EARLY-STAGE TESTICULAR CANCER MANAGEMENT REFERRING TO EUROPEAN ASSOCIATION OF UROLOGY (EAU) GUIDELINES: A SURVEY IN INDONESIA

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ABSTRACT

Objective: *This study aimed to determine the management of early-stage testicular cancer among urologists in Indonesia by using a survey.* ***Material & Methods:*** *This research was a descriptive-analytic study using a survey method through a Google-forms questionnaire distributed to urologists throughout Indonesia who were willing to participate. Data were collected from September 1 to 30, 2021.* ***Results:*** *Of the total respondents, 15 (14.2%) respondents were consultant urologic oncologists, and 90 (85.71%) respondents were non-consultant urologists or consultant urologists non-oncology. There was no difference in the treatment given by consultant uro-oncologists and non-consultant urologists/consultant urologists non-oncology in the management of surveillance of stage IA-IB seminoma (66.7% vs. 55.6%, p-value = 0.207), chemotherapy of stage IIA-IIB seminoma (100.0% vs. 90.0%, p-value = 0.080), surveillance of stage I non-seminoma cancers (46.7% vs. 41.1%, p-value = 0.304), and chemotherapy of stage IIA and IIB non-seminoma cancers (80% vs. 91.1%, p-value = 0.193).* ***Conclusion:*** *In general, as many as 84.4% of oncology consultant urologists and 83.7% of non-consultant urologists/consultant urologists non-oncology have performed initial diagnostic examinations, treatment, and follow-up following testicular cancer management guidelines according to the European Association of Urology 2021.*

Keywords: *Seminoma, survey and questionnaire, testicular cancer, urologists.*

ABSTRAK

Tujuan: *Penelitian ini menggunakan metode survei untuk mengetahui penatalaksanaan kanker testis stadium awal yang dilakukan oleh dokter spesialis urologi di Indonesia.* ***Bahan & Cara:*** *Penelitian ini adalah penelitian deskriptif-analitik yang menggunakan metode survei menggunakan kuesioner online yang disusun menggunakan Google form dan disebarkan kepada dokter spesialis urologi di seluruh Indonesia. Proses pengumpulan data berlangsung pada tanggal 1 hingga 30 September 2021.* ***Hasil:*** *Dari total responden tersebut, terdapat 15 spesialis urologi konsultan onkologi (14.2%) yang menjadi responden dan terdapat 90 (85.71%) responden yang merupakan spesialis urologi non konsultan atau konsultan non onkologi. Tidak didapatkan perbedaan terhadap tata laksana yang diberikan oleh spesialis urologi konsultan onkologi dan spesialis urologi non konsultan/ konsultan non-onkologi dalam penatalaksanaan surveillance seminoma stadium IA-IB (66.7% vs 55.6%, nilai p = 0.207), kemoterapi pada seminoma stadium IIA-IIB (100.0% vs 90.0%, nilai p = 0.080), surveillance pada kanker non-seminoma stadium I (46.7% vs 41.1%, nilai p = 0.304), dan kemoterapi pada kanker non seminoma stadium IIA dan IIB (80% vs 91.1%, nilai p = 0.193).* ***Simpulan:*** *Secara umum, sebanyak 84.4% spesialis urologi konsultan onkologi dan 83.7% spesialis urologi non konsultan/ konsultan non onkologi telah melakukan pemeriksaan diagnostik awal, tata laksana, dan follow up sesuai dengan panduan tata laksana kanker testis menurut European Association of Urology 2021.*

Kata Kunci: *Seminoma, survei dan kuesioner, kanker testis, dokter urologi.*

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INTRODUCTION

Testicular cancer is the most common malignancy among men aged 15 to 45 years but remains curable if treated early with a multimodal approach. Testicular cancer occurs in 1% of malignancies in men and 5% of malignancies of the urinary tract.[1] The global incidence of testicular cancer has doubled over the last four decades.[2] In the United States, testicular cancer is most commonly

diagnosed among men aged 20 to 34 (51% of all cases). In the 35 to 44 age group, the incidence of testicular cancer is 22.9%, 12.9% between 45 and 54 years, and the rest are in other age groups.[2] In Indonesia, data show that the average number of testicular cancer was 4 to 11 new cases per year in the period of 2000-2018; the most common histological type was seminoma, and the age range was between 15-35 years.[3,-4]

Through effective management, testicular cancer would have a good prognosis, more than 90% cure rate and more than 95% five-year survival rate.[5,-6] Immediate diagnosis and treatment are crucial because testicular malignancies have a high cure rate and high chemotherapy sensitivity. Until recently, the treatment options for patients have been cisplatin-based chemotherapy, radiotherapy, and radical inguinal orchidectomy or retroperitoneal lymph node dissection.[7]

A study in the United States comparing the management of testicular cancer and the NCCN (National Comprehensive Care Network) guidelines show that non-adherence to the NCCN guidelines leads to incorrect diagnostic management (44%), overtreatment (40%), and misdiagnosis (24%). Lack of adherence to the guidelines leads to poor outcomes, so obtaining epidemiological data on the diagnostic and therapeutic management of testicular cancer is important.[8] Meanwhile, testicular cancer case management in Indonesia refers to the testicular cancer guidelines published by the European Association of Urology (EAU). However, until recently, no literature has discussed the practices of urologists in Indonesia that refers to the EAU guidelines.

OBJECTIVE

This study aimed to determine the management of early-stage testicular cancer among urologists in Indonesia by using a survey.

MATERIAL & METHODS

This study was descriptive-analytic that aimed to determine the management of early-stage testicular cancer by urologists in Indonesia. This study used an online questionnaire survey via Google forms sent to emails of all research targets. The data were collected from September 1 to 30, 2021. The inclusion criterion in this study was urologists in Indonesia who had performed early-stage testicular cancer management, while the exclusion criterion was urologists in Indonesia who refused to take part in the survey. The sample was collected using the total sampling method, and from the formula for calculating the number of the survey sample, the minimum sample in this study was 64 respondents.[9] This study was conducted after obtaining ethical clearance from the Ethics Committee of Saiful Anwar General Hospital (No. 400/212/K.3/302/2021).

The survey used a questionnaire containing 25 questions. The questions were divided into the specialist type, the initial examination, management, and follow-up carried out in the management of testicular cancer. Then, to find out the differences in testicular cancer management in each parameter, the sample was divided into two groups, consultant uro-oncologists and non-consultant urologists/ consultant urologists non-oncology. The testicular cancer management was limited to stage IA, IIB, IIA, and IIB seminoma and non-seminoma cancers.

Data were collected and processed descriptively and continued with statistical tests. The initial examination, treatment, and follow-up parameters were calculated using the Chi-square test (X2) to see the differences in management performed in testicular cancer treatment between the two groups. Data were processed using the SPSS program (IBM Corp. 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.)

RESULTS

The survey resulted in 105 respondents, that consisted of 15 (14.2%) consultant uro-oncologists and 90 (85.71%) non-consultant urologists or consultant urologists non-oncology. Overall, 83.5% of urologists in Indonesia treated testicular cancer according to EAU guidelines. This figure was obtained from the average percentage in the diagnostic examination, management, and follow-up sections if each respondent had chosen one of the options in the EAU guidelines or the highest percentage was taken in the same sample group. The data are shown in Table 1.

In the diagnostic examination, serum tumor marker examination (AFP, β-HCG, LDH) was performed by 101 (95.52%) urologists from a total of 105 respondents, as seen in Table 2. The test results showed a p-value of 0.004 ($p<0.05$), so there was a significant difference in the laboratory examination of tumor marker serum between consultant uro-

oncologists and non-consultant urologists/ consultant urologists non-oncology that laboratory examination for the tumor marker serum among oncology consultant urologists was mostly done before inguinal radical orchidectomy (93.3%), after chemotherapy (66.6%), before chemotherapy (53.3%), and after inguinal radical orchidectomy (53.3%). Meanwhile, laboratory examination for serum tumor markers among non-consultant urologists/consultant urologists non-oncology was mostly done before inguinal radical orchidectomy (91.1%), after chemotherapy (31.1%), after inguinal radical orchidectomy (31.1%), and before chemotherapy (15.5%). In addition, 8 (53.3%) consultant uro-oncologists and 20 (22.2%) non-consultant urologists/consultant urologists non-oncology examined serum tumor markers before and after radical inguinal orchidectomy.

In addition, on radiology examination, as many as 92 (85.7%) urologists from 105 total respondents did chest X-rays, 33 (31.4%) respondents did abdominal CT scans, 114 (97.1%) respondents did ultrasounds, 9 (8.6%) respondents did thoracic CT scans, and 3 (2.8%) respondents did

Table 1. Management of testicular cancer by urologists in Indonesia referring to the EAU guidelines.

Parameter	Total (N=105) n (%)	Consultant Uro-oncologists (n=15) n (%)	Non-Consultant Urologists or Consultant Urologists Non-Oncology (n=90) n (%)
Diagnostic examination			
Examination of serum tumor markers			
Before radical inguinal orchidectomy	42 (40.00)	14 (93.33)	82 (91.11)
After radical inguinal orchidectomy	32 (30.48)	8 (20.00)	28 (20.40)
Before and after radical inguinal orchidectomy	28 (26.6)	8 (53.3)	20 (22.2)
Radiological examination			
Testicular Ultrasound	102 (97.14)	12 (80.00)	90 (100.00)
Abdominal CT scan	33 (31.42)	14 (93.33)	19 (21.11)
Seminoma Management			
Stage IA dan IB			
Surveillance	60 (57.14)	10 (66.66)	50 (55.55)
Single-agent Carboplatin	29 (27.61)	5 (33.33)	24 (26.66)
Total	89 (84.76)	15 (100.00)	74 (82.22)
Stage IIA & IIB			
3 cycles of BEP	96 (91.42)	12 (80.00)	76 (84.40)
4 cycles of EP	7 (62.00)	3 (20.00)	5 (5.60)
Total	103 (98,10)	15 (100.00)	81 (90.00)
Non-seminoma Management			
Stage I			
Surveillance	44 (41.9)	7 (46.66)	37 (41.11)
1 cycle of BEP	55 (52.38)	6 (40.00)	49 (54.44)
Total	99 (94.28)	13 (86.66)	86 (95.55)
Stage IIA dan IIB			
3 cycles of BEP	94 (89.5)	12(80.0)	82(91.1)
Follow up			
Tumor marker serum /6 months	46 (43.8)	7 (46.66)	39 (43.33)
Abdominal CT scan /6 months	36 (34.28)	6 (40.00)	30 (33.33)
Thoracic CT scan /1 year	14 (13.33)	4 (26.66)	10 (11.11)
Average Percentage	**83.48%**	**84.44%**	**83.70%**

MRIs. For the initial support examination, the test results obtained a p-value of <0.001, so there was a significant difference in the initial supporting examination between consultant uro-oncologists and non-consultant urologists/ consultant urologists non-oncology that 93.3% oncology consultant urologists did chest X-rays, 93.3% did abdominal CT scans, 80.0% did ultrasounds, 20.0% did thoracic CT scans, and 13.3% did MRIs. Meanwhile, 86.7% non-consultant urologists/consultant urologists non-oncology did chest X-rays, 21.1% did abdominal CT scans, 100% did ultrasounds, 6.6% did thoracic CT scans, and 1.1% did MRIs.

The most common treatment for stage I non-seminoma was 1 cycle of BEP that was conducted by as many as 55 respondents (52.4%), followed by surveillance (44 respondents or 41.9%) and retroperitoneal lymph node dissection (RPLND) (6 respondents or 5.7%) (Table 3). As many as 40% of oncology consultant urologists gave 1 cycle of BEP, 13.3% gave RPLND, and 46.7% gave surveillance. Meanwhile, 54.4% of non-consultant urologists/consultant urologists non-oncology gave 1 cycle of BEP, 4.4% gave RPLND, and 41.1% gave surveillance. The test results obtained a p-value of 0.304, so there was no significant difference in the management that was often performed on stage I non-seminoma between consultant uro-oncologists and non-consultant urologists/consultant urologists non-oncology.

The most common treatment for stage IIA and IIB non-seminoma cancer cases were 3 cycles of BEP (92 respondents or 89.5%) and RPLND (11 respondents or 10.5%). As many as 80% of consultant uro-oncologists gave 3 cycles of BEP, and 20% gave RPLND. Meanwhile, 91.1% of non-consultant urologists/consultant urologists non-oncology gave 3 cycles of BEP, and 8.9% gave RPLND. Comparing the treatment options between the two groups, the test results obtained a p-value of

Table 2. Diagnostic examination of testicular cancer by urologists in Indonesia referring to the EAU guidelines.

Parameter		Consultant Uro-oncologists (n=15) n (%)	Non-Consultant Urologists/Consultant Urologists Non-Oncology (n=90) n (%)	p-Value
Tumor Marker (AFP, Beta-HCG, LDH) Lab	Never	0 (0)	4 (4.4)	**0.004***
	Before chemotherapy	8 (53.3)	9 (10.0)	
	After chemotherapy	10 (66.6)	14 (15.5)	
	Before radical inguinal orchidectomy	14 (93.3)	82 (91.1)	
	After radical inguinal orchidectomy	8 (53.3)	28 (31.1)	
Supporting Examination	Never	0 (0)	2 (2.2)	**0.000***
	Chest X-ray	14 (93.3)	78 (86.7)	
	Abdominal CT scan	14 (93.3)	19 (21.1)	
	Testicular Ultrasound	12 (80.0)	90 (100.0)	
	Thoracic CT scan	3 (20.0)	6 (6.6)	
	MRI	2 (13.3)	1 (1.1)	

Note: * p-value < 0.05

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0.193, so there was no significant difference between the treatment that most consultant uro-oncologists and non-consultant urologists/consultant urologists non-oncology often considered for administering 3 cycles of BEP or RPLND.

Serum tumor marker follow-up examination was performed by 85 (81%) respondents. Of the urologists who did the follow-up, most (43.8%) respondents did a tumor marker serum examination every 6 months, followed by a tumor marker serum examination every 3 months (30.5%), and once a year (6.7 %). However, there was no difference in the interval between tumor marker serum examinations for follow-up between consultant uro-oncologists and non-consultant urologists/consultant urologists non-oncology (p-value = 0.944). Both consultant uro-oncologists and non-consultant urologists /consultant urologists non-oncology more frequently performed tumor marker serum examination follow-up at a 6-month interval as much as 46.7% and 43.3%, respectively. In addition, 20 (19%) respondents who did not perform follow-up tumor marker serum examinations and the response frequency of respondents who did or did not do follow-up tumor marker serum between consultant uro-oncologists and non-consultant urologists/ consultant urologists non-oncology did not show any difference (p-value = 0.543). The data are shown in Table 4.

The survey results on the abdominal CT scan follow-up showed differences between the consultant urologic oncologist group and the non-consultant urologists/consultant urologist non-oncology group in considering abdominal CT scan follow-up (p-value = 0.049). There were 93.3% consultant uro-oncologists and 68.9% non-consultant urologists/consultant urologists non-oncology who performed abdominal CT scan follow-up. In the group of consultant uro-oncologists who perform abdominal CT scans, the most chosen interval was every 1 year (40%), every 6 months (33.3% of respondents), every 3 months (6.7%), and never (6.7%). Different results were shown in the group of non-consultant urologists/consultant urologists non-oncology, most of them chose abdominal CT scan follow-up every 1 year, 28.9% of respondents performed abdominal CT follow-up scan every 3 months, but 32.3% of respondents in this group did not do abdominal CT scan follow-up. If compared, the difference in the percentage of CT scan follow-up intervals between the two groups was not found (p-value = 0.215).

The survey results on the thoracic CT scan follow-up did not show any difference between consultant uro-oncologists and non-consultant urologists/consultant urologists non-oncology in considering thoracic CT scan follow-up (p-value = 0.163). There were 66.7% of consultant uro-oncologists and 82.2% of non-consultant urologists/consultant urologists non-oncology who did not perform thoracic CT scan follow-up. However, 5 (33.3%) consultant uro-oncologists and 16 (17.8%) non-consultant urologists/ consultant urologists non-oncology did thoracic CT scan follow-up. In the group of consultant urologic oncologists, the most chosen interval for thoracic CT scan was every 1 year (26.7%), but some respondents (6.7%) chose the follow-up every 6

Table 3. The management of early-stage seminoma and non-seminoma cancers.

Parameter		Consultant Uro-oncologists (n=15) n (%)	Non-Consultant Urologists/Consultant Urologists Non-Oncology (n=90) n (%)	p-Value
Stage IA & IB Seminoma	Radiotherapy	0 (0)	16 (17.8)	0.207
	Single-Agent Carboplatin	5 (33.3)	24 (26.7)	
	Surveillance	10 (66.7)	50 (55.6)	
Stage IIA & IIB Seminoma	3 cycles of BEP	12 (80)	76 (84.4)	0.080
	4 cycles of EP	3 (20)	5 (5.6)	
	Radiotherapy	0 (0)	9 (10.0)	
Stage I Non-Seminoma	1 cycle of BEP	6 (40.0)	49 (54.4)	0.304
	RPLND	2 (13.3)	4 (4.4)	
	Surveillance	7 (46.7)	37 (41.4)	
Stage IIA & IIB Non Seminoma	3 cycles of BEP	12 (80.0)	82 (91.1)	0.193
	RPLND	3 (20.0)	8 (8.9)	

Table 4. Follow-up modalities in testicular cancer cases in Indonesia.

Parameter		Consultant Uro-oncologists (n=15) n (%)	Non-Consultant Urologists/Consultant Urologists Non-Oncology (n=90) n (%)	p-Value
Tumor marker serum follow-up	Yes	13 (86.7)	72 (80.0)	0.175
	No	2 (13.3)	18 (20.0)	
Tumor marker serum follow-up interval	Every 3 months	5 (13.3)	27 (30.0)	0.134
	Every 6 months	7 (33.3)	39 (43.3)	
	Every 1 year	1 (6.7)	39 (43.3)	
Abdominal CT scan follow	Yes	14 (93.33)	62 (68.9)	**0.049***
	No	1 (6.7)	28 (31.1)	
Abdominal CT scan follow-up interval	Every 3 months	1 (6.7)	5 (5.6)	0.215
	Every 6 months	5 (33.3)	26 (28.9)	
	Every 1 year	6 (40)	30 (33.3)	
Thoracic CT scan follow-up	Yes	5 (33.3)	16 (17.8)	0.163
	No	10 (66.7)	74 (82.2)	
Thoracic CT scan follow-up interval	Every 3 months	0 (0)	1 (1.1)	0.417
	Every 6 months	1 (6.7)	6 (6.7)	
	Every 1 year	4 (26.7)	10 (11.1)	

Note: * p-value < 0.05.

months. Similar to non-consultant urologist/consultant urologist non-oncology group, most (11.1%) respondents chose to do abdominal CT scan follow-up every 1 year, and there was also 1 (1.1%) respondent in this group who did thoracic CT scan follow-up every 3 months. If compared, there was no difference in the percentage of CT scan follow-up intervals between the two groups (p-value = 0.417).

DISCUSSION

Testicular cancer management by urologists in Indonesia is still varied based on the EAU guidelines, as seen in Table 1. Overall, 83.5% of urologists in Indonesia treat testicular cancer according to EAU guidelines. Until recently, little literature has discussed how urologists consider applying the EAU guidelines. However, a study by Nestler in Germany that examined the compliance of 252 urologists and urology residents in implementing the EAU guidelines on testicular cancer management showed significant improvements in performance and accuracy in testicular cancer management compared to those who did not apply the EAU guidelines. The study also showed a difference between urologists who work in hospitals and those who work on an office-based basis.[10] In general, the management carried out by urologists in Indonesia, both consultant uro-oncologists and non-consultant urologists/ consultant urologists non-oncology, is in line with the guidelines issued by the EAU. Several conditions might cause variations. First, the resources and modalities of hospitals in Indonesia are not evenly distributed. However, the EAU guidelines provide alternatives if the required modalities are unavailable.[11] Secondly, the national system of medical practices and insurance in Indonesia provide flexibility for handling oncology cases to surgeons specializing in oncology, internists specializing in oncology and hematology, and urology oncology specialists.

In diagnostic examinations, 97.14% urologists in Indonesia have followed the EAU

guidelines by performing tumor marker serum examinations, testicular ultrasound, or abdominal CT scans. This study also shows that consultant uro-oncologists preferred to perform abdominal CT scans compared to non-consultant urologists/ consultant urologists non-oncology who preferred a testicular ultrasound. This study also indicates that non-consultant urologists/ consultant urologists non-oncology selected to perform tumor marker serum examinations before and after radical inguinal orchidectomy. Serum tumor marker examination is the first step that can be done in people with testicular cancer risk factors. A relatively cheaper cost than other examination methods, such as CT-scan, becomes the main choice of investigation in testicular cancer patients and corresponds to EAU 2021 testicular cancer management guidelines. Alpha-fetoprotein (AFP), beta subunit of human chorionic gonadotropin (β-hCG), and Lactate Dehydrogenase (LDH) should be examined before and after radical inguinal orchidectomy to support the diagnosis of testicular cancer, which can indicate the histology of germ cell tumors and as staging and risk stratification. In addition, the EAU 2021 guidelines also recommend an initial investigation in the form of testicular ultrasound to confirm testicular tumors, although there is clinical evidence of lesions on the testes. Meanwhile, contrast abdominal CT examination also follows the EAU 2012 guidelines and is recommended in all patients for staging before inguinal radical orchidectomy but can be postponed until histopathological confirmation suggests malignancy.[11]

The results on the management parameters of stage IA-IB and IIA-IIB seminoma are also in accordance with the recommendations in the EAU guidelines. At stage IA-IB, most respondents carried out the surveillance recommended by the EAU 2021 guidelines. Surveillance is still the main treatment option in patients with stage I seminoma testicular cancer. Most patients choose surveillance because the costs are much lower than other treatments. However, patients who choose to undergo surveillance must strictly adhere to the commitments between the patient and the doctor.[12] In stage IIA-IIB, about 80% of respondents in this study chose 3 cycles of BEP chemotherapy, both in the urologic oncologist group and the non-consultant urologist/consultant urologist non-oncology group. It follows the guidelines for testicular cancer management according to the EAU 2021 that the main treatment option for seminomas IIA and IIB is chemotherapy with 3 cycles of BEP or 4 cycles of EP if the patient contraindicates to bleomycin, and the alternative therapy that can be used is radiotherapy.[11] In the management of non-seminoma testicular cancer, chemotherapy is the main modality chosen according to the EAU 2021 guidelines. Non-seminoma patients with clinical stage IIA with elevated serum tumor markers and stage IIB with or without elevated markers may be treated with adjuvant cisplatin-based chemotherapy.[13]

In the follow-up examination, 40% respondents chose to have serum tumor markers checked every 6 months to see the response to the therapy given. It follows the EAU 2021 testicular cancer management guidelines, which recommend the examination of serum tumor markers in clinical stage I seminoma with surveillance or after adjuvant treatment every six months at medical check-ups in the first, second, and third year. Meanwhile, serum tumor markers can be examined only once a year in the fourth and fifth years. For the sixth year onwards, further management is carried out according to the survivor's care plan. However, in clinical stage I non-seminoma patients with active surveillance, tumor marker serum examination was carried out four times in the first and second years (every three months), and in the third year, tumor marker serum was recommended to be examined every six months (twice a year), and the serum tumor markers can be examined once or twice a year in the fourth and fifth years. For the sixth year onwards, further management is carried out according to the survivor's care plan. Monitoring recommendations after adjuvant treatment or complete remission for advanced disease (unless the prognosis is poor, and there is no remission) Serum tumor markers should be checked every three months in the first and second years, and every six months in the third, fourth, and fifth years. In the sixth year onwards, further management is carried out according to the survivor's care plan.[11] In contrast, abdominal and thoracic CT scans are not the main options for follow-up in patients with testicular cancer in Indonesia. The high cost, long duration of work, side effects due to radiation exposure, and the need for patient compliance are why these modalities are not the first choice.

This study shows that urologists' considerations in Indonesia in managing testicular cancer have mostly adopted from the guidelines published by the EAU. However, some variations in the concerns of consultant uro-oncologists and non-consultant urologists/consultant urologists non-oncology were due to the absence of guidelines for the management of testicular cancer in Indonesia.

Without local guidelines, considerations taken are not limited to strict guidelines. However, a study by Nestler showed that adherence to the guidelines could increase therapy accuracy, effectiveness, and success rate.[10] Thus, this research is expected to contribute to the development of testicular cancer management guidelines in Indonesia. In addition, the EAU guidelines cannot be fully implemented in Indonesia, but this study does not discuss in depth the difficulties of urologists in implementing the guidelines. Thus, the opportunity for further research on this topic is still wide open and can be done in the future.

The limitations in this study were due to the questionnaire method that assessed at one time, which allowed for memory bias of the subjects. Subjects might not have thoroughly documented the cases obtained at the hospitals, which caused a memory bias toward the answers in the survey. In addition, the survey was conducted using an online platform with short questions so the subjects could easily understand the meaning of each question. However, the possibility of information bias is still possible because the filling-in depends on each respondent's perception.

CONCLUSION

In general, 84.4% consultant uro-oncologists and 83.7% non-consultant urologists/ consultant urologists non-oncology have performed initial diagnostic examinations, management, and follow-up under testicular cancer management guidelines according to the European Association of Urology 2021.

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