to determine intra- and inter-rater reliability.

Results: Of 339 participants more Europeans (49%) chose sonography as the first management step for NPT compared to U.S. surgeons (12%). Regardless of sonographic findings, over 80% chose laparoscopy as the first step. In the presence of normal, atretic and blind-ending vessels, the decisions to proceed with inguinal/scrotal exploration were 88%, 68% and 17%, respectively. Contralateral hypertrophy and sonography findings had no significant impact on decision to proceed with inguinal/scrotal exploration.

The visual gonadal vessel survey showed surgeon interpretation of normal or blind-ending vessels had moderate inter-rater reliability. Surgeons did not agree on normal status 37% of the time and did not agree on atretic status 66% of the time. There was no statistical difference between European and U.S. respondents (P = 0.23). Intra-rater reliability was fair for blind-

ending vessels. When the first interpretation was blind-ending, the same surgeon changed interpretation of the same image 39% of the time. There was no statistical difference by years of practice.

Conclusions: Non-visualization of NPT on sonography and contralateral testis size had no significant impact upon management decisions. Surgeons chose to pursue inguinal/scrotal exploration based upon laparoscopic gonadal vessel status. However, these interpretations were subjective with low inter- and intra-rater reliability.

Keywords: testis, laparoscopy, orchiopexy, cryptorchidism

Key Abbreviations
AUA = American Urological Association
EAU/ESPU = European Association of Urology/European Society for Pediatric Urology
IAT = intra-abdominal testis
NPT = non-palpable testis
SPU = Societies for Pediatric Urology
UDT = undescended testis

Introduction

Undescended testis (UDT) is one of the most common congenital malformations in male neonates. Incidence ranges from 1 to 5% in full-term neonates of which approximately 30% are non-palpable testis (NPT).[1,2] To guide diagnosis and treatment, both the American Urological Association (AUA) and the European Association of Urology/European Society for Pediatric Urology (EAU/ESPU) have published guidelines.[3,4]

Obtaining imaging such as ultrasound or MRI is not recommended as it cannot reliably localize or confirm the absence of a testis.[5] Braga et al. demonstrated that in the setting of NPT contralateral testicular length of greater than 20 mm has a 87.5% positive predictive value for absence of a viable testis.[6] Inguinal or scrotal exploration has been shown to be equal to diagnostic laparoscopy in the setting of a unilateral NPT.[7] AUA and EAU/ESPU guidelines recommend diagnostic laparoscopy or open inguinal/scrotal exploration as a first step.

If initial management includes diagnostic laparoscopy, the status of the vessels determines next steps; inguinal exploration or not. To date, there are no studies assessing the adherence to guidelines. Our aim was to assess patient and clinician variables that effect NPT management decisions. Survey results showed that testicular vessel appearance is a very significant variable. The presumption has been that the appearance of the gonadal vessels is fact rather than an interpretation or opinion. Thus, we developed a second aim and study to evaluate the reliability of surgeon interpretation of gonadal vessel status.

Materials and Methods

Management of NPT: Electronic surveys were sent to members of Societies for Pediatric Urology (SPU) and EAU/ESPU (Appendix A). Surgeons who chose laparoscopy as the first step for NPT were given further questions on management. The index patient was defined as a thin, healthy 1-year old boy with a normal penis, normal scrotum with a descended testis and an NPT. In the setting of a contralateral normal or hypertrophic testicle, surgeons were inquired if they would obtain an ultrasound pre-operatively (Fig. 1). If an ultrasound was obtained, the sonogram showed no testis. Surgical approach and observation was assessed. If diagnostic laparoscopy was pursued, intra-operative findings included a closed internal ring and no abdominal testis. Surgeons were inquired if they would pursue an inguinal or scrotal exploration based on the status of the gonadal vessels: normal, atretic or blind-ending. Demographic information of regional membership (EAU/ESPU or SPU), years in practice and practice setting were obtained.

For each question, the rate of each response was compared between categories using Fisher's Exact Test. Cells having more or fewer cells than expected under homogeneity were identified using standardized Pearson residuals.[8] Analyses were conducted using R, version 3.5.1.[9] Participant's answers for normal-size and hypertrophic scenarios were compared by tests for marginal homogeneity (based on the Madansky test of interchangeability) conducted using the R package coin, version 1.2.2.

Interpretation of gonadal vessels:

After analysis of the above survey showed that vessel status was critical in decision making, a second survey was developed to analyze reliability of vessel interpretation. After receiving Institutional Review Board approval (806697) intra-abdominal images were obtained during diagnostic laparoscopy for NPT showing the closed internal inguinal ring, vas deferens and gonadal vessels in 32 consecutive cases with findings of an absent intra-abdominal testis (IAT). All cases were performed by a single surgeon. The image from the normal side was placed next to the NPT-side in high-resolution digital format (Figure 2). These images were presented in a separate digital survey to EAU/ESPU and SPU members. To determine inter-reader correlation, participants were asked to choose their interpretation of the NPT-side vessels from three possible descriptions: normal, atretic and blind-ending. Eighteen images were presented twice in random order to determine intra-reader reliability. Inter-rater reliability was calculated using Fleiss' kappa coefficient.[10] Intra-rater reliability (the agreement between multiple ratings of a subject by the same rater) was also calculated using Fleiss' kappa, with kappa values averaged across all pairs of repeated images. Kappa values were compared between patient subgroups using z tests.

Results

A total of 339 pediatric urologists completed the practice pattern survey. Of 445 SPU members, 179 responded (40%). Of 763 ESPU members, 160 responded (21%). Overall, 76% of participants frequently perform diagnostic laparoscopy for NPT. There was no difference based upon continent, years in practice or type of practice. When asked how many years in practice, 44% had greater than 20 years in practice. All other age brackets were evenly distributed. There was no significant difference in years in practice between continents or practice setting (P = 0.05). A majority of respondents, 84%, practiced in an academic setting.

Europeans (~49%) compared to U.S. surgeons (~12%) were more likely to obtain a sonogram in the setting of a contralateral normal-size or hypertrophic testicle ($P < 0.01$). Choice of sonogram usage was not associated with years in practice or type of practice. Of those who chose no sonography with a normal-size contralateral testis, only 2% switched and chose sonography when it was hypertrophic ($P = 0.763$). Overall, responses were almost identical in comparing normal-size versus hypertrophic scenarios.

Regardless of the contralateral testicle size, 81 – 97% of participants chose laparoscopy as the first step. However, 7 - 11% of surgeons did change their choice from diagnostic laparoscopy to open exploration in the presence of contralateral hypertrophy. Surgeons were statistically more likely to start with an inguinal or scrotal exploration with a contralateral hypertrophic testicle (17%) versus a normal contralateral testis (7%) when no prior ultrasound was obtained ($P < 0.001$). But, still the majority chose laparoscopy as the initial step regardless of contralateral size.

When three gonadal vessel descriptions during laparoscopy were presented: normal, atretic and blind-ending, the U.S. and European decisions to proceed with inguinal/scrotal exploration were nearly identical at 88%, 68%, and 17%, respectively. The test of marginal homogeneity did not show a difference in a participant's decision to proceed with open exploration between normal-size and hypertrophic states.

Interpretation of gonadal vessels:

Overall, 116 pediatric urologists completed the digital survey on interpretation of gonadal vessels. Reliability is reflected by Fleiss' kappa coefficient. In the case of perfect agreement, kappa will be 1, if there is no agreement kappa will be ≤ 0. Inter-rater reliability was moderate, for normal (K = 0.59) and blind-ending (K = 0.42) vessels and worse for atretic vessels (K = 0.27). Surgeons did not agree on normal status 37% of the time and did not agree on atretic status 66% of the time. There was no statistical difference between European and U.S. respondents (P = 0.23). Pediatric urologists with less than 5 years of practice had a statistically significant higher inter-rater reliability within their group compared to pediatric urologists with greater than 20 years in practice (P <0.001). In other words, more experienced urologists disagreed with each other's interpretations more often.

Intra-rater reliability was moderate, for normal (K = 0.50) and atretic (K = 0.41) vessels and worse for blind-ending vessels (K = 0.34) (P = 0.22) **(Table 1)**. When the first interpretation was blind-ending, the same surgeon changed interpretation of the same image 39% of the time. There was no statistical difference by years of practice.

To better illustrate the pattern of interpretation, participant answers were grouped into three categories defined by greater than 50% choosing a vessel status (Fig. 3 & 4). This illustrates that most of the inter- and intra-rater disagreement was between normal and atretic and blind-ending and atretic.

Discussion

Guidelines are increasingly published and updated to provide evidence-based guidance for standardized care. However, it is known that compliance to guidelines can be variable. Both AUA and EAU/ESPU guidelines agree that ultrasound is not recommended in the management of UDT as it is time-consuming, costly and for NPT lacks accuracy in establishing the presence or absence of an IAT. Both guidelines support either diagnostic laparoscopy or inguinal exploration in the setting of NPT. AUA guidelines state that the identification of the testicular vessels should be the objective of any exploration for an NPT. In concurrence, if "blind-ending vessels" are encountered, no further exploration is recommended. EAU/ESPU guidelines do comment that if an ipsilateral scrotal nubbin is suspected with contralateral testicular hypertrophy, a scrotal incision with removal of the nubbin is an option in lieu of laparoscopy.[3,4]

Despite guidelines, it is clear that referring practitioners are ordering ultrasounds prior to referrals. With a sensitivity of 45% ultrasound cannot rule out an absent testis. And with a specificity of 78%, sonography cannot reliably identify an NPT.[11] Based upon our survey, U.S. pediatric urologists utilized sonography for NPT at a lower rate (12%) than primary medical doctors, but European pediatric urologists chose sonography at a much higher rate (49%) for NPT management.[12] Of those who chose no sonography with a normal-size contralateral testis, only 2% switched and chose sonography when it was hypertrophic.

Less than 20% of participants chose inguinal/scrotal approach as the first choice for NPT. Proponents of this approach have argued that the incision provides easier detection of testicular remnants and that laparoscopy can be "avoided" since only 14 to 32% had an IAT. [13,14] In

contrast to these single-surgeon retrospective series, the majority of participants chose laparoscopy as the first step which is in concert with contemporary literature. This may be a philosophical shift in strategy. Although an IAT is less likely than an extra-abdominal (remnant or viable) testis, most prefer laparoscopy to treat an IAT or prove there is not one. On the other hand, an inguinal/scrotal incision is superior for removal of remnants if one believes they need to be removed.[15]

The size of the contralateral testicle in the setting of a unilateral NPT has been utilized to predict monorchism (absent IAT). Contralateral testis cut-off size of 1.8 and 2.0 cm have been shown to provide a specificity greater than 85%.[6,14] Despite this fact, less than 17% of participants chose to start with an inguinal/scrotal exploration when there was a contralateral hypertrophic testicle. Overall, 7 - 11% of surgeons did change their choice from diagnostic laparoscopy to open exploration in the presence of contralateral hypertrophy. This was only statistically significant in the setting when no ultrasound was obtained.

When three gonadal vessel descriptions during laparoscopy were presented: normal, atretic and blind-ending, the U.S. and European decisions to proceed with inguinal/scrotal exploration were nearly identical at 88%, 68%, and 17%. Both AUA and ESPU guidelines recommend no further exploration in the setting of "blind-ending" vessels. However, studies have demonstrated that inguinal exploration can also be avoided in the setting of atretic vessels. Inguinal or scrotal exploration despite vessel status may be performed due to concern for leaving viable testicle tissue, and hence risk of malignant potential.[16] Sturm et al. reviewed 595 patients with NPT and 318 (53%) had an abdominal testis. Of 86 boys deemed to have atretic vessels entering a closed

ring, two (2%) were found to have a normal testis. Of the 102 deemed to have normal vessels entering a closed ring, 17 (17%) were found to have a normal testis.[17] This study was retrospective. Vessel status was recorded by the surgeon after surgery was completed hence vessel designation could have been influenced by inguinal findings. Of the 207 excised testicular remnants, only two (1%) had germ cells and no specimen had germ cell atypia or germ cell neoplasia.[17]

Management of NPT is guided by surgeon assessment of gonadal vessels. To our knowledge, there are no prior studies assessing the reliability of this interpretation. The presumption was that this was an objective assessment (not interpretation) with general agreement. While limitations of the digital image survey include assessment of vessels via a 2D image in contrast to a 30-degree angled laparoscope, our experience is that spermatic vessels are flattened under the peritoneum and rotation of the scope is not requisite for evaluation. Most of the disagreement was between normal and atretic; and atretic and blind-ending. The fact that pediatric urologists with less than 5 years of experience had a higher inter-rater reliability suggests this is not improved with experience. Intra-rater reliability was surprisingly lower than anticipated (K 0.34 - 0.50). If a single surgeon is not consistent with their own interpretation (intra-rater), this could also explain the disagreement between two different surgeons (inter-rater).

At first sight, one might argue that these interpretations are subtle and carry little importance. But, the management survey demonstrated that vessel interpretation is the most important factor used by surgeons when determining whether to proceed to inguinal exploration. Our prior work has shown that non-palpable viable testis can be missed if inguinal exploration is not

performed.[17] For "atretic" vessels entering a closed ring, only 2% had a viable testis found after inguinal exploration, whereas 17% had a viable testis found with normal appearing vessels. In no case was a viable testis found with a "blind-ending" vessel. Thus, clearly distinguishing vessel status has clinical importance if one decides not to explore based upon vessel status. If the goal was to never miss an inguinal testis, all normal and atretic cases would require exploration due to the overlap in interpretation of these two vessel states.

Despite 339 participants and a 28% response rate, this study is limited by participation bias inherent to voluntary surveys. This fact and the participation rate may influence and/or select for individuals with particular practice patterns. The survey was created to avoid any ambiguity in the patient status with an algorithm to allow assessment of distinct variables. Despite, some participants could misinterpret the intended scenario. As mentioned, the presentation of the gonadal vessel images were limited to a 2D format whereas during laparoscopy the surgeon has a 30 degree angulation for viewing.

On the whole, guidelines are being followed except the utilization of sonography. From a cost-effective standpoint this could be improved. From a do-no-harm perspective, most surgeons are following guidelines appropriately. The rate limiting step in this process is a more robust and reliable assessment of vessel status. Possibly a more objective tool could be developed to define vessel status.

Conclusions

Absence of testis on sonography has no statistically significant impact on management decisions for NPT. This does not imply the converse finding, such as a testis being seen might change the approach. Hypertrophy of the contralateral testis has no to minimal impact on management decisions for NPT. Of all evaluated variables, physician region and the appearance of gonadal vessels had the most impact upon management decisions. Yet, the assessment of the vessels is subjective based upon inter- and intra-rater reliability testing.

Conflict of Interest:

None

Funding:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethical Approval:

IRB approval obtained

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Figure 1

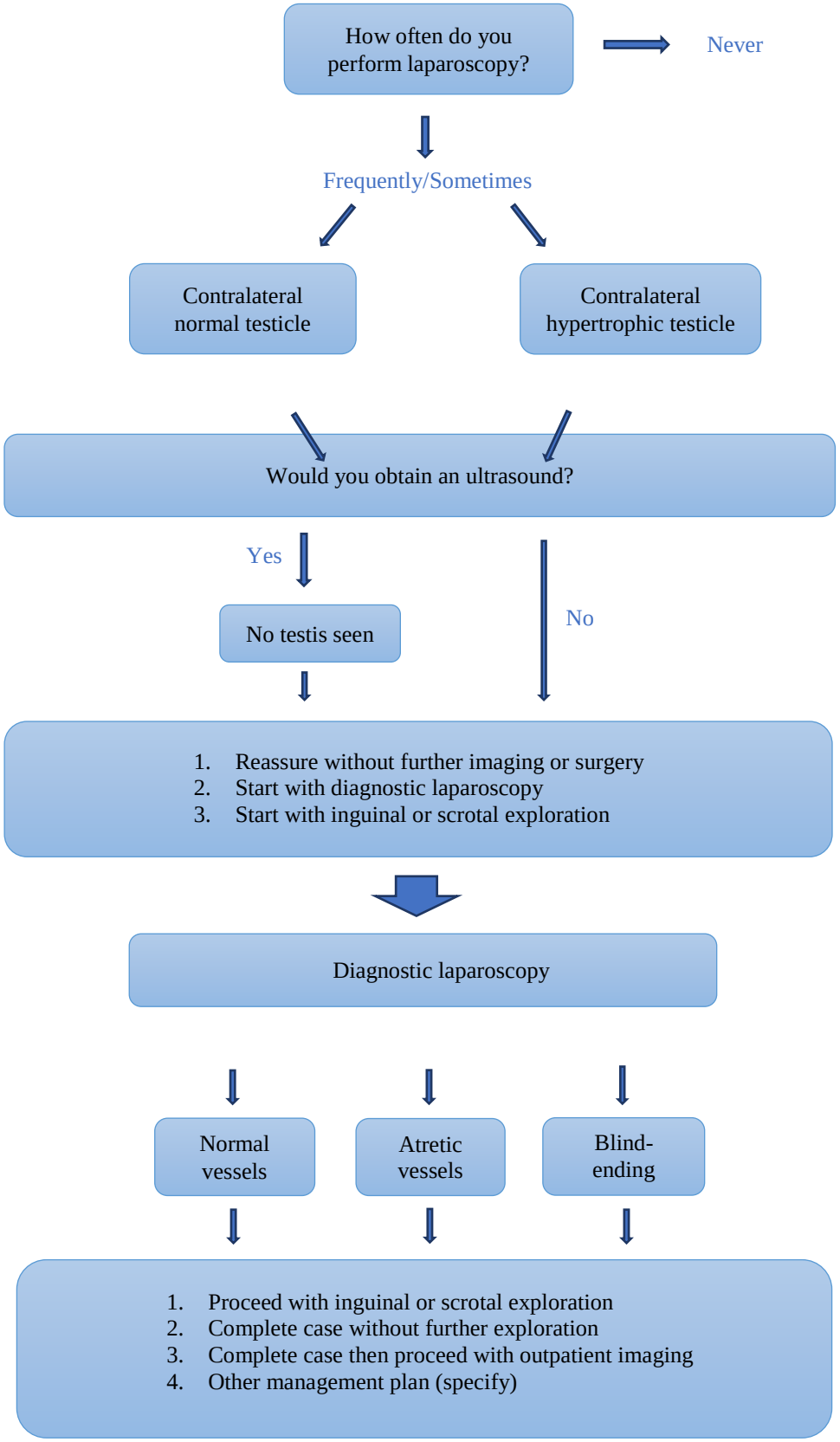

How often do you perform laparoscopy?
Never
Frequently/Sometimes
Contralateral normal testicle
Contralateral hypertrophic testicle
Would you obtain an ultrasound?
Yes
No
No testis seen
1. Reassure without further imaging or surgery
2. Start with diagnostic laparoscopy
3. Start with inguinal or scrotal exploration
Diagnostic laparoscopy
Normal vessels
Atretic vessels
Blind-ending
1. Proceed with inguinal or scrotal exploration
2. Complete case without further exploration
3. Complete case then proceed with outpatient imaging
4. Other management plan (specify)

Figure 2

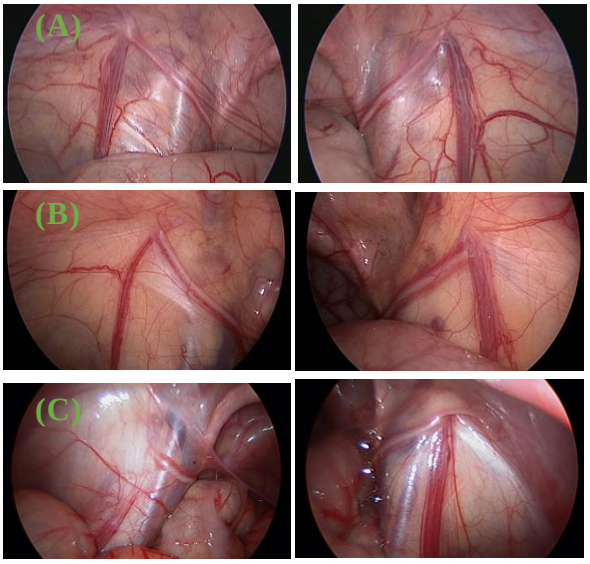


Figure 3

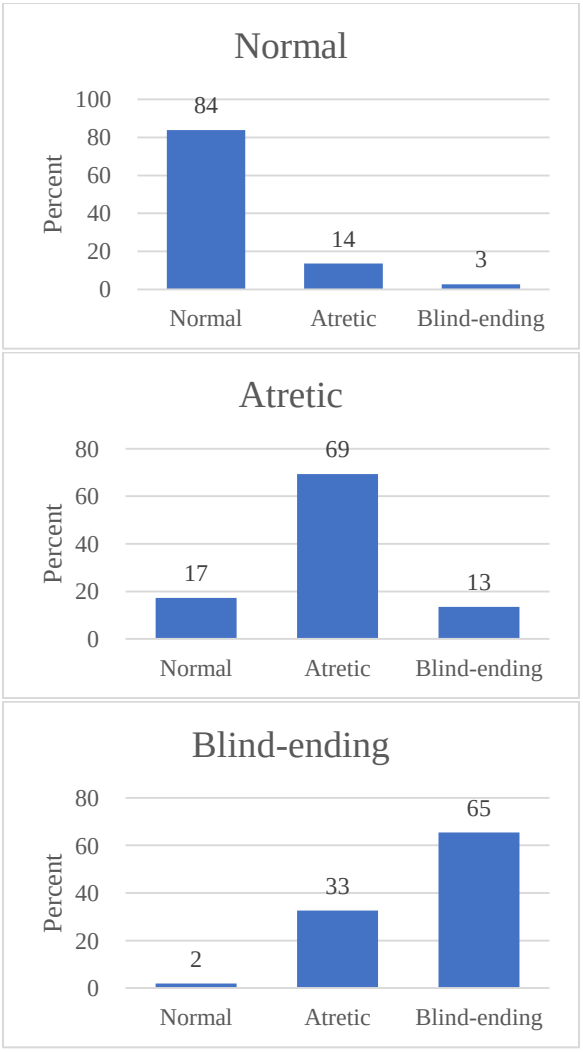
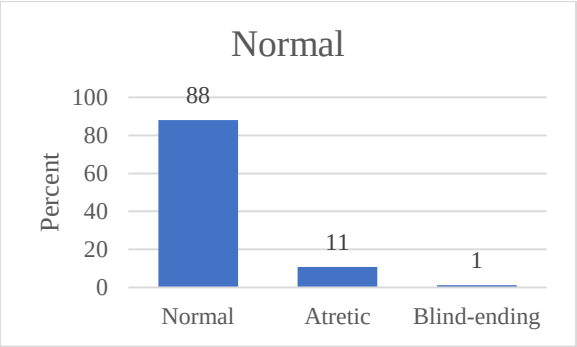
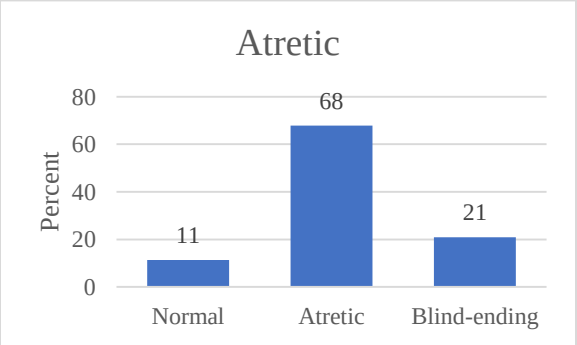
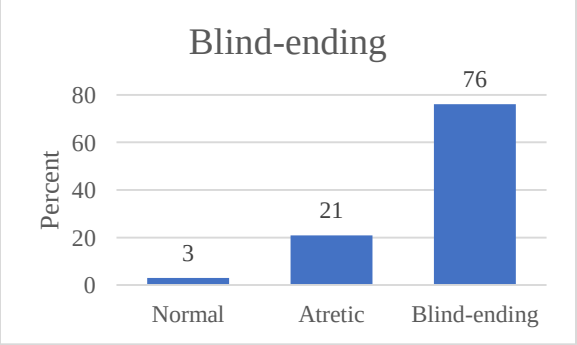

Normal
Percent
100
80
60
40
20
0
84
14
3
Normal
Atretic
Blind-ending
Atretic
Percent
80
60
40
20
0
17
69
13
Normal
Atretic
Blind-ending
Blind-ending
Percent
80
60
40
20
0
2
33
65
Normal
Atretic
Blind-ending

Figure 4


Normal
Percent
100
80
60
40
20
0
88
11
1
Normal
Atretic
Blind-ending


Atretic
Percent
80
60
40
20
0
11
68
21
Normal
Atretic
Blind-ending


Blind-ending
Percent
80
60
40
20
0
3
21
76
Normal
Atretic
Blind-ending

Summary Image

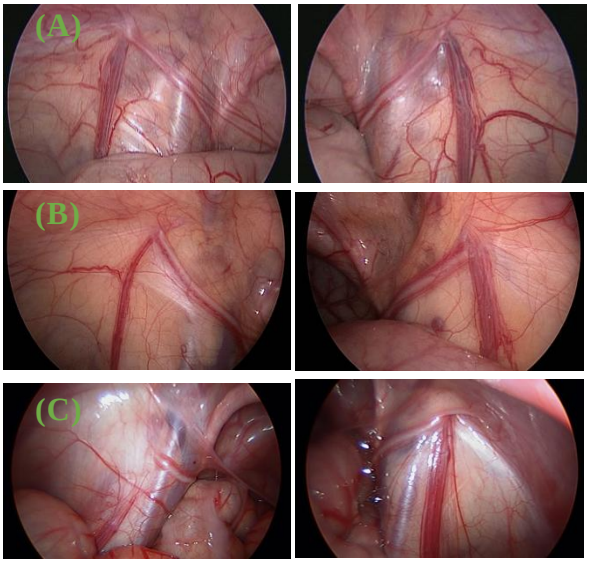


Figure 3 Caption

Figure 3 Inter-rater comparisons. Mean percent interpretation of gonadal vessels grouped by predominant interpretation amongst participants evaluating 32 unique images.

Figure 4 Caption

Figure 4 Intra-rater comparisons. Mean percent interpretation of gonadal vessels grouped by predominant interpretation amongst participants evaluating 18 repeated images.

Figure 1 Caption

Figure 1 Representative flowchart of electronic surveys sent to members of SPU and EAU/ESPU

Figure 2 Caption

Figure 2 Participants were asked to evaluate photographs from 32 consecutive patients undergoing diagnostic laparoscopy. The right and left abdominal photographs were mirrored (if necessary) such that the NPT side was always on the left. Representative images for (A) normal (B) atretic and (C) blind-ending vessels.

Summary Caption

Participants were asked to evaluate photographs from 32 consecutive patients undergoing diagnostic laparoscopy. The right and left abdominal photographs were mirrored (if necessary) such that the NPT side was always on the left. Representative images for (A) normal (B) atretic and (C) blind-ending vessels.

Table 1

	Inter-reader	Intra-reader
Normal	0.59	0.50
Atretic	0.27	0.41
Blind-ending	0.42	0.34

To determine inter- and intra-reader correlation, participants were asked to choose their interpretation of the NPT-side vessels from three possible descriptions: normal, atretic and blind-ending. Reliability was calculated using Fleiss' kappa coefficient. If there is perfect agreement, coefficient is 1; and complete disagreement produces a coefficient of zero.

Appendix 1

Click here to download Supplementary Data: Appendix 1.docx

Appendix 1

Patient is a 1-year old thin, healthy boy referred for a non-palpable testis with a normal penis and scrotum. The other testis is in the lower scrotum.
1. For a 1-year old thin, healthy boy referred for a non-palpable testis with normal penis and scrotum, how often do you perform laparoscopy?
2. For a 1-year old thin, healthy boy referred for a non-palpable testis with normal penis and scrotum, would you obtain an ultrasound?
3. For a 1-year old thin, healthy patient with a non-palpable testis: Contralateral testis: in scrotum, normal size Sonogram: no testis seen Next step:

The next 3 scenarios occur during diagnostic laparoscopy with the same patient. **For a 1-year old thin, healthy patient with a non-palpable testis:** **Contralateral testis: in scrotum, normal testis** **Sonogram: no testis seen** **The only changing variable is the status of the vessel.**
4. During laparoscopy, you find: No abdominal testis, closed internal ring Normal appearing vas and vessels enter the closed ring What is your next step:
5. During laparoscopy, you find No abdominal testis, closed internal ring Normal vas enter the closed ring Atretic vessels enter the closed ring What is your next step:
6. During laparoscopy, you find: No abdominal testis, closed internal ring Normal vas enter the closed ring Blind-ending vessel that terminates proximal to closed ring, does not enter the internal closed ring What is your next step:
7. For a 1-year old thin, healthy patient with a non-palpable testis: Contralateral testis: in scrotum, normal size Sonogram: not obtained Next step:

The next 3 scenarios occur during diagnostic laparoscopy with the same patient. **For a 1-year old thin, healthy patient with a non-palpable testis:** **Contralateral testis: in scrotum, normal testis** **Sonogram: not obtained** **The only changing variable is the status of the vessel.**
8. During laparoscopy, you find: No abdominal testis, closed internal ring Normal appearing vas and vessels enter the closed ring What is your next step:
9. During laparoscopy, you find: Closed internal ring, normal vas enter the closed ring Atretic vessels enter the closed ring What is your next step:

10. During laparoscopy, you find:
No abdominal testis, closed internal ring
Normal vas enter the closed ring
Blind-ending vessel that terminates proximal to closed ring, does not enter the internal closed ring
What is your next step:

11. For a 1-year old thin patient with a non-palpable testis:
Contralateral testis: in scrotum, hypertrophic
Would you obtain an ultrasound?

12. For a 1-year old thin, healthy patient with a non-palpable testis:
Contralateral testis: in scrotum, hypertrophic
Sonogram: no testis seen
Next step:

The next 3 scenarios occur during diagnostic laparoscopy with the same patient.

For a 1-year old thin, healthy patient with a non-palpable testis:
Contralateral testis: in scrotum, hypertrophic
Sonogram: no testis seen

The only changing variable is the status of the vessel.

14. During laparoscopy, you find:
No abdominal testis, closed internal ring
Normal appearing vas and vessels enter the closed ring
What is your next step:

15. During laparoscopy, you find
No abdominal testis, closed internal ring
Normal vas enter the closed ring
Atretic vessels enter the closed ring
What is your next step:

16. During laparoscopy, you find:
No abdominal testis, closed internal ring
Normal vas enter the closed ring
Blind-ending vessel that terminates proximal to closed ring, does not enter the internal closed ring
What is your next step:

13. For a 1-year old thin, healthy patient with a non-palpable testis:
Contralateral testis: in scrotum, hypertrophic
Sonogram: not obtained
Next step:

The next 3 scenarios occur during diagnostic laparoscopy with the same patient.

For a 1-year old thin, healthy patient with a non-palpable testis:
Contralateral testis: in scrotum, hypertrophic
Sonogram: not obtained

The only changing variable is the status of the vessel.

17. During laparoscopy, you find:
No abdominal testis, closed internal ring
Normal appearing vas and vessels enter the closed ring
What is your next step:

18. During laparoscopy, you find
No abdominal testis, closed internal ring
Normal vas enter the closed ring
Atretic vessels enter the closed ring
What is your next step:

19. During laparoscopy, you find:
No abdominal testis, closed internal ring
Normal vas enter the closed ring
Blind-ending vessel that terminates proximal to closed ring, does not enter the internal closed ring
What is your next step:

Thank you for participating. We'd like to know a bit about you and your practice setting

23 . How many years have you been in practice?

24. What is your practice setting?