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中国泌尿肿瘤MDT会诊公益行动

“大医同行” 全国泌尿肿瘤专家互联网患者关爱系列活动（第七场）

睾丸肿瘤诊治新进展

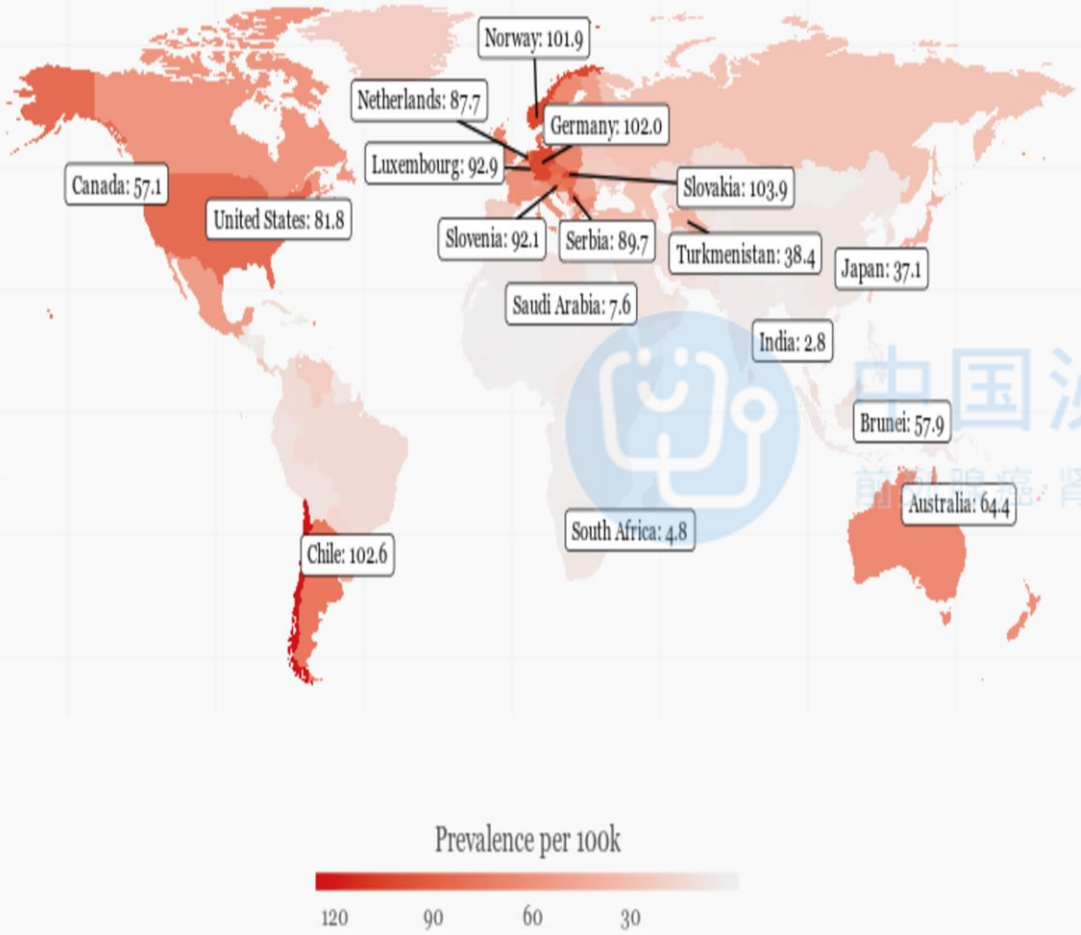
长晴大爱 健康中国

中国泌尿肿瘤MDT会诊公益行动

睾丸癌的诊断及手术治疗

中国科学技术大学附属第一医院(安徽省立医院) 肖峻

一、睾丸癌（Testicular Cancer，TC）全球发病率



睾丸癌（**Testicular Cancer，TC**）较少见，仅占男性肿瘤的1%-1.5%，占泌尿系统肿瘤的5%。在15-34岁的年轻男性中其发病率列所有肿瘤之首。

其发病率在不同地区、不同种族具有明显的差异，睾丸癌发病率最高的分别是西欧（7.8%）、北欧（6.7%）和澳大利亚（6.5%），亚洲和非洲的发生率最低(<1.0%)。美国黑人发病率是美国白人的一半，是非洲黑人的10倍。在以色列，犹太人比非犹太人的发病率高8倍以上。

20世纪以来，全球发病率有逐渐增加的趋势。我国发病率为11/10万左右，占男性全部恶性肿瘤的1%-2%，占泌尿生殖系统恶性肿瘤的3%-9%。

IHME GBD，2016

二、TC的病理分型、分级分期

1. **Germ cell tumours** 生殖细胞肿瘤
   - Germ cell neoplasia *in situ* (GCNIS) 原位生殖细胞瘤
2. **Derived from germ cell neoplasia *in situ*** 原位衍生生殖细胞瘤
   - Seminoma 精原细胞瘤
   - Embryonal carcinoma 胚胎性精原细胞瘤
   - Yolk sac tumour, post-pubertal type 卵黄囊瘤，青春期后型
   - Trophoblastic tumours 滋养细胞肿瘤
   - Teratoma, post-pubertal type 畸胎瘤，青春期后型
   - Teratoma with somatic-type malignancies 畸胎瘤伴体细胞形态恶性肿瘤
   - Mixed germ cell tumours 混合型生殖细胞瘤
3. **Germ cell tumours unrelated to GCNIS** 与GCNIS无关的生殖细胞肿瘤
   - Spermatocytic tumour 精细胞肿瘤
   - Yolk sac tumour, pre-pubertal type 卵黄囊瘤，青春期前型
   - Mixed germ cell tumour, pre-pubertal type 混合型生殖细胞瘤，青春期前型
4. **Sex cord/stromal tumours** 性索/间质肿瘤
   - Leydig cell tumour 间质细胞瘤
     - Malignant Leydig cell tumour 恶性间质细胞瘤
   - Sertoli cell tumour 支持细胞瘤
     - Malignant Sertoli cell tumour 恶性支持细胞瘤
     - Large cell calcifying Sertoli cell tumour 大细胞钙化支持细胞瘤
     - Intratubular large cell hyalinising Sertoli cell neoplasia 管内大细胞透明质化支持细胞瘤
   - Granulosa cell tumour 颗粒细胞瘤
     - Adult type 成人型
     - Juvenile type 少年型
   - Thecoma/fibroma group of tumours 卵巢泡膜瘤/纤维瘤
   - Other sex cord/gonadal stromal tumours 其他性索/性腺间质瘤
     - Mixed 混合型
     - Unclassified 未分类型
   - Tumours containing both germ cell and sex cord/gonadal stromal 包含生殖细胞和性索/性腺基质的肿瘤
     - Gonadoblastoma 性腺母细胞瘤
5. **Miscellaneous non-specific stromal tumours** 其他非特异性基质肿瘤
   - Ovarian epithelial tumours 卵巢上皮肿瘤
   - Tumours of the collecting ducts and rete testis 集合管/睾丸网的肿瘤
     - Adenoma 腺瘤
     - Carcinoma 癌
   - Tumours of paratesticular structures 睾丸旁组织肿瘤
     - Adenomatoid tumour 腺瘤样肿瘤
     - Mesothelioma (epithelioid, biphasic) 间皮瘤（上皮，双相）
     - Epididymal tumours 附睾肿瘤
   - Cystadenoma of the epididymis 附睾囊腺瘤
   - Papillary cystadenoma 乳头状囊腺瘤
   - Adenocarcinoma of the epididymis 附睾腺癌
   - Mesenchymal tumours of the spermatic cord and testicular adnexae 精索和睾丸附件的间质瘤

European Association of Urology Guidelines on Testicular Cancer： 2019

TC的TMN分期：

pT - Primary Tumour[1]			
pTX	Primary tumour cannot be assessed (see note 1)		
pT0	No evidence of primary tumour (e.g. histological scar in testis)		
pTis	Intratubular germ cell neoplasia (carcinoma *in situ*)		
pT1	Tumour limited to testis and epididymis without vascular/lymphatic invasion; tumour may invade tunica albuginea but not tunica vaginalis*		
pT2	Tumour limited to testis and epididymis with vascular/lymphatic invasion, or tumour extending through tunica albuginea with involvement of tunica vaginalis**		
pT3	Tumour invades spermatic cord with or without vascular/lymphatic invasion**		
pT4	Tumour invades scrotum with or without vascular/lymphatic invasion		
N - Regional Lymph Nodes – Clinical			
NX	Regional lymph nodes cannot be assessed		
N0	No regional lymph node metastasis		
N1	Metastasis with a lymph node mass 2 cm or less in greatest dimension or multiple lymph nodes, none more than 2 cm in greatest dimension		
N2	Metastasis with a lymph node mass more than 2 cm but not more than 5 cm in greatest dimension; or more than 5 nodes positive, none more than 5 cm; or greatest dimension; or more than 5 nodes positive, none more than 5 cm; or evidence of extranodal extension of tumour		
N3	Metastasis with a lymph node mass more than 5 cm in greatest dimension		
pN - Regional Lymph Nodes – Pathological			
pNX	Regional lymph nodes cannot be assessed		
pN0	No regional lymph node metastasis		
pN1	Metastasis with a lymph node mass 2 cm or less in greatest dimension and 5 or fewer positive nodes, none more than 2 cm in greatest dimension		
pN2	Metastasis with a lymph node mass more than 2 cm but not more than 5 cm in greatest dimension; or more than 5 nodes positive, none more than 5 cm; or greatest dimension; or more than 5 nodes positive, none more than 5 cm; or extension of tumour evidence or extranodal extension of tumour		
pN3	Metastasis with a lymph node mass more than 5 cm in greatest dimension		
M - Distant Metastasis			
MX	Distant metastasis cannot be assessed		
M0	No distant metastasis		
M1	Distant metastasis **		
	M1a Non-regional lymph node(s) or lung metastasis		
	M1b Distant metastasis other than non-regional lymph nodes and lung		
S - Serum Tumour Markers			
SX	Serum marker studies not available or not performed		
S0	Serum marker study levels within normal limits		
	LDH (U/l)	**hCG (mIU/mL)**	**AFP (ng/mL)**
S1	< 1.5 x N and	< 5,000 and	< 1,000
S2	1.5-10 x N or	5,000-50,000 or	1,000-10,000
S3	> 10 x N or	> 50,000 or	> 10,000

TC的AJCC 分期：

	T	N	M	S
Stage 0	pTis	N0	M0	S0
Stage I	pT1-T4	N0	M0	SX
Stage IA	pT1	N0	M0	S0
Stage IB	pT2	N0	M0	S0
	pT3	N0	M0	S0
	pT4	N0	M0	S0
Stage IS	Any pT/TX	N0	M0	S1-3
Stage II	Any pT/TX	N1-3	M0	SX
Stage IIA	Any pT/TX	N1	M0	S0
	Any pT/TX	N1	M0	S1
Stage IIB	Any pT/TX	N2	M0	S0
	Any pT/TX	N2	M0	S1
Stage IIC	Any pT/TX	N3	M0	S0
	Any pT/TX	N3	M0	S1
Stage III	Any pT/TX	Any N	M1	SX
Stage IIIA	Any pT/TX	Any N	M1a	S0
	Any pT/TX	Any N	M1a	S1
Stage IIIB	Any pT/TX	N1-3	M0	S2
	Any pT/TX	Any N	M1a	S2
Stage IIIC	Any pT/TX	N1-3	M0	S3
	Any pT/TX	Any N	M1a	S3
	Any pT/TX	Any N	M1b	Any S

三、TC的诊断

1、症状和体征

睾丸肿瘤一般表现为患侧阴囊内单发元痛性肿块，也患者出现阴囊钝痛或者下腹坠胀不适。 部分睾丸肿瘤患者还会出现男性女乳症（gynaecomastia），尤其是非精原细胞瘤。少数患者以男性不育就诊或因外伤后随访而意外发现。

2、影像学检查

超声检查是睾丸肿瘤首选检查，即使临床较明确的睾丸肿瘤也推荐行超声检查。超声检查不仅可以确定肿块位于睾丸内还是睾丸外，明确睾丸肿块特点，还可以了解对侧睾丸情况。

2019 EAU指南提示：睾丸超声检查应在有腹膜后或内脏肿块和/或血清hCG或AFP升高的年轻人中进行，和/或咨询生育问题且无明显睾丸肿块。

腹部和盆腔 CT目前被认为是腹膜后淋巴结转移的最佳检查方法，可以检测到小于 2cm 的淋巴结，有利于患者分期。

阴囊的磁共振成像在诊断TC上，在诊断的敏感性(100%)和特异性 (95%-100%) 方面，要显著优于超声检查，而MRI费用贵，可选择应用。

CUA Guideline：2014
European Association of Urology Guidelines on Testicular Cancer： 2019

三、TC的诊断

3、血清肿瘤标志物

主要包括:甲胎蛋白（α-fetoprotein, AFP)、人绒毛膜促性腺激素（human chorionic gonadotropin, HCG）和乳酸脱氢酶(lactic acid dehydrogenase, LDH）。

在诊断睾丸肿瘤时， AFP、 HCG 及 LDH推荐为必查指标，

肿瘤标志物对于诊断和预后都是有价值的。NSGCT患者的甲胎蛋白和hCG分别升高50-70％和40-60％。约90％的NSGCT的一种或两种标志物升高。在疾病过程中，多达30％的精原细胞瘤可表现出hCG水平或使其升高。

此外，有研究提示miR-371--miR-373和miR-302--miR-367在诊断残留和复发性GCT方面比常规标记物具有更高的准确性。

CUA Guideline：2014
European Association of Urology Guidelines on Testicular Cancer： 2019

Marker	GCNIS	Seminoma	Post-puberal yolk sac tumour	Embryonal Carcinoma	Tropho-blastic Cyto	Tropho-blastic Syncytio	Sperma-tocytic tumour	Pre-puberal yolk sac tumour	Sex cord gonadal stromal tumours
OCT3/4	100%	100%	-	90%	-	-	-	-	-
SALL 4	90%	100%	90%	90%	+	-	50-90% (weak)	100%	-
Glypican3	-	-	100%	8%	100% (irregular)	100% (irregular)	-	-	-
CD30	-	< 10%	< 10%	100%	-	-	-	-	-
AFP	-	-	80%	33%	-	-	-	-	-
β-hCG	-	-	-	-	-	100%	-	-	-
CD117	100%	90/100%	60% (focal)	-	-	-	+/- (Weak)	-	-
PLAP	100%	86/95%	53%	86%	+/-	100%	-	-	-
α-inhibin	-	-	-	-	-	+/-	-	+	Sertoli; 30-50% Leydig; 100%
Calretinin	-	-	-	-	-	-	-	-	100%
AE1/AE3	-	20/36%	+ (focal)	95% (weak)	+/-	+/-	-	-	Sertoli; 64% Leydig; 42%
EMA	-	2%	5%	2%	-	46%	-	-	+/-
CEA	-	-	11%	-	-	25%	-	-	-
GATA 3	-	-	100%	40% (focal)	+	100%	-	-	-
hPL	-	-	-	-	-	+	-	-	-
CgA	-	-	-	-	-	-	-	-	Sertoli; 82% Leydig; 92%
Synapto	-	-	-	-	-	-	-	-	Sertoli; 45% Leydig; 70%
p63	-	-	-	-	+	-	-	-	-

相关血清肿瘤标志物：

OCT3/4: POU家族的同源结构域转录因子；
SALL4 :Spalt-like基因家族成员编码的转录因子；
Glypican 3（GPC3）:膜结合的硫酸肝素蛋白聚糖；
CD30:免疫组化标记；
AFP:甲胎蛋白；
hCG:人绒毛膜促性腺激素；
CD117（c-KIT）:免疫组化标记；
PLAP:胎盘碱性磷酸酶；
α-inhibin :肽激素；
Calretinin :钙结合蛋白；
AE1/AE3:细胞角蛋白；
EMA:上皮膜抗原；
CEA:癌胚抗原；
GATA 3:转录因子；
hPL:人胎盘乳原；
CgA:嗜铬粒蛋白A;
Synapto:神经内分泌标志物；
P63:转化相关蛋白63。

European Association of Urology Guidelines on Testicular Cancer： 2019

三、TC的诊断

4、经腹股沟探查（inguinal exploration）

任何患者如果怀疑睾丸肿瘤均应进行经腹股沟途径探查，将睾丸及其周围筋膜完整拉出，确诊者在内环口处分离精索切除睾丸。如果诊断不能明确，可切取可疑部位睾丸组织冰冻活检。

5、睾丸活检

2019 EAU指南提倡一侧TC时，对侧活检以排除GCNIS的存在。

对于**睾丸体积<12 mL，有隐睾病史或精子发生不良**（Johnson Score 1-3）的对侧睾丸活检的高危患者应进行对侧睾丸活检。 40岁以上且无危险因素的患者无需进行对侧活检。

CUA Guideline：2014

European Association of Urology Guidelines on Testicular Cancer： 2019

三、TC的诊断

2019 EAU指南

EAU Guidelines on
Testicular
Cancer

对于TC，为了准确分级、分期，必须评估：

- 睾丸切除术前后血清肿瘤标志物变化；
- 腹膜后和锁骨上淋巴结，骨骼和肝脏的状态；
- 是否存在纵隔淋巴结转移和肺转移；
- 在出现可疑症状或高危风险时，检测大脑和骨骼的状况

Test	Recommendation	Strength rating
Serum tumour markers	Alpha-fetoprotein Human chorionic gonadotrophin (hCG) Lactate dehydrogenase	Strong
Abdominopelvic computed tomography (CT)	All patients	Strong
Chest CT	All patients	Strong
Testis ultrasound (bilateral)	All patients	Strong
Bone scan or magnetic resonance imaging (MRI) columna	In case of symptoms	Strong
Brain scan (CT/MRI)	In case of symptoms and patients with metastatic disease with multiple lung metastases or high β-hCG values.	Strong

European Association of Urology Guidelines on Testicular Cancer： 2019

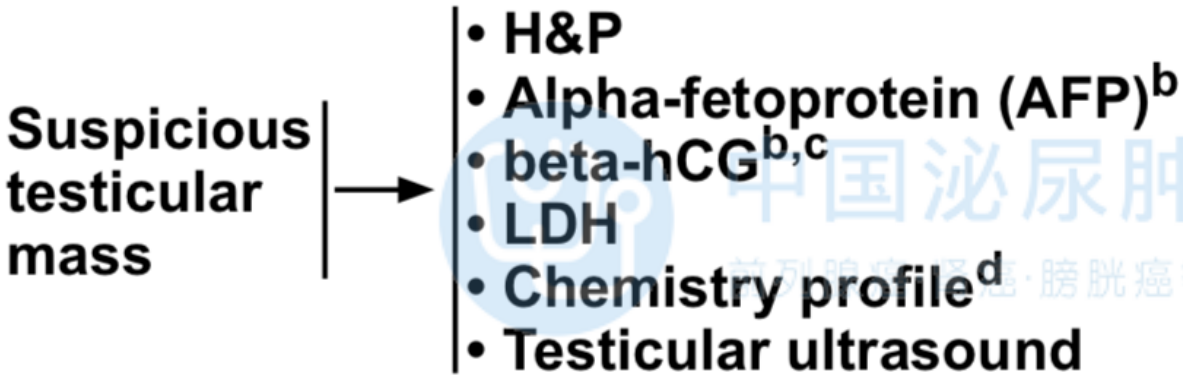
三、TC的诊断

2020 NCCN指南

National Comprehensive Cancer Network®

NCCN Guidelines Version 2.2020
Testicular Cancer

发现睾丸可疑占位时：

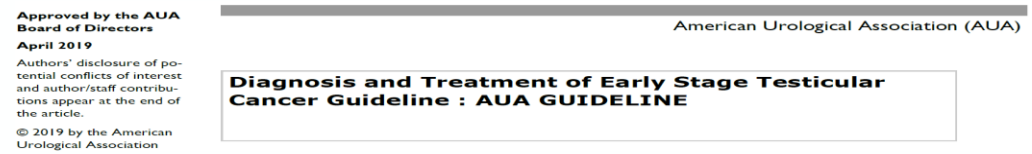


b：轻度升高，非升高的AFP水平可能并不表示存在生殖细胞肿瘤。 治疗决定不应基于<20 ng / mL的AFP值。 在开始治疗β-hCG轻度升高（通常<20 IU / L）之前，应考虑进一步检查，因为其他因素，包括性腺机能减退和大麻使用，可能导致假阳性结果。
c： β亚基的定量分析。
d：考虑测量性腺功能的基线水平。

NCCN Guidelines on Testicular Cancer : 2020，v1

三、TC的诊断

2019 AUA指南


Approved by the AUA Board of Directors
April 2019
Authors' disclosure of potential conflicts of interest and author/staff contributions appear at the end of the article.
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American Urological Association (AUA)

Diagnosis and Treatment of Early Stage Testicular Cancer Guideline : AUA GUIDELINE

1.经身体检查或影像学检查发现睾丸中的实性肿块应作为恶性肿瘤进行处理。 (Clinical Principle)

2.对于睾丸中有可疑恶性肿瘤的男人，应在进行任何治疗（包括睾丸切除术）之前，先测量血清肿瘤标志物（AFP、hCG和LDH），并绘制变化图。 （适度推荐；证据等级：C级）

3.在进行最终治疗之前，应告知患者性腺功能低下和不育的风险（中等建议；证据级别：C级），并在适当时提供精子库。对于没有正常对侧睾丸或已知有不孕的患者，应在睾丸切除术之前慎重考虑。 (Clinical Principle)

4.单侧或双侧阴囊肿块可疑者应行阴囊超声检查。 （强烈建议；证据等级：B级）

5.睾丸微石症在没有固体肿块和发生GCT的危险因素的情况下，不会增加恶性肿瘤的风险，因此不需要进一步评估。 （适度推荐；证据等级：C级）

6.血清肿瘤标记物（hCG和AFP）正常且在体检或睾丸超声检查中发现睾丸肿瘤的结果不确定的患者，应在六至八周内进行重复成像。 (Clinical Principle)

7. MRI不可用于可疑肿瘤的睾丸病变的初步评估和诊断。 （适度推荐；证据等级：C级）

AUA Guidelines on Testicular Cancer : 2019

四、TC的外科治疗

生殖细胞肿瘤的治疗

精原细胞瘤

根治性睾丸切除基础上
＋严密监测、辅助性放疗、辅助性化疗

SEMINOMA MANAGEMENT– SURVEILLANCE/RPLND/CHEMOTHERAPY/RADIATION

26. Clinicians should recommend surveillance after orchiectomy for patients with stage I seminoma. Adjuvant radiotherapy and carboplatin-based chemotherapy are less preferred alternatives. (Strong Recommendation; Evidence Level: Grade B)

27. For patients with stage IIA or IIB seminoma with a lymph node ≤3cm, clinicians should recommend radiation therapy or multi-agent cisplatin-based chemotherapy based on shared decision-making. (Moderate Recommendation; Evidence Level: Grade B). For patients with IIB seminoma with a lymph node >3 cm, chemotherapy is recommended. (Moderate Recommendation; Evidence Level: Grade B)

European Association of Urology Guidelines on Testicular Cancer： 2019

四、TC的外科治疗

I期生殖细胞肿瘤的治疗

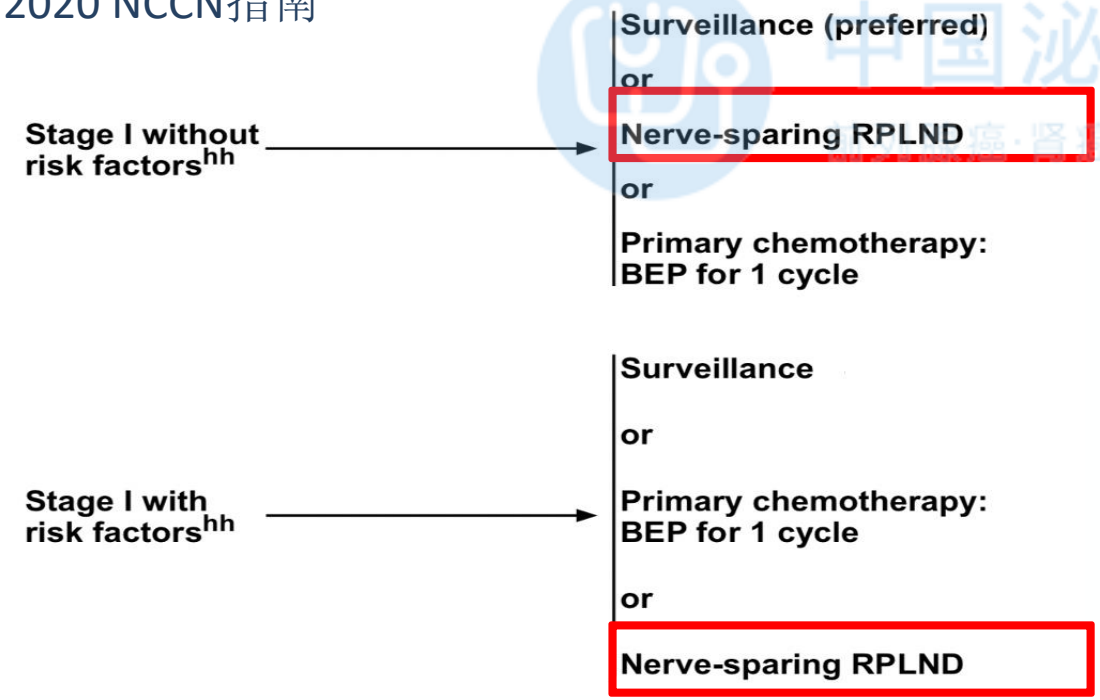
非精原细胞TC

外科治疗主要是指对原发肿瘤行根治性睾丸切除术 + **选择性**进行腹膜后淋巴结清扫术

根据ESMO Consensus Conference on testicular cancer:2016

RPLND既不推荐也不作为I期睾丸癌的标准治疗方法

2020 NCCN指南



11. Other treatment alternatives for stage I disease: is there a role for RPLND?

RPLND is neither recommended nor carried out as standard treatment of stage I testicular cancer [62]. However, it represents an alternative to active surveillance or adjuvant chemotherapy in clinical stage I non-seminoma patients who are not eligible for or not willing to accept one of the above mentioned therapeutic options. If conducted, RPLND needs to be done at tertiary referral centres with high levels of experience (i.e. ≥20 cases per year) [62, 105]. Furthermore, RPLND should preferably be carried out as an open, nerve-sparing procedure. RPLND might be conducted laparoscopically; however, a higher level of experience is needed for this procedure than for open RPLND [106].

ESMO Guidelines on Testicular Cancer： 2016
NCCN Guidelines on Testicular Cancer： 2020 v1
European Association of Urology Guidelines on Testicular Cancer： 2019

四、TC的外科治疗

主要手术方式：

根治性睾丸切除术：一般应尽早实施，手术前后应检测血清肿瘤标志物。根治性睾丸切除术应取腹股沟切口，游离精索至腹股沟管内环处离断，然后沿精索向阴囊方向剥离并切除睾丸。如阴囊壁有浸润，应连同浸润部位一并切除。禁忌行肿瘤活检或经阴囊途径手术。切除标本经病理检查后，根据其病理类型及临床分期决定下一步治疗方案。

保留器官手术（organ-preserving surgery)：即睾丸部分切除术。睾丸部分切除术亦取腹股沟切口，沿肿瘤假包膜小心切除部分睾丸组织，完整切除睾丸肿瘤。双侧同时或先后发生的睾丸肿瘤和孤立睾丸的肿瘤，如睾酮分泌水平正常但肿瘤体积小于睾丸体积的 30%，可考虑该术式。 但是由GCNIS的发生率高达82%，因此术后需行辅助放射治疗。如患者有生育需求，应暂缓放疗。

European Association of Urology Guidelines on Testicular Cancer： 2019

四、TC的外科治疗

腹膜后淋巴结清扫术（RPLND）：

RPLND指征包括:(1)高危的I期非精原细胞瘤（主要为病理:T2-T4，血管淋巴管侵犯，胚胎癌比例>40%)。(2)对于IIa及IIb期的非精原细胞瘤，睾丸切除术后瘤标不高的患者，首选RPLDN;对于睾丸切除术后瘤标升高的患者，首先考虑化疗，之后再实施残余肿瘤的切除，可能更为合适。 (3)对于IIc和III期非精原细胞瘤，如化疗后瘤标正常，但腹膜后淋巴结仍肿大，可考虑手术。 (4)高分期的睾丸精原细胞瘤在治疗后如腹 膜后淋巴结仍>3cm，应行PET-CT检查，如阳性，应行腹膜后淋巴结清扫术。

RPLND范围：一般采用自剑突下向下绕脐达耻骨联合上方的腹正中切口，将患侧肾蒂上方2cm平面以下的腹膜后脂肪、结缔组织及淋巴结完全清扫干净，也有学者提倡双侧清扫的扩大根治术。虽然有多项研究表明，双侧保留神经的RPLND术后出现腹腔、盆腔肿瘤复发风险最低(<2%)，**关于手术清扫的范围是单侧还是双侧目前仍没有统一意见**。一般来说，左侧睾丸的主要淋巴引流不越过腹主动脉，肿瘤向右转移机会小，主张经左侧结肠旁沟进路行单侧腹膜后淋巴结清扫术。因右侧睾丸淋巴引流到对侧，肿瘤可累及对侧淋巴结，主张沿右侧结肠旁沟切开后腹膜至盲肠下方转向屈氏韧带，显露腹膜后组织并行双侧腹膜后淋巴结清扫术。

目前RPLND的诊断性作用已减弱。一项随机的III期试验比较了RPLND与BEP x 1作为辅助治疗的情况，与手术相比，一个疗程的BEP复发率显着降低，生活质量（QoL）没有发生的临床相关的差异。传统的RPLND损伤了腹下神经及盆神经丛，几乎所有患者术后都会出现逆行射精、阳痿或不育等。为减少和避免这类并发症，**推荐采用保留神经的腹膜后淋巴结清扫术(NS-RPLND)**。

Albers, P., *et al.* J Clin Oncol, 2008.
European Association of Urology Guidelines on Testicular Cancer： 2019

四、TC的外科治疗

残余病灶、复发病灶的处理

残余肿瘤切除：化疗后残留的精原细胞瘤是否需要切除取决于影像学表现及瘤标水平，PET-CT对于判断是否残留恶性肿瘤有重大意义：有Meta分析对FDG PET-CT及CT评价残余肿块内是否存在活性肿瘤组织的准确性进行了对比，结果发现特异性分别为92% vs 59%，敏感性分别为 72% vs 63%。**EAU、AUA指南均推荐采用 FDG PET-CT评价转移性精原细胞瘤化疗后残余肿块内是否存在有活性的肿瘤组织，如残余肿块内存在有活性的肿瘤组织，需行补救性化疗，必要时可选择手术切除或放疗。**

对于非精原细胞瘤，腹膜后复发患者，手术的作用尚存争议。对于残留病变<1cm，绝大多数患者具有纤维坏死组织，但仍有残留癌变或畸胎瘤的风险。**非精原细胞瘤的残余肿块超过1cm，即建议切除。**

Mu¨ller J, et al. Urologe A ,2011
AUA Guidelines on Testicular Cancer :2019
European Association of Urology Guidelines on Testicular Cancer : 2019

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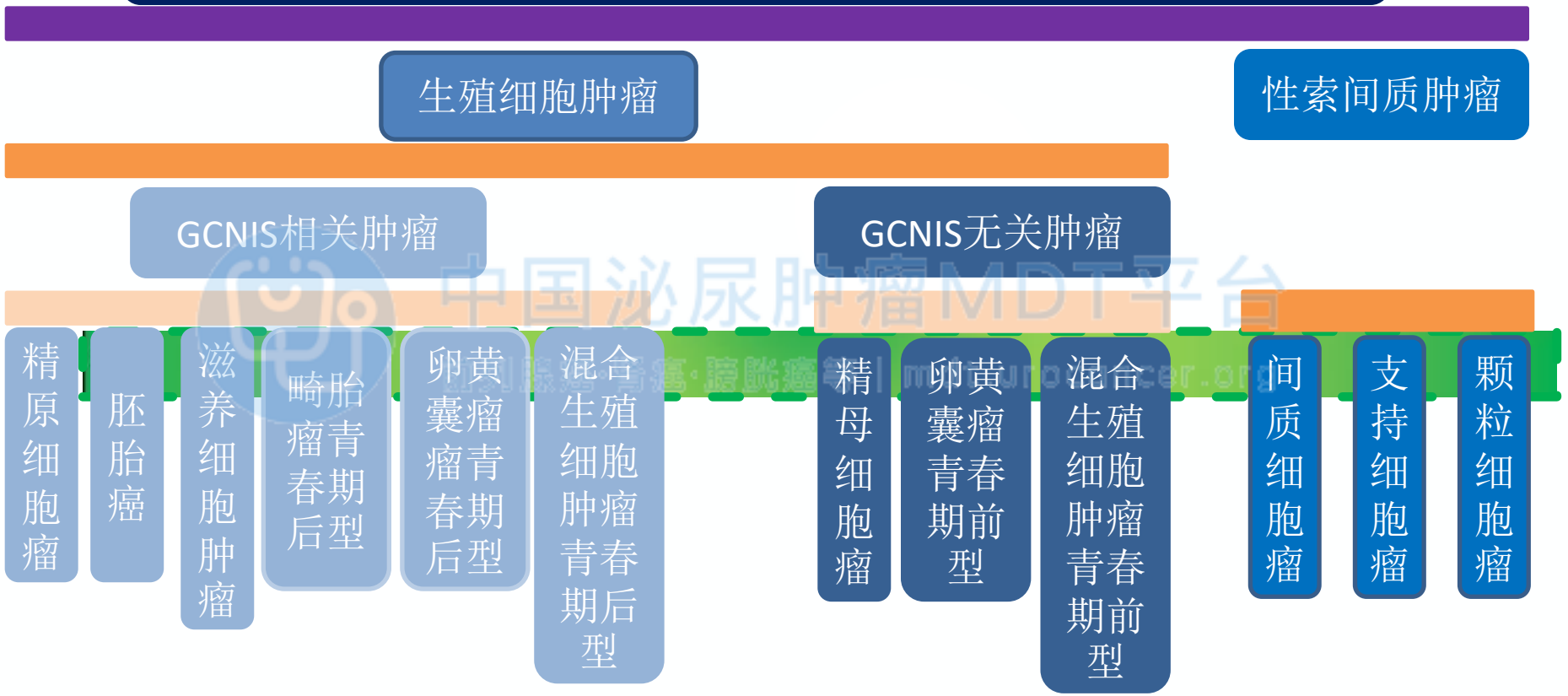
睾丸癌的腹膜后淋巴结清扫术

四川省肿瘤医院 廖洪

临床常见的WHO睾丸肿瘤分型（2016版）



GCNIS： germ cell carcinoma in-situ 生殖细胞原位瘤

睾丸肿瘤的分期： AJCC 8ed(2017)

- T分期
  - T1： 肿瘤局限于睾丸内不伴LVI
  - T2： 肿瘤局限于睾丸内伴有LVI
  - T3： 肿瘤侵犯精索
  - T4： 肿瘤侵犯阴囊
- N分期
  - N1： 区域淋巴结转移<2cm
  - N2： 区域淋巴结转移2-5cm
  - N3： 区域淋巴结转移>5cm
- M分期
  - M1a： 区域外淋巴结或肺转移
  - M1b： 其他远处转移
- S分期
  - S0： 瘤标正常
  - S1： LDH<1.5N， HCG<5000， AFP<1000
  - S2： LDH 1.5-10N， HCG 5000-50000， AFP 1000-10000
  - S3： LDH>10N， HCG>50000， AFP>10000

临床分期简要规则

I期： TxN0M0S0

II期： TxNxM0及S1以下

III期： M1或S2以上

纯精原细胞瘤

- 随访观察
- 化疗
- 放疗

非精原细胞瘤

- 腹膜后淋巴结清扫
- 化疗
- 随访观察

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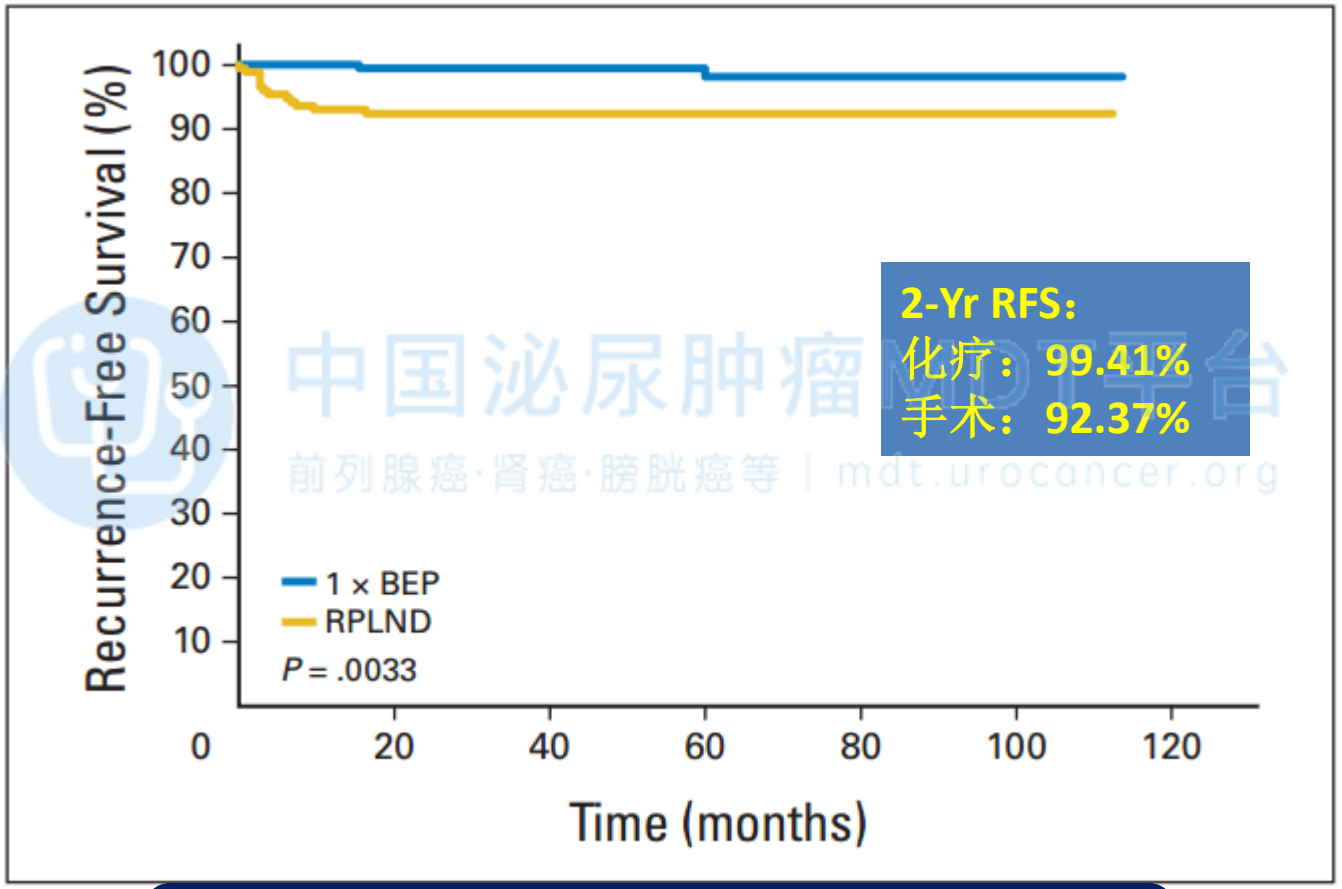
NCCN Guidelines Version 2.2020
Testicular Cancer - Nonseminoma

CLINICAL STAGE	PRIMARY TREATMENT[ii,jj]	
Stage I without risk factors[hh]	Surveillance (preferred)	See Follow-up for Nonseminoma, Table 5 (TEST-B 1 of 3)
	or	
	Nerve-sparing RPLND[kk,ll]	See Postsurgical Management (TEST-10)
	or	
	Primary chemotherapy:[p,z] BEP for 1 cycle	See Follow-up for Nonseminoma, Table 7 (TEST-B 2 of 3)
Stage I with risk factors[hh]	Surveillance	See Follow-up for Nonseminoma, Table 6 (TEST-B 1 of 3)
	or	
	Primary chemotherapy:[p,z] BEP for 1 cycle	See Follow-up for Nonseminoma, Table 7 (TEST-B 2 of 3)
	or	
	Nerve-sparing RPLND[kk,ll]	See Postsurgical Management (TEST-10)

I期非精原细胞瘤术后可以严密随访，也可以BEP方案化疗或预防性腹膜后淋巴结清扫

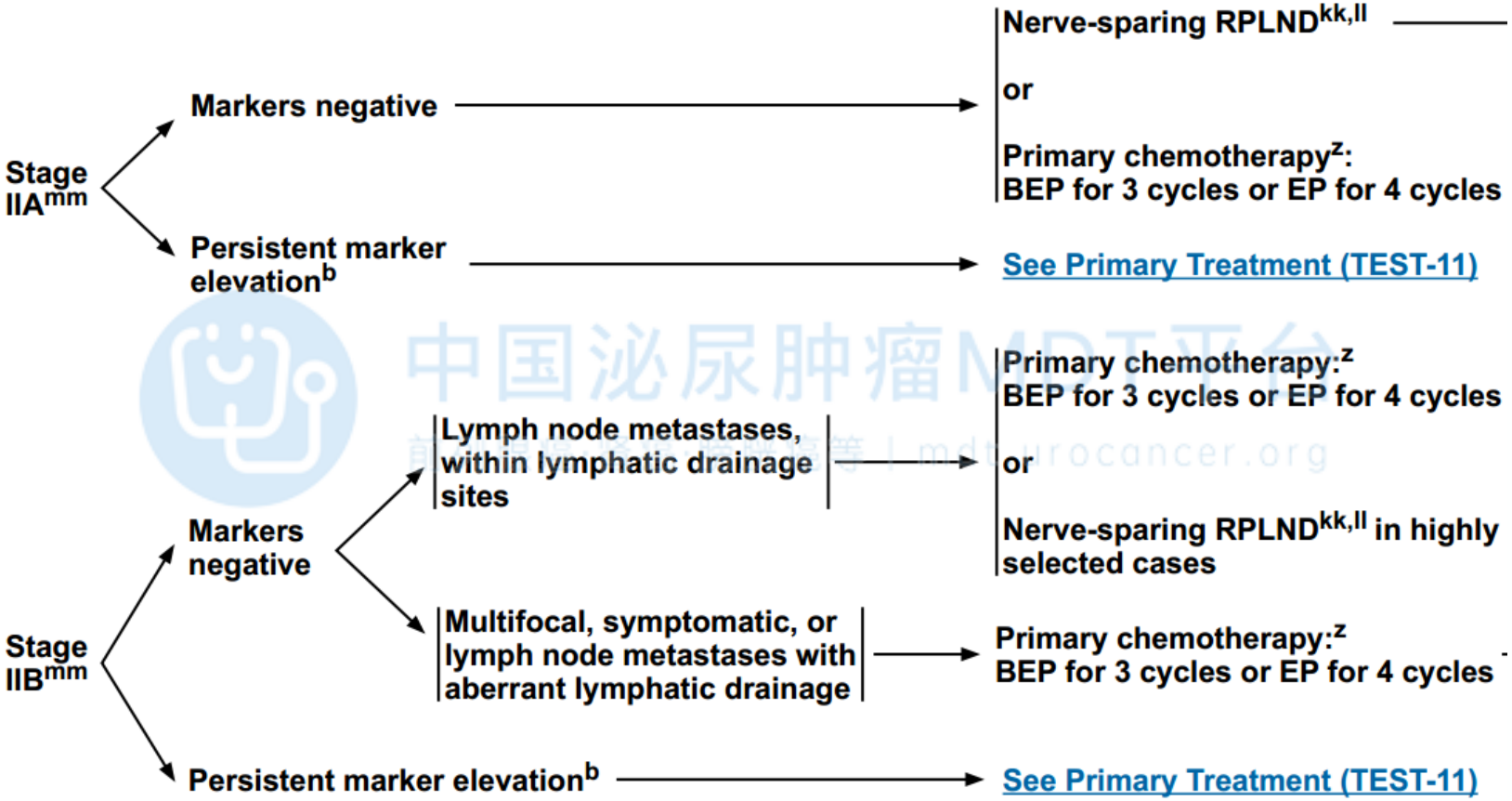
I期非精原细胞瘤的治疗：化疗与腹膜后淋巴结清扫



I期非精原细胞瘤术后辅助化疗或预防性腹膜后淋巴结清扫都可明显提高RFS

JCO,2008

II期非精原细胞瘤初治方案选择：化疗 VS RPLND



瘤标阴性且腹膜后小淋巴结转移的患者可选择RPLND转移淋巴结病灶越大手术选择越谨慎

II期非精原细胞瘤的治疗：化疗后的序贯治疗

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Testicular Cancer - Nonseminoma

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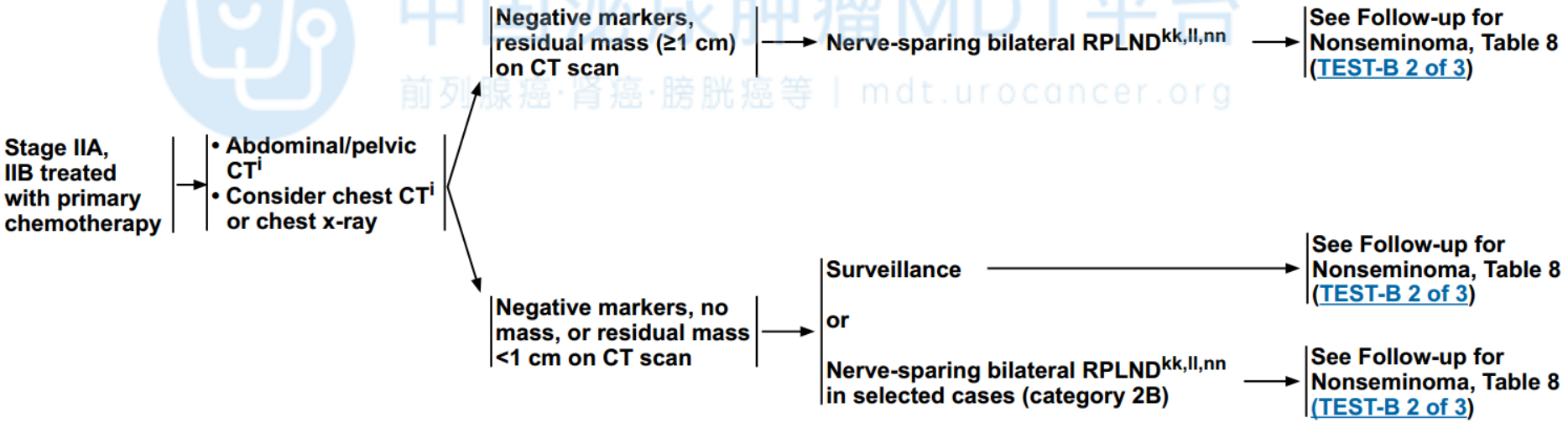
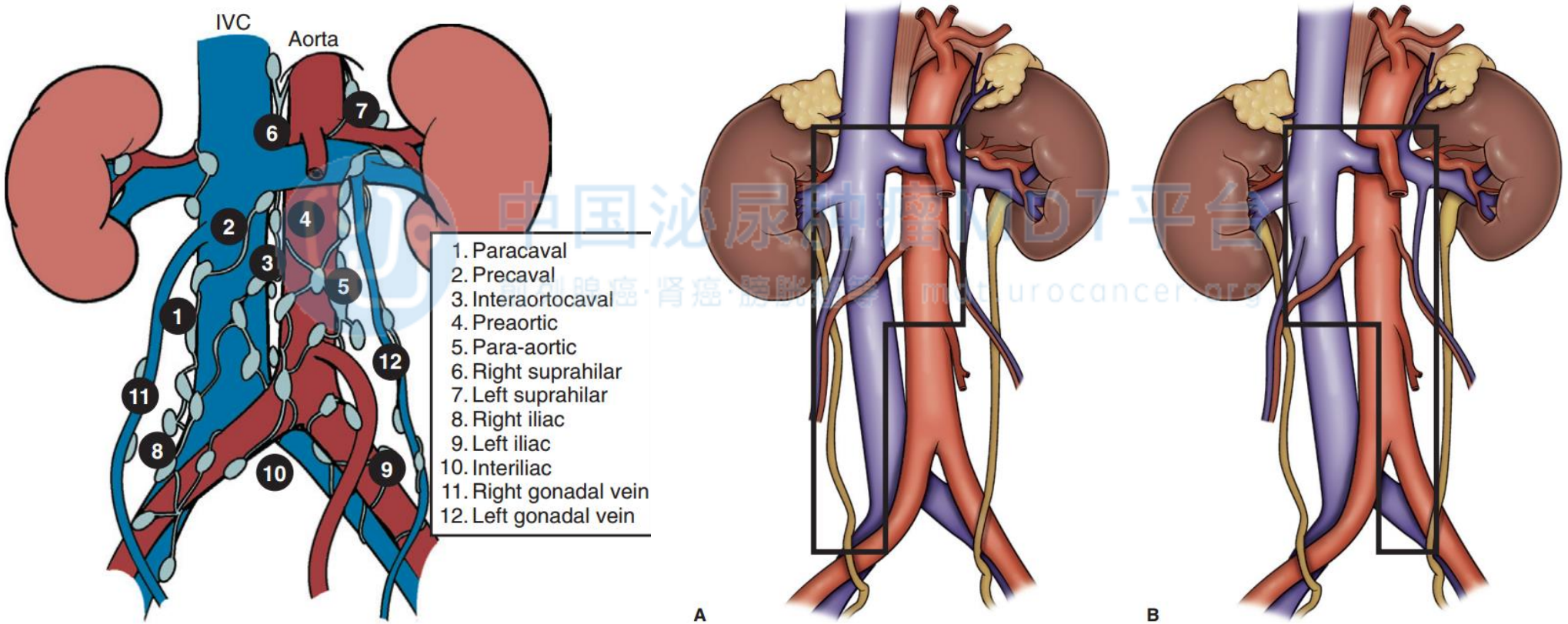
POSTCHEMOTHERAPY MANAGEMENT

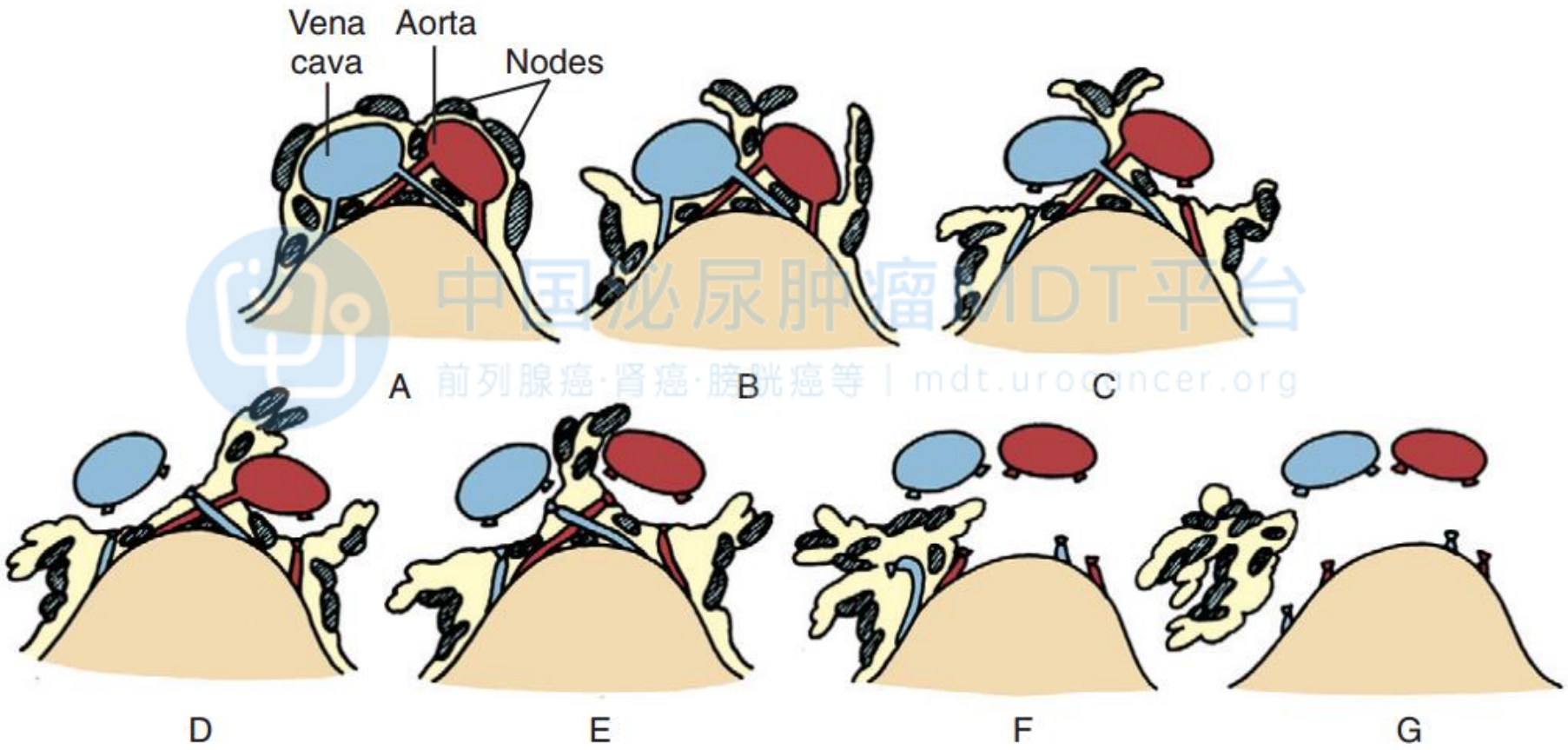


II期非精原细胞瘤化疗后瘤标阴性的残留腹膜后转移病灶可考虑清扫

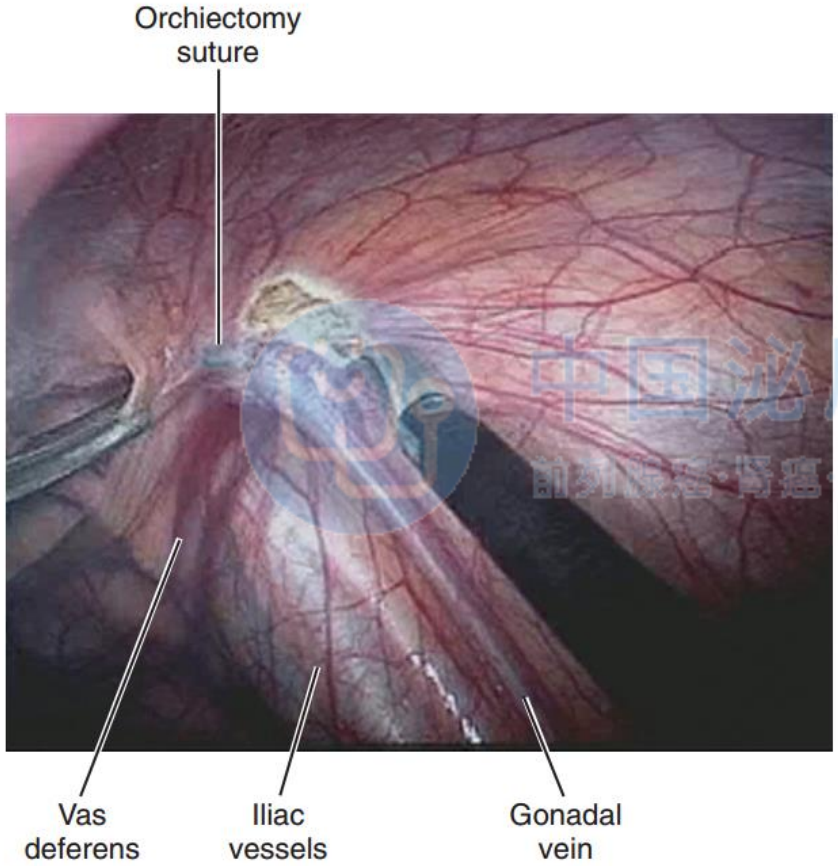
睾丸肿瘤的腹膜后淋巴结清扫范围

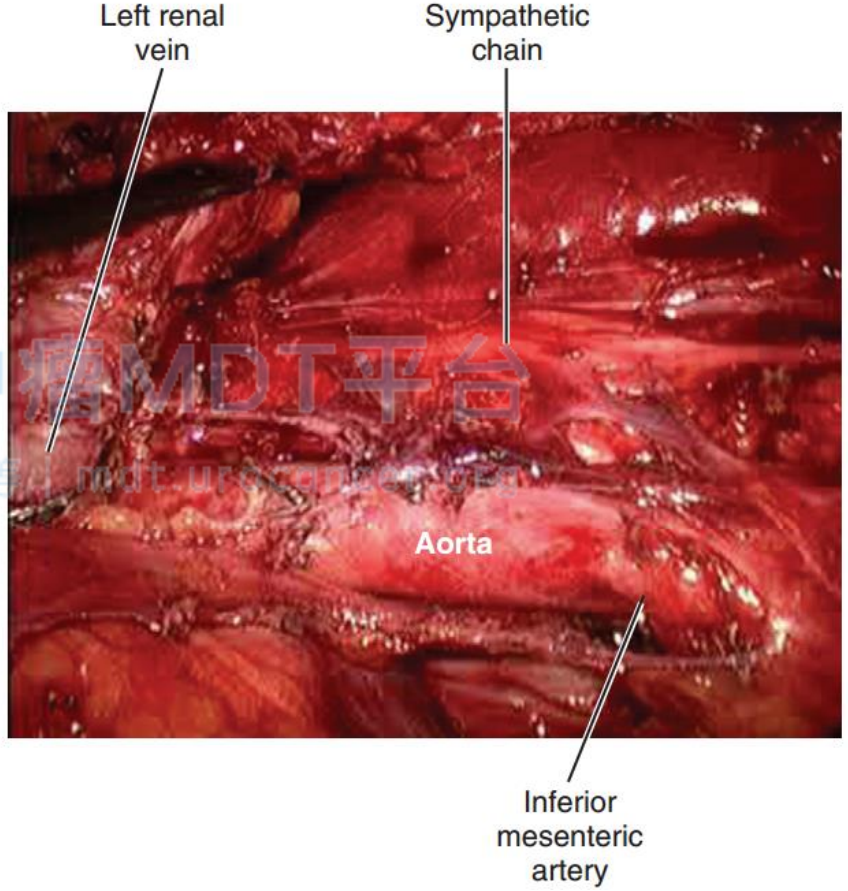


睾丸肿瘤的腹膜后淋巴结清扫



睾丸肿瘤的腹膜后淋巴结清扫





从内环精索离断处开始

保留交感神经链

睾丸肿瘤的腹膜后淋巴结清扫

视频

视频页面

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睾丸癌的综合治疗

复旦大学附属肿瘤医院 戴波

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NCCN Guidelines Version 2.2020
Testicular Cancer - Pure Seminoma

NCCN Guidelines Index
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Discussion

CLINICAL STAGE	PRIMARY TREATMENT[o]	FOLLOW-UP	
Stage IA, IB	Surveillance for pT1-pT3 tumors (strongly preferred)	See Follow-up for Seminoma, Table 1 (TEST-A 1 of 2)	Recurrence, treat according to extent of disease at relapse[v]
	or		
	Single-agent carboplatin[p,q] (AUC=7 x 1 cycle or AUC=7 x 2 cycles)	See Follow-up for Seminoma, Table 2 (TEST-A 1 of 2)	Recurrence, treat according to extent of disease at relapse[v]
	or		
	RT[r] (20 Gy or 25.5 Gy)[s]	See Follow-up for Seminoma, Table 2 (TEST-A 1 of 2)	Recurrence, treat according to extent of disease at relapse[v]
Stage IS	Repeat elevated serum tumor marker measurement[b] and assess with chest/abdominal/pelvic CT (with contrast) to scan for evaluable disease[t,u]		Recurrence, treat according to extent of disease at relapse[v]

[b] Mildly elevated, non-rising AFP levels may not indicate presence of germ cell tumor. Decisions to treat should not be based on AFP values <20 ng/mL. Further workup should be considered before initiating treatment for mildly elevated beta-hCG (generally <20 IU/L) since other factors, including hypogonadism and marijuana use, can cause false-positive results. See Discussion.

[o] Discuss sperm banking prior to chemotherapy or radiation treatment.

[p] Recommend abdomen/pelvic CT scan and chest x-ray or CT scan within the 4 weeks prior to the initiation of chemotherapy to confirm staging, even if scan was done previously. See Principles of Imaging (TEST-I).

[q] There are limited long-term follow-up data on the toxicity and efficacy of carboplatin. A recent population-based study suggested patients with larger tumors, rete testis involvement, or both derive a smaller reduction in relapse rate with 1 cycle of carboplatin than previously reported. See Discussion.

[r] See Principles of Radiotherapy for Pure Testicular Seminoma (TEST-C).

[s] For stage I seminoma, long-term follow-up studies indicate an increase in late toxicities with radiation treatment. See Discussion.

[t] For further information on stage IS, see Discussion.

[u] Elevated tumor markers increase the risk of disease outside of the retroperitoneum. Therefore, systemic therapy should be encouraged. See Primary Chemotherapy Regimens for Germ Cell Tumors (TEST-E).

[v] Patients should not be treated based upon an elevated LDH alone.

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any patient with cancer is in a clinical trial. Participation in clinical trials is especially encouraged.

Pathological T	Primary Tumor
pTX	Primary tumor cannot be assessed
pT0	No evidence of primary tumor
pTis	Germ cell neoplasia *in situ*
pT1	Tumor limited to testis (including rete testis invasion) without lymphovascular invasion
pT1a*	Tumor smaller than 3 cm in size
pT1b*	Tumor 3 cm or larger in size
pT2	Tumor limited to testis (including rete testis invasion) with lymphovascular invasion OR Tumor invading hilar soft tissue or epididymis or penetrating visceral mesothelial layer covering the external surface of tunica albuginea with or without lymphovascular invasion
pT3	Tumor directly invades spermatic cord soft tissue with or without lymphovascular invasion
pT4	Tumor invades scrotum with or without lymphovascular invasion

*Subclassification of pT1 applies to only pure seminoma.

Pathological N	Regional Lymph Nodes
pNX	Regional lymph nodes cannot be assessed
pN0	No regional lymph node metastasis
pN1	Metastasis with a lymph node mass 2 cm or smaller in greatest dimension and less than or equal to five nodes positive, none larger than 2 cm in greatest dimension
pN2	Metastasis with a lymph node mass larger than 2 cm but not larger than 5 cm in greatest dimension; or more than five nodes positive, none larger than 5 cm; or evidence of extranodal extension of tumor
pN3	Metastasis with a lymph node mass larger than 5 cm in greatest dimension

M		**Distant Metastasis**
M0		No distant metastases
M1		Distant metastases
	M1a	Non-retroperitoneal nodal or pulmonary metastases
	M1b	Non-pulmonary visceral metastases

S	**Serum Markers**
SX	Marker studies not available or not performed
S0	Marker study levels within normal limits
S1	LDH <1.5 x N* and hCG (mIU/mL) <5,000 *and* AFP (ng/mL) <1,000
S2	LDH 1.5–10 x N* or hCG (mIU/mL) 5,000–50,000 *or* AFP (ng/mL) 1,000–10,000
S3	LDH >10 x N* or hCG (mIU/mL) >50,000 *or* AFP (ng/mL) >10,000

Table 2. **AJCC Prognostic Stage Groups**

	T	N	M	S
Stage 0	pTis	N0	M0	S0
Stage I	pT1-T4	N0	M0	SX
Stage IA	pT1	N0	M0	S0
Stage IB	pT2	N0	M0	S0
	pT3	N0	M0	S0
	pT4	N0	M0	S0
Stage IS	Any pT/TX	N0	M0	S1-3
Stage II	Any pT/TX	N1-3	M0	SX
Stage IIA	Any pT/TX	N1	M0	S0
	Any pT/TX	N1	M0	S1
Stage IIB	Any pT/TX	N2	M0	S0
	Any pT/TX	N2	M0	S1
Stage IIC	Any pT/TX	N3	M0	S0
	Any pT/TX	N3	M0	S1
Stage III	Any pT/TX	Any N	M1	SX
Stage IIIA	Any pT/TX	Any N	M1a	S0
	Any pT/TX	Any N	M1a	S1
Stage IIIB	Any pT/TX	N1-3	M0	S2
	Any pT/TX	Any N	M1a	S2
Stage IIIC	Any pT/TX	N1-3	M0	S3
	Any pT/TX	Any N	M1a	S3
	Any pT/TX	Any N	M1b	Any S

Testicular Cancer – Pure Seminoma

- Since most patients with stage I pure seminoma are cured by orchiectomy alone, the NCCN Panel strongly prefers surveillance as the standard postorchiectomy management option for these patients.
- However, since 15% to 20% of patients on surveillance will experience relapse, the panel recommends chemotherapy with one or two cycles of single-agent carboplatin, or RT (20 Gy or 25.5 Gy) to decrease the risk of relapse in certain patients.
- Disease-specific survival for stage I disease approaches 100% irrespective of the management strategy used

Testicular Cancer – Pure Seminoma

- *Adjuvant Chemotherapy:*
- Oliver et al reported the initial results of a trial that randomized 1477 patients with stage I seminoma to receive either RT (n = 885) or 1 cycle of intravenous carboplatin (n = 560) at the dose AUC x 7 (ie, based on the formula 7 x [glomerular filtration rate (GFR, mL/min) + 25 mg]).
- At a follow-up of 3 years, the relapse-free survival rates for both groups were similar (95.9% for the RT group and 94.8% for the carboplatin group), which established the noninferiority of carboplatin compared to RT.
- The mature results of this trial confirmed the noninferiority of single dose carboplatin versus RT in terms of relapse-free survival.

CLINICAL STAGE | **PRIMARY TREATMENT[ii,jj]**

Stage I without risk factors[hh]
- **Surveillance (preferred)** → **See Follow-up for Nonseminoma, Table 5 (TEST-B 1 of 3)**
- **or**
- **Nerve-sparing RPLND[kk,ll]** → **See Postsurgical Management (TEST-10)**
- **or**
- **Primary chemotherapy:[p,z] BEP for 1 cycle** → **See Follow-up for Nonseminoma, Table 7 (TEST-B 2 of 3)**

Stage I with risk factors[hh]
- **Surveillance** → **See Follow-up for Nonseminoma, Table 6 (TEST-B 1 of 3)**
- **or**
- **Primary chemotherapy:[p,z] BEP for 1 cycle** → **See Follow-up for Nonseminoma, Table 7 (TEST-B 2 of 3)**
- **or**
- **Nerve-sparing RPLND[kk,ll]** → **See Postsurgical Management (TEST-10)**

Stage IS → **Persistent marker elevation[b]** → **See Primary Treatment (TEST-11)**

[b] Mildly elevated, non-rising AFP levels may not indicate presence of germ cell tumor. Decisions to treat should not be based on AFP values <20 ng/mL. Further workup should be considered before initiating treatment for mildly elevated beta-hCG (generally <20 IU/L) since other factors, including hypogonadism and marijuana use, can cause false-positive results. See Discussion.

[p] Recommend abdomen/pelvic CT scan and chest x-ray or CT scan within the 4 weeks prior to the initiation of chemotherapy to confirm staging, even if scan was done previously. See Principles of Imaging (TEST-I).

[z] See Primary Chemotherapy Regimens for Germ Cell Tumors (TEST-E).

[hh] Risk factors include lymphovascular invasion or invasion of spermatic cord or scrotum. Some centers consider predominance of embryonal carcinoma as an additional risk factor for relapse.

[ii] Treatment options listed based on preference. See Discussion.

[jj] Retroperitoneal lymph node dissection (RPLND) is preferred as primary treatment for tumors with transformed teratoma. Patients with stage I pure teratoma and normal markers should receive either surveillance or RPLND. See Discussion.

[kk] RPLND is recommended within 4 weeks of CT scan and 7–10 days of marker measurement.

[ll] See Principles of Surgery for Germ Cell Tumors (TEST-H).

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any patient with cancer is in a clinical trial. Participation in clinical trials is especially encouraged.

Testicular Cancer – Nonseminoma

- The major difference in the management of low-risk and high-risk patients is that surveillance is preferred for patients with stage I nonseminoma without risk factors
- The survival rates for stage I nonseminoma managed with surveillance, nerve-sparing RPLND, or one cycle of BEP chemotherapy exceed 98%.
- In a prospective trial by SWENOTECA, stage I nonseminoma patients with or without LVI received 1 course of adjuvant BEP. The relapse rate at 5 years was 3.2% for patients with LVI and 1.6% for patients without LVI. Five-year OS was 100% in both groups.
- Several other studies using two cycles of BEP as primary treatment for stage I nonseminoma patients have similarly reported relapse-free survival rates >95%.
- However, late consequences of cisplatin based chemotherapy, such as hearing damage and loss, cardiovascular conditions, hypertension, and neuropathy, have been reported during long-term follow-up.

谢谢！

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睾丸癌的化疗策略

同济大学附属上海市第十人民医院 许青

- 睾丸癌占所有肿瘤2%
- 15～34岁男性最常见的实体瘤
- 近年来其发病率增加1倍
- 总体上，90%以上患者可治愈，70%～80%晚期患者可治愈

	AFP	HCG
精原细胞瘤	-	+
非精原细胞瘤（常混合存在）		
恶性畸胎瘤	-	-
胚胎癌	+	-
卵黄囊瘤（内胚窦瘤）	+	-
绒毛膜癌	-	+

AFP半衰期**5-7**天， **β-HCG**半衰期**1-3**天

同济大学癌症中心
TONGJI UNIVERSITY CANCER CENTER

危险状况	Nonseminoma	Seminoma	比例（%） NS/S	5y-OS（%）
低危	原发睾丸或腹膜后 无肺外转移 AFP < 1000 HCG < 5000 LDH < 1.5×ULN	无肺外转移 AFP正常	56/90	92/86
中危	原发睾丸或腹膜后 无肺外转移 AFP 1000 - 10000 HCG 5000 - 50000 LDH 1.5 - 10×ULN	有肺外转移 AFP正常	28/10	80/72
高危	原发纵隔，或 存在肺外转移，或 S3	NO	16/0	48/—

J Clin Oncol, 2019, 15: 594

同济大学癌症中心
TONGJI UNIVERSITY CANCER CENTER

- 睾丸癌术辅助化疗
- 转移性睾丸癌的化疗

National Comprehensive Cancer Network®

NCCN Guidelines Version 2.2020
Testicular Cancer - Pure Seminoma

NCCN Guidelines Index
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Discussion

- IA、IB：
    1. 观察：马蹄肾、有放疗史和内脏炎性病（IIA→I类）T1、T2选择性病例（IIb类）
    2. 放疗：20-30Gy， 膈下、腹主动脉旁±髂血管旁（ IIA→ I类）
    3. 化疗：单药Carboplatin1程，AUC =7(IIB→I类)
- IS：放疗25-30Gy
- IIA、IIB：
    1. 放疗：35-40Gy，膈下、腹主动脉旁 + 髂血管旁
    2. 化疗：EP×4（for IIb）
- IIC、III：
    – 低危：EP×4或BEP×3化疗（I类）
    1. 中危：BEP×4化疗（I类）

IIB、 IIC、III残留：

1. 标记物正常：优先考虑PET/CT，阴性随访，阳性考虑切除活检、补救化疗、放疗；无PET/CT，3cm以内者观察，3cm以上者观察、手术或放疗（IIb）。
2. 进展或标记物升高：补救化疗(TIP or VIP)。

National Comprehensive Cancer Network®

NCCN Guidelines Version 2.2020
Testicular Cancer - Nonseminoma

NCCN Guidelines Index
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Discussion

- IA：观察或RPLND
- IB：RPLND、2程BEP化疗、观察（T2）（IIb）
- IS：RPLND后 4程EP或3程BEP（这类患者多存在弥散性病灶）
- IIA：
  - 标记物正常：RPLND、化疗（4程EP或3程BEP）（IIb）
  - 标记物持续增高：4程EP或3程BEP　RPLND 或观察
- IIB：
  - 引流区淋巴结转移、标记物正常：RPLND、化疗（4程EP或3程BEP）（IIb）
  - 非引流区、标记物持续增高：4程EP或3程BEP
- IB～IIB化疗后： RPLND、观察（IIb）。 RPLND后：
  - N0：观察
  - N1-2：观察或2程EP/BEP
  - N3： 4程EP或3程BEP（优先）

National Comprehensive Cancer Network®

NCCN Guidelines Version 2.2020
Testicular Cancer - Nonseminoma

NCCN Guidelines Index
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- IIC、IIIA：4程EP或3程BEP
- IIIB：4程BEP
- IIIC：考虑临床试验（优先）、4程BEP或VIP。
- IIC-IIIC：化疗后
  - CR且血清标记物正常：观察或加RPLND（IIb）
  - PR且血清标记物正常：手术切除，术后为成熟畸胎瘤或坏死可观察；如有残留，推荐加2程化疗（EP、VeIP或TIP）
  - 无效：补救化疗
- 脑转移：化疗+放疗±手术（如可能）

- 睾丸癌术辅助化疗
- 转移性睾丸癌的化疗

- 20%转移性GCT一线治疗不能取得CR或复发
- 标准VeIP补救化疗的CR率在36%～50%
- 改善预后的方法：新药？HDCT?

Vp-16　　100mg/㎡ iv d1～5

DDP　　20mg/㎡ iv d1～5

BLM　　30iu iv d2，8，15

TAXOL　　175mg/㎡ iv d1

每3周重复

13例，CR100%，18个月后全部NED

Int J Cancer. 2019; 83(6): 831

- MSKCC：46例预后良好的复发GCT
- TIP×4，Taxol剂量：3例175，3例215，
- 其余40例250 mg/m2

70%（32例）达CR

69月时，有29例保持DFS

2y-PFS：65%

JCO, 2019, 23: 6549

方案：CBOP/BEP

以 Carboplatin、BLM、VCR、DDP诱导化疗，

继之用BEP方案化疗

54例预后不良者

3年存活 91.5%（95%CI 78.6-96.8）

JCO. 2019; 21(5): 871

方案：POMB/ACE

DDP,VCR,MTX,BLM/Actinomycin,CTX,VP16

12例原发纵隔、精原细胞瘤化疗后手术切除，5年存活率

73%

Eur J Cancer. 2019; 33(6): 838; Ann Oncol. 2019; 8(5): 477

Austria 2019：回顾分析4个癌症中心 310例复发性

NSGCT，有以下情况者疗效不佳：

1、移植前 PD状态

2、纵隔原发非精原性生殖细胞瘤

3、常规含铂化疗完全无效

4、 HCG>1000μ/L

JCO, 2019, 7: 932

- Bhatia等 65例 （JCO 2019）

  中位随访39个月时，有57% 患者保持无病状态

- Motzer等 37例 DDP耐药者（JCO 1994）

  57% CR，30个月的DFS 41%

- Rick等 80例DDP耐药者（JCO 2019）

  3年 OS 30%

- 35例复发精原细胞瘤，均为三线患者。
- HDCE（CBP 700mg/m2，etoposide 750mg/m2，均连续3天 ）
- 治疗相关死亡率为11%，
- 74%患者在中位随访4年时继续保持无病状态。
- 结论：HDCE化疗具有较高的治愈率，即使是三线，但三线以上补救时治疗相关死亡率较高，建议早期补救治疗。

2019 ASCO #5054

- 一线化疗取得CR
- PFS在2年以上
- 原发于生殖腺
- 复发时AFP、HCG和LDH正常

- **HDCT**三线治疗可使**15%～25%**难治性**GCT**获得长期**CR**
- **HDCT**治疗相关死亡率**10%～20%**
- 早期应用**HDCT**可提高有效率、降低死亡率
- **HDCT**后最终有**15%**左右为难治性

入选患者均对铂耐药，部分患者接受过HDCT。

有效率在25%左右。

作者	病例数	HD比例（%）	方案	有效率（%）
Motzer, 1994	31	16	250mg/m2 civ 24h, q3w	26
Bokemeyer, 2019	24	50	225mg/m2 iv 3h, q3w	25

对铂耐药，一半以上患者接受过HDCT。总有效率在20%以下。MST 6个月。

作者	病例数	HD比例（%）	方案	有效率（%）
Einhorn, 2019	20	55	1200mg/m2, d1, d8, d15, q3w	15
Bokemeyer, 2019	31	71	1000mg/m2, d1, d8, d15, q3w	19

Oxaliplatin 单药

- 32例顺铂耐药患者， 25例 (78%) 接受过干细胞移植 HDCT；
- Oxaliplatin 60 mg/2, d1 d8 d15（或130 mg/2, d1 d8 ） , q4w；2组各16例
- 有效率13%（4例PR，无CR），130 mg/m2组有效率19%。

JCO, 2019, 20: 2031

Irinotecan 单药

- 15例，13例 (86%) 接受过干细胞移植 HDCT；
- Irinotecan 350 mg/m2, d1, q3w；
- 无有效病例。

Br J Cancer, 2019, 87: 729

Paclitaxel + Gemcitabine
（ECOG 9897 Trial）

- 30例，11例（36%）接受过HDCT治疗；
- Pac 110 mg/m2, Gem 1000 mg/m2, d1 d8 d15, q4w;
- 有效率21%， 3例CR，2例CR患者DFS在15月以上。

JCO, 2019, 20: 1859

Gemcitabine + Oxaliplatin

- 35例，31例(89%)为HDCT后复发者；
- Gem 1000 mg/m2 d1 d8, Oxaliplatin 130 mg/m2 d1, q3w;
- 总有效率46%（3例CR，13例PR）；
- 有效者MST 13个月。

JCO, 2019, 22: 108

同济大学癌症中心 TONGJI UNIVERSITY CANCER CENTER

GOP方案

（gemcitabine + oxaliplatin + paclitaxel ）

- 41例患者中， 78%患者为一线治疗后复发（39%）或二线大剂量化疗后复发（39%）。GOP方案每3周重复。
- 总有效率在52%（CR 5%、PR 47%），中位持续有效时间8个月，20%患者取得了延长生存的疗效。
- 15%患者出现3/4级白细胞降低，49%的血小板降低。

2019 ASCO #5084

同济大学癌症中心 TONGJI UNIVERSITY CANCER CENTER

- Navelbine
- Capecitabine
- Etopside（oral）
- Nedaplatin

展 望

1. 标准BEP方案可治愈80%以上转移性GCT
2. 目前可取药物及方案尚不能有效地改善预后不良的转移性GCT预后
3. 结合GCT生物学特性，进行随机试验，寻找新的治疗药物是治疗难治性GCT的希望

中国泌尿肿瘤MDT会诊平台
前列腺癌·肾癌·膀胱癌等 | mdt.urocancer.org

长晴大爱 健康中国

中国泌尿肿瘤MDT会诊公益行动

睾丸癌放疗进展

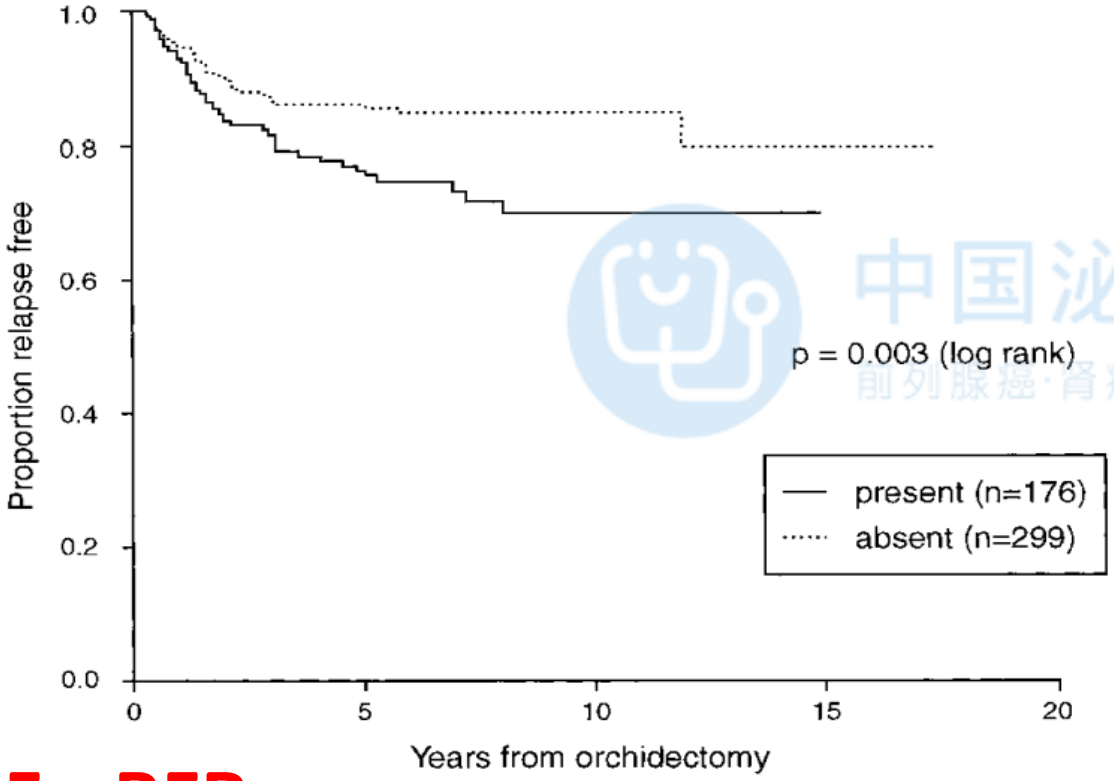
中山大学肿瘤防治中心 何立儒

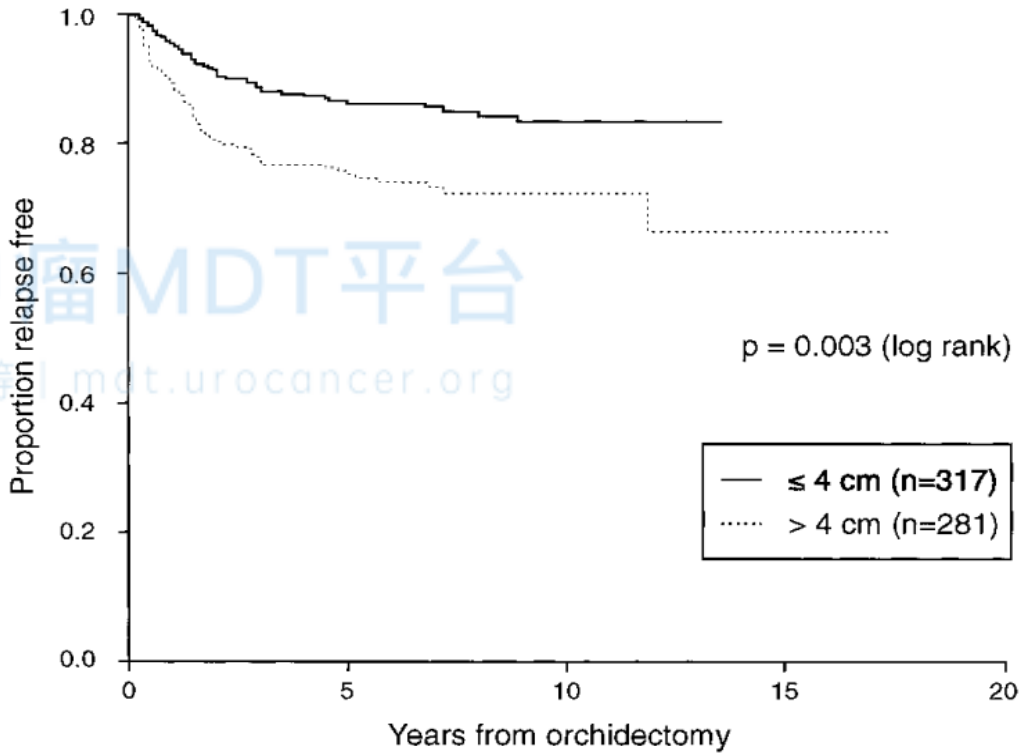
- I 期精原细胞瘤 (pT1-T4 NO MO SX)
- II 期精原细胞瘤 (Any pT/TX N1-3 MO SX)

- I 期精原细胞瘤 (pT1-T4 N0 M0 SX)
- II 期精原细胞瘤 (Any pT/TX N1-3 M0 SX)

JCO: 原发肿瘤体积和睾丸网侵犯是I期复发高危因素

Prognostic Factors for Relapse in Stage I Seminoma Managed by Surveillance: A Pooled Analysis





5y-RFR:

86% [睾丸网未侵犯] **v 77%** [睾丸网侵犯]

87% [原发灶≤4cm] **v 76%** [原发灶>4cm]

J Clin Oncol 2002; 20: 4448–52

JCO: 原发肿瘤体积和睾丸网侵犯是I期复发高危因素

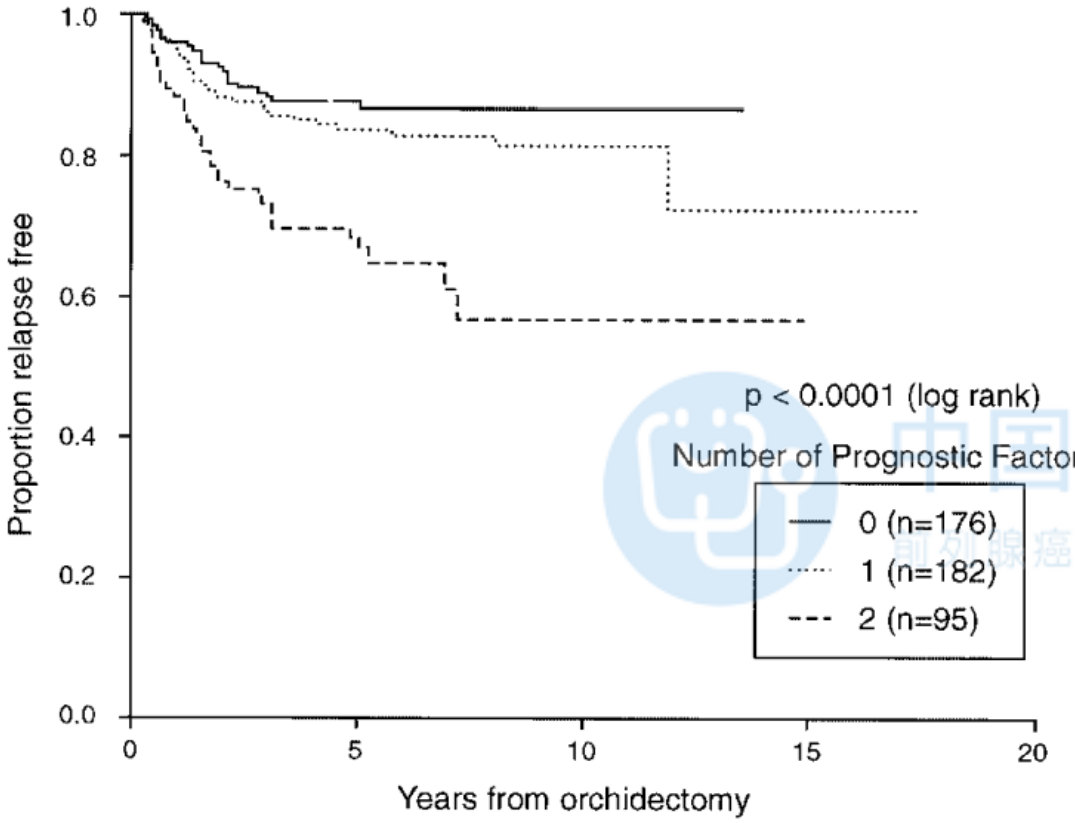


Fig 4. Relapse-free rate based on number of adverse prognostic factors.

Table 3. Five-Year Relapse-Free Rates Based on Tumor Size and Rete Testis Invasion

Tumor Size	Rete Testis Involvement: No	Rete Testis Involvement: Yes
≤ 4 cm	n = 176 87.8% ± 2.5%* HR = 1.0†	n = 75 85.6% ± 4.3%* HR = 1.7† 95% CI, 1.1-2.6‡
> 4 cm	n = 107 83.0% ± 3.7%* HR = 2.0† 95% CI, 1.3-3.2	n = 95 68.5% ± 4.9%* HR = 3.4† 95% CI, 2.0-6.1

同时具有两个高危因素无复发生存率最低 **87.8%** → **68.5%**

J Clin Oncol 2002; 20: 4448–52

Radiation Oncology: I期精原细胞瘤放疗or化疗显著降低复发率

Boujelbene *et al. Radiation Oncology* 2011, **6**:90
http://www.ro-journal.com/content/6/1/90

RADIATION ONCOLOGY

REVIEW Open Access

Pure seminoma: A review and update

Table 3 Outcome of patients treated for seminoma from 1999 to 2008 [22]

Stage	Treatment	Number of patients	5-Year relapse rate (%)	Second relapse, n	5-Year disease-specific survival (%)	5-Year overall survival (%)	Dead of disease/ treatment, n (%)	Death other cause, n (%)
I	Surv	313	19.3	3[a] (1%)	100	99	0	2 (1)
	RT	159	2	0	100	99.3	0	1 (1)
	Carb	73	2	0	100	100	0	0

Boujelbene et al. Radiation Oncology 2011, 6:90

NEJM: I期精原细胞瘤放疗or化疗显著降低复发率

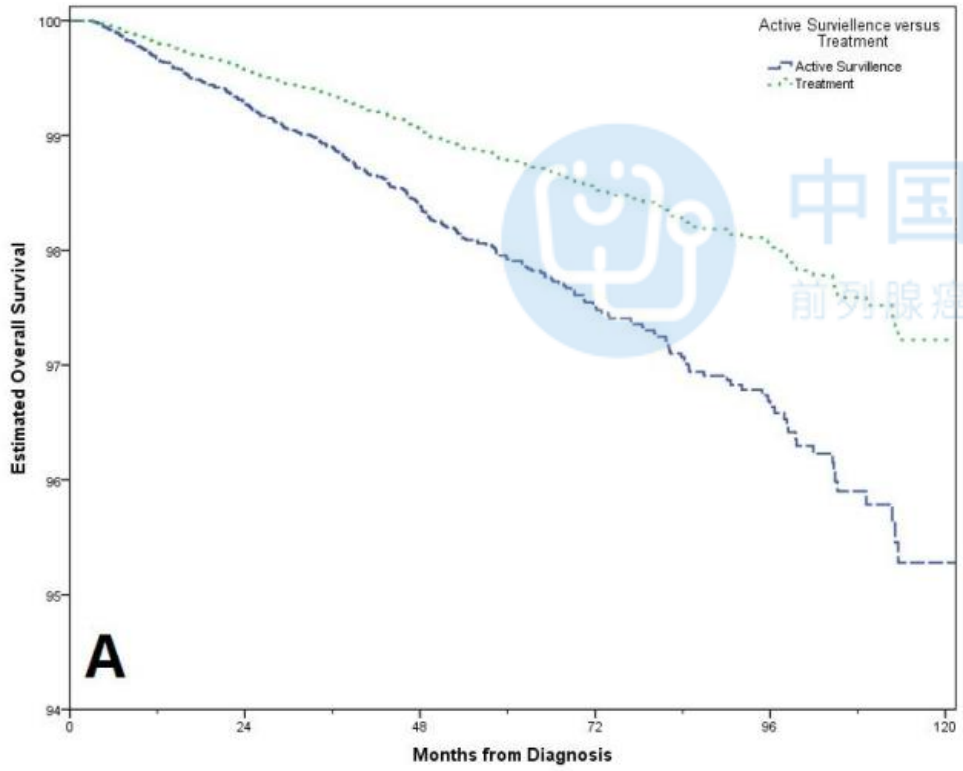
Table 2. Treatment Options for Stage I Seminoma.*

Option	Outcomes	Advantages	Disadvantages	Reference
Active surveillance	20% relapse rate; 99% long-term cancer-specific survival rate	Most patients require no treatment; long-term outcomes excellent	Adherence is essential; higher doses of radiotherapy or 9–12 wk of chemotherapy required if disease recurs	Mortensen et al.,[17] Soper et al.,[18] Oldenburg et al.[19]
Radiotherapy	4% relapse rate; 99% long-term cancer-specific survival rate	Reduces relapses; reduces odds of need for 9–12 wk of chemotherapy; reduces frequency of abdominal imaging	Short-term side effects, including fatigue, nausea, diarrhea; uncertainty in staging may lead to undertreatment of some patients; long-term risks of secondary cancer	Soper et al.,[18] Oldenburg et al.,[19] Oliver et al.[20]
Carboplatin (one or two cycles)	4% relapse rate; 99% long-term cancer-specific survival rate	Reduces relapses; reduces odds that patient will need 9–12 wk of chemotherapy or radiotherapy	Short-term side effects, including fatigue, nausea; risk of complications of neutropenia; uncertainty in staging may lead to undertreatment of some patients; long-term risks of carboplatin unknown	Oldenburg et al.,[19] Oliver et al.[20]

N Engl J Med 2014;371:2005-16.

IJROBP：辅助治疗OS略优于密切随访

Surveillance and Radiotherapy for Stage I Seminoma – Have We Learned From the Evidence?



Materials and Methods: We identified 33,094 stage I seminoma patients following orchiectomy from 1998 to 2012 from the National Cancer Database. Factors affecting

AT(adjuvant treatment) vs AS

10y-OS 95.0% vs 93.4%, HR=0.58, p<0.0005

	Chemotherapy (n=2,284)	Radiation (n=19,230)
Sociodemographic Factors		
Year of Diagnosis*		
1998-2001	174 (2.6%)	6,613 (97.4%)
2002-2005	239 (3.7%)	6,184 (96.3%)
2006-2009	819 (15.3%)	4,549 (84.7%)
2010-2012	1,052 (35.8%)	1,884 (64.2%)

Int J Radiat Oncol Biol Phys 2016;94:75-84.

I期精原细胞瘤：指南推荐存在争议

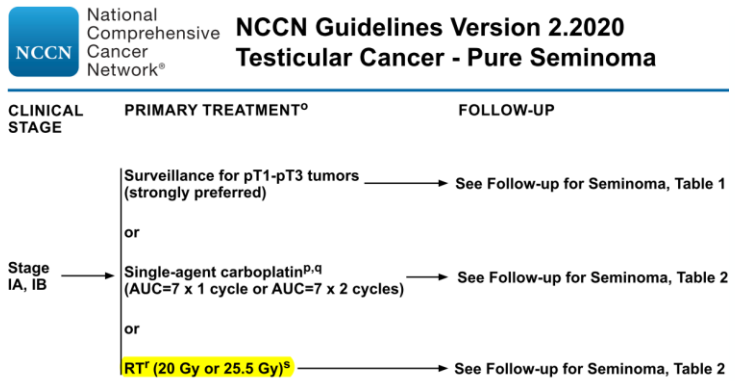
7.2.1.3 Adjuvant radiotherapy and risk-adapted treatment

Seminoma cells are extremely radiosensitive. Adjuvant RT to a para-aortic (PA) field or to a PA and ipsilateral field (PA and ipsilateral iliac nodes), with moderate doses (total 20-24 Gy), will reduce the relapse rate to 1-3%

7.2.1.5 Recommendations for the treatment of stage I seminoma

Recommendations	Strength rating
Fully inform the patient about all available management options, including surveillance or adjuvant chemotherapy after orchiectomy, as well as treatment-specific recurrence rates and acute and long-term side effects.	Strong
Offer surveillance as a management option if facilities are available and the patient is compliant.	Strong
Offer one course at area under curve 7 (AUC), if carboplatin chemotherapy is considered.	Strong
Do not perform adjuvant treatment in patients at very low risk (no risk factors).	Strong
Do not perform radiotherapy as adjuvant treatment.	Strong

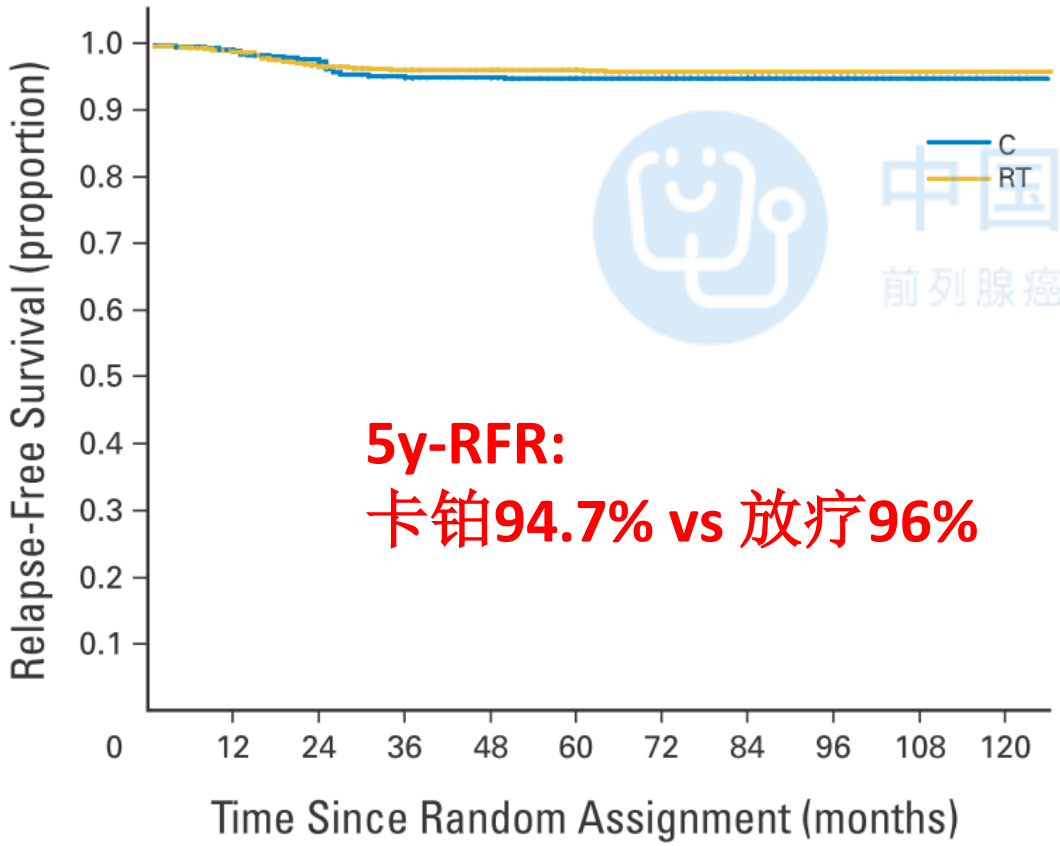
	Stage I
First line	Low risk* Preferred : • Surveillance Alternatively : ▪ Carboplatin x 1 (AUC 7) ▪ Radiotherapy (20 Gy) High risk# Preferred: • Surveillance • Carboplatin x 1 (AUC 7) Alternatively: • Radiotherapy (20 Gy)



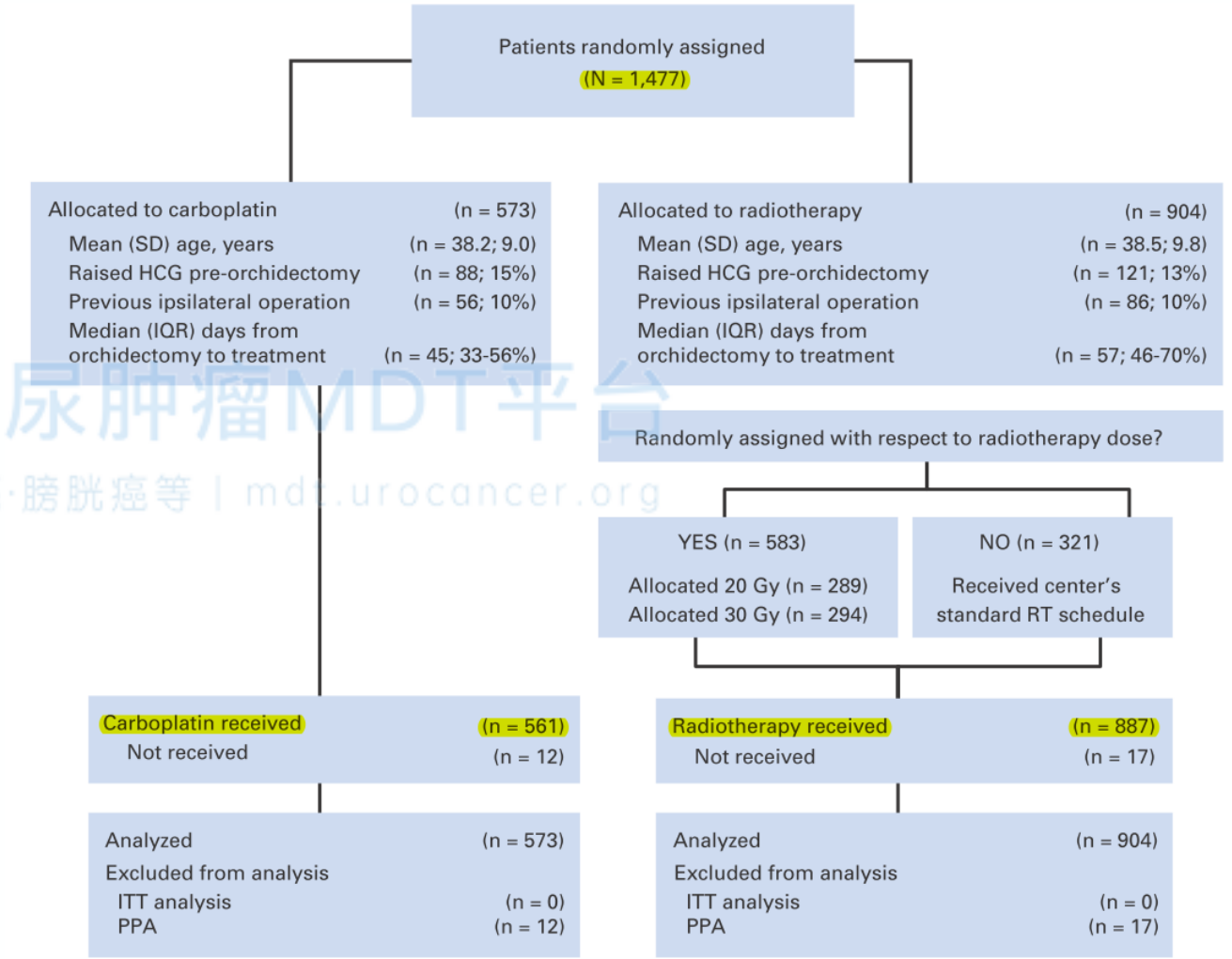
JCO MRC TE19 Trial：I期精原细胞瘤化疗不劣于放疗

1477 stage I patients

Randomized Trial of Carboplatin Versus Radiotherapy for Stage I Seminoma: Mature Results on Relapse and Contralateral Testis Cancer Rates in MRC TE19/EORTC 30982 Study (ISRCTN27163214)



5y-RFR:
卡铂94.7% vs 放疗96%



J Clin Oncol 2011; 29: 957–62

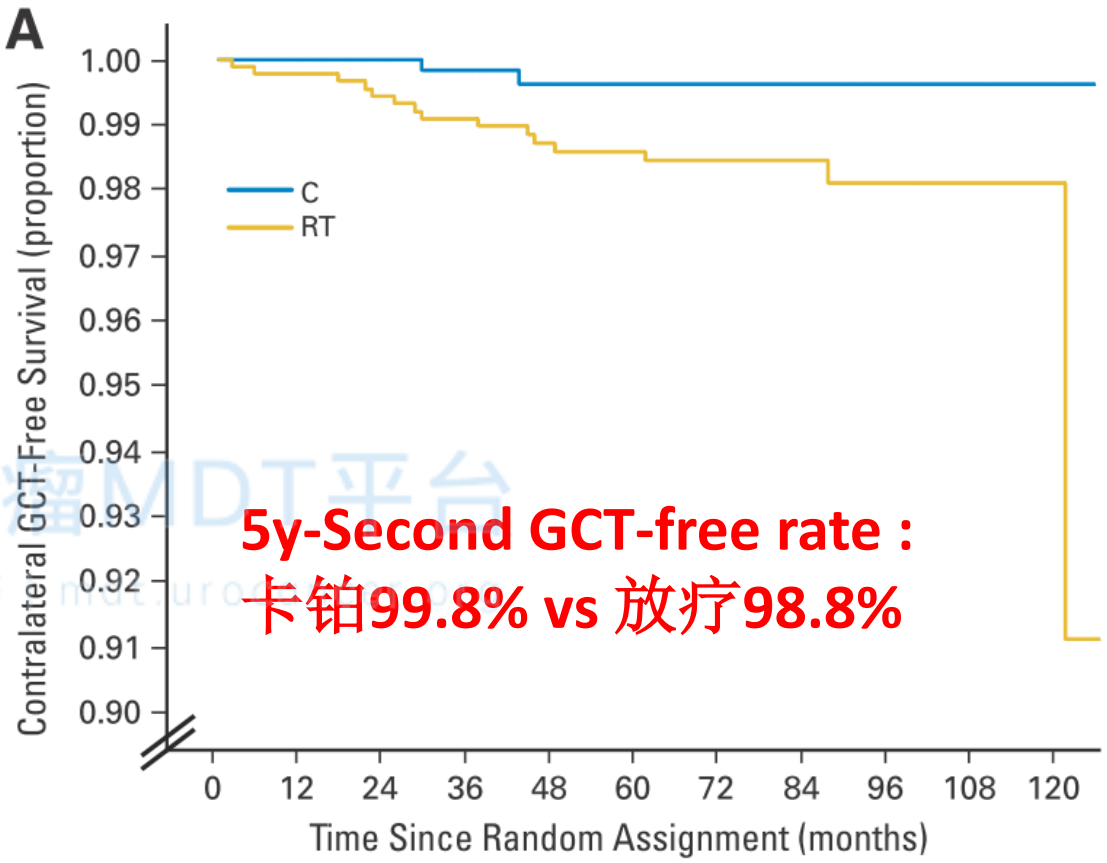
JCO MRC TE19 Trial：I期精原细胞瘤化疗vs放疗对侧生殖细胞肿瘤发生率略低

Overall, 1,477 patients were recruited to the trial between 1996 and 2001; 573 were randomly assigned to carboplatin, and 904 were randomly assigned to RT. Eighty-seven percent of the patients had PA-

Table 1. Summary of Events

Event	Treatment Arm: Carboplatin (n = 573) No.	%	Radiotherapy (n = 904) No.	%
Total relapse	29	5.1	37	4.1
New primary cancers	7	1.2	25	2.8
GCT	2		15	
Other	5		10	
Total deaths	6	1.0	10	1.1
Death as a result of seminoma	0		1	
Death as a result of other cause	6		9	

Abbreviation: GCT, germ cell tumor.



5y-Second GCT-free rate :
卡铂99.8% vs 放疗98.8%

longer follow-up. The RT technology, dose and treatment field as used in the MRC TE 19 trial are no longer relevant in the era of IMRT, VMAT and upcoming proton therapy. Further updates of the MRC TE 19 trial are urgently needed, with separate analyses of the different RT doses and irradiated volumes used.

J Clin Oncol 2011; 29: 957–62

Ann Oncol：前瞻性研究显示辅助化疗VS密切随访不足以显著降低复发率

Treatment of stage I seminoma, with one course of adjuvant carboplatin or surveillance, risk-adapted recommendations implementing patient autonomy: a report from the Swedish and Norwegian Testicular Cancer Group (SWENOTECA)

From 2007 to 2010, 897 patients

Relapse rate（RR）：
Without risk factors : 4.0% (surveillance) VS 2.2% (adjuvant carboplatin)

With one or two risk factors: 15.5% (surveillance) VS 9.3% (adjuvant carboplatin)

Patients without risk factors have a low RR and adjuvant therapy is not justified in these patients. The efficacy of adjuvant carboplatin is relatively low and there is need to explore more effective adjuvant treatment options in patients with high-risk seminoma. The data do not support the concept of a steep dose response for adjuvant carboplatin.

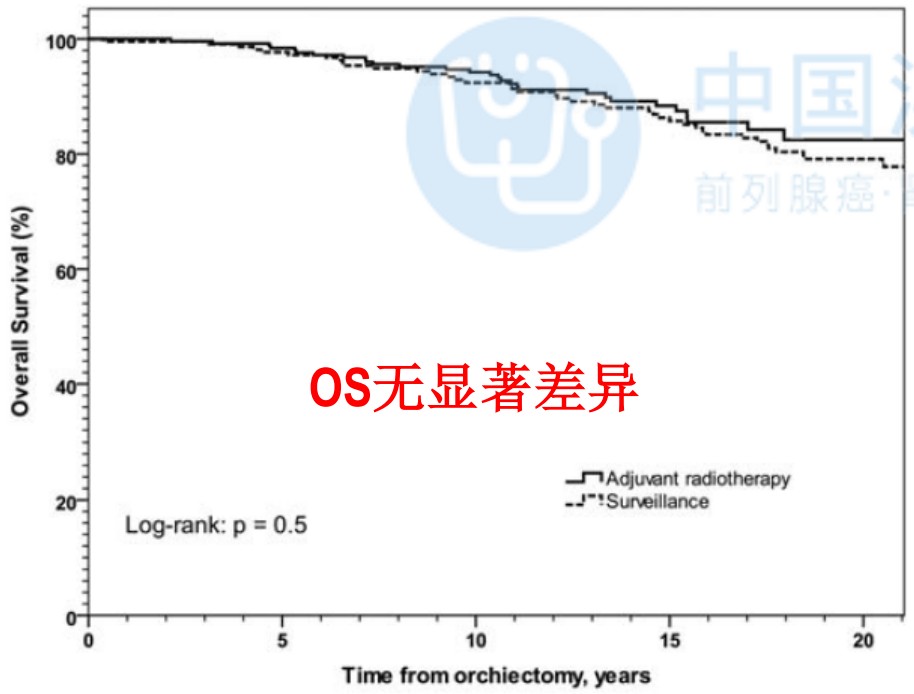
Ann Oncol 2016; 27: 1299–304

CANCER：I期 肿瘤原发灶≥6cm 随访 vs 放疗： 放疗显著降低复发率

Surveillance Versus Adjuvant Radiotherapy for Patients With High-Risk Stage I Seminoma

10-year cumulative incidence of disease recurrence was 32% versus 2.8%,

Adjuvant RT	Surveillance	Total
254	219	473



OS无显著差异

No. at risk					
Surveillance	219	210	183	148	121
Adjuvant RT	254	247	198	102	23

TABLE 2. Number and Type of Second Cancers

Cancer Type	Adjuvant RT	Surveillance	Total
Cerebrum	1	1	2
Malignant melanoma	4	0	4
Kidney	1	3	4
Bladder	0	2	2
Prostate	2	5	7
Lung/pleura	5	2	7
Pancreas	1	2	3
Colorectal	2	7	9
GIST	1	0	1
Head and neck	2	3	5
CUP	1	1	2
Hodgkin lymphoma	1	0	1
Non-Hodgkin lymphoma	0	1[a]	1
Leukemia	0	2	2
Myelomatosis	0	1	1
Total no. of second cancers	21	30	51

第二原发瘤无显著差异

Cancer 2017;123: 1212–8

Radiation Oncology: 减小照射野范围 疗效相同

Table 2 Relapses and survival in randomized controlled trials in stage 1 seminoma

Reference/No. of patients	Treatment	Total relapses	No. pelvic relapses	Relapse-free survival	Other
[44] n = 625	20 Gy RT (n = 313)	11	3	At 2 years: 97%	8/9 pelvic relapses occurred in the PA RT field group
	30 Gy RT (n = 312)	10	6	At 5 years: 97%*	
[43] n = 478	DL RT (n = 242)	9	0	At 3 years: 96.6% At 5 years: 96.2%*	3-years OS: 100%
	PA RT (n = 236)	9	4	At 3 years: 96% At 5 years: 96.1%*	3-years OS: 99.3%
[18,58] n = 1477	RT: PA or DL, 20 or 30 Gy (n = 904)	36	10	At 3 years: 95.9% At 5 years: 96%*	- All pelvic relapses occurred in the PA RT group - 74% of relapses in the carboplatin group occurred in the PA nodes
	1 cycle carboplatin (n = 573)	29	0	At 3 years: 94.8% At 5 years: 94.7%*	

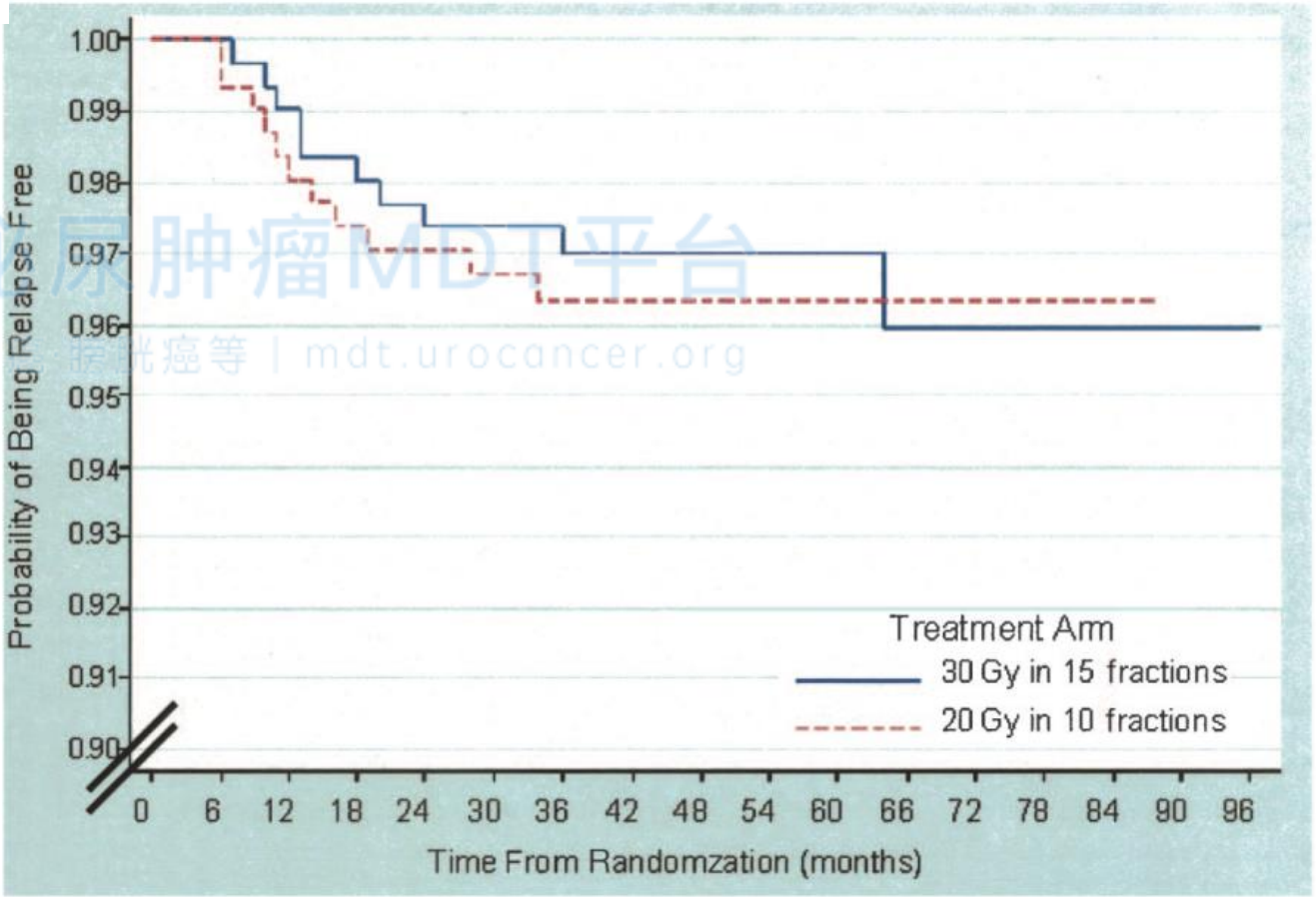
RT: radiation therapy; DL: Dog-Leg; PA: para-aortic; OS: overall survival;* data retrieved in update.

Boujelbene et al. Radiation Oncology 2011, 6:90

JCO：I期精原细胞瘤 20Gy/10F与30Gy/15F 疗效相同，病人耐受性更好

Randomized Trial of 30 Versus 20 Gy in the Adjuvant Treatment of Stage I Testicular Seminoma: A Report on Medical Research Council Trial TE18, European Organisation for the Research and Treatment of Cancer Trial 30942 (ISRCTN18525328)

	Allocated Treatment			
	30 Gy (n = 313)		20 Gy (n = 312)	
Toxicity (grade)	Count	%	Count	%
Nausea or vomiting*				
0	68	22.0	95	30.6
1	133	43.0	127	41.0
2	47	15.2	31	10.0
3	60	19.4	56	18.1
4	1	0.3	1	0.3
Not known	4		2	
Leucopenia†				
0	241	81.7	244	85.9
1	34	11.5	35	12.3
2	18	6.1	5	1.8
3	2	0.7	0	0.0
Not known	18		28	
Thrombocytopenia‡				
0	292	99.0	285	100
1	2	0.7	0	0.0
3	1	0.3	0	0.0
Not known	18		27	



DOI: 10.1200/JCO.2005.08.003

JCO：I期精原细胞瘤 20Gy/10F与30Gy/15F 疗效相同，病人耐受性更好

20Gy剂量中出现中高度乏力人数<35%

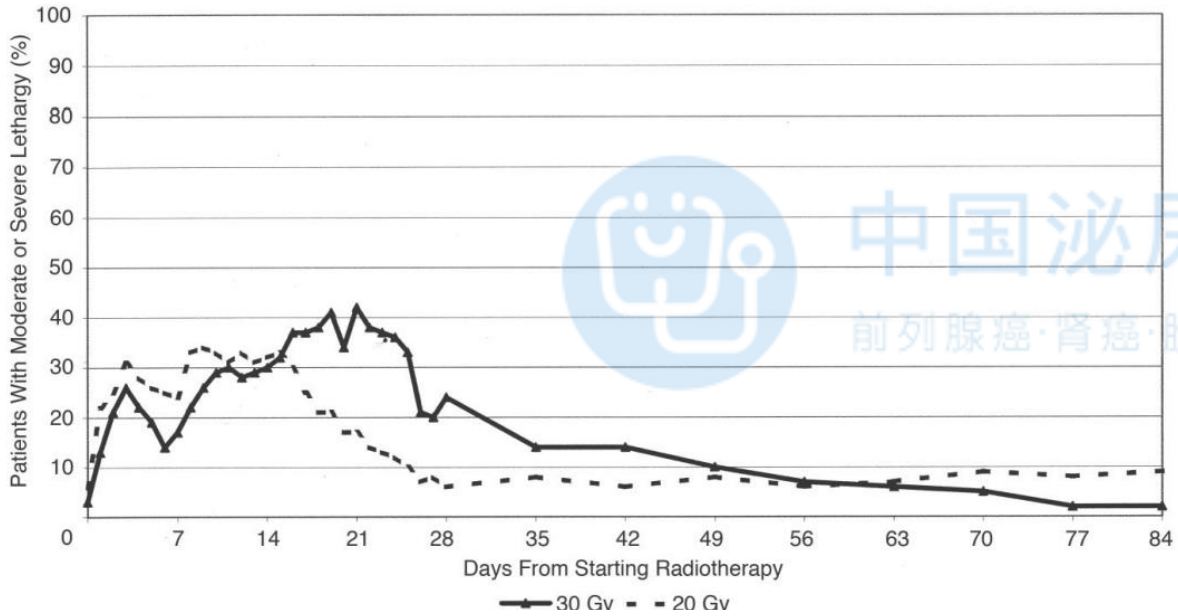


Fig 1. Patient diary card: percentage of patients with moderate or severe lethargy.

20Gy剂量中>70%的人3周后恢复正常工作

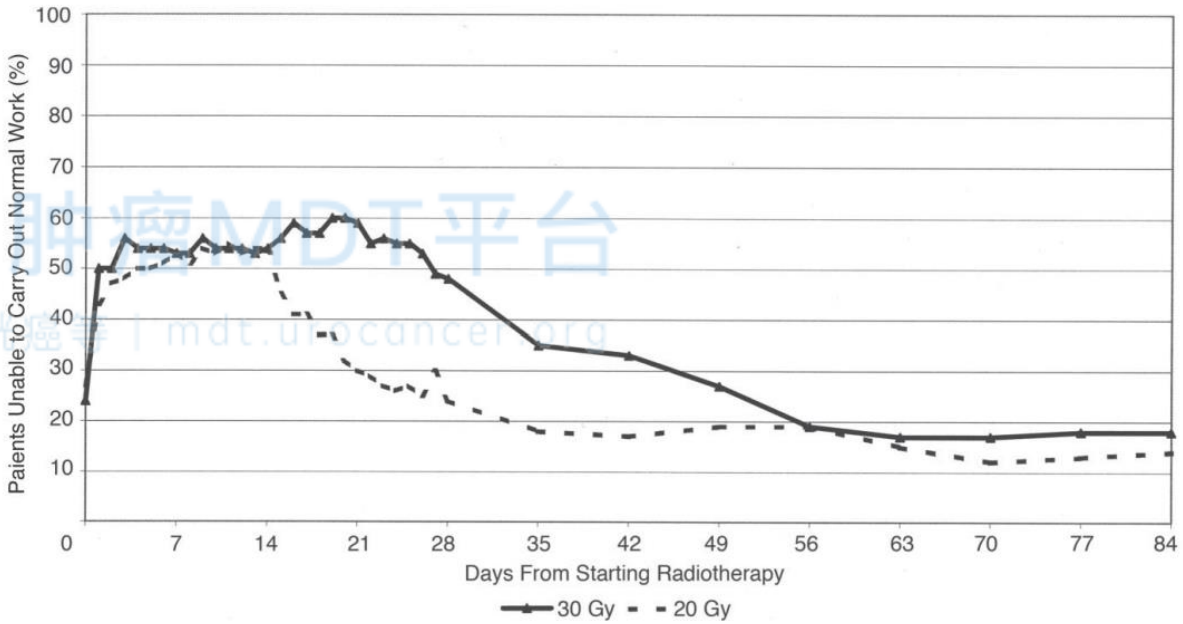
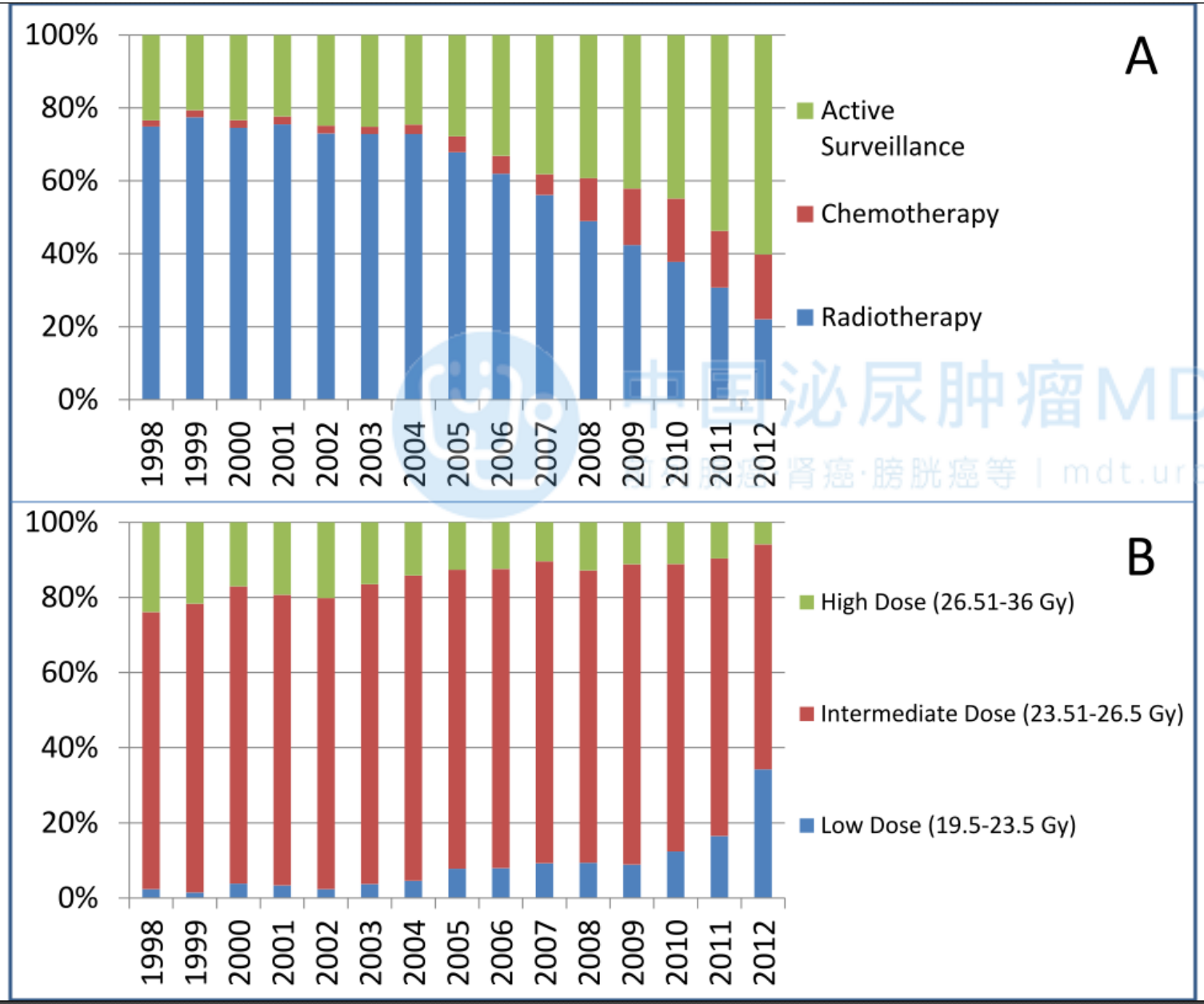


Fig 2. Patient diary card: percentage of patients unable to carry out normal work.

DOI: 10.1200/JCO.2005.08.003

I期精原细胞瘤术后放疗趋势：细分适应人群，降低照射剂量与范围



Int J Radiat Oncol Biol Phys 2016;94:75-84.

I期精原细胞瘤术后放疗趋势：在高危因素人群占比逐渐增加

Surveillance Versus Adjuvant Radiotherapy for Patients With High-Risk Stage I Seminoma

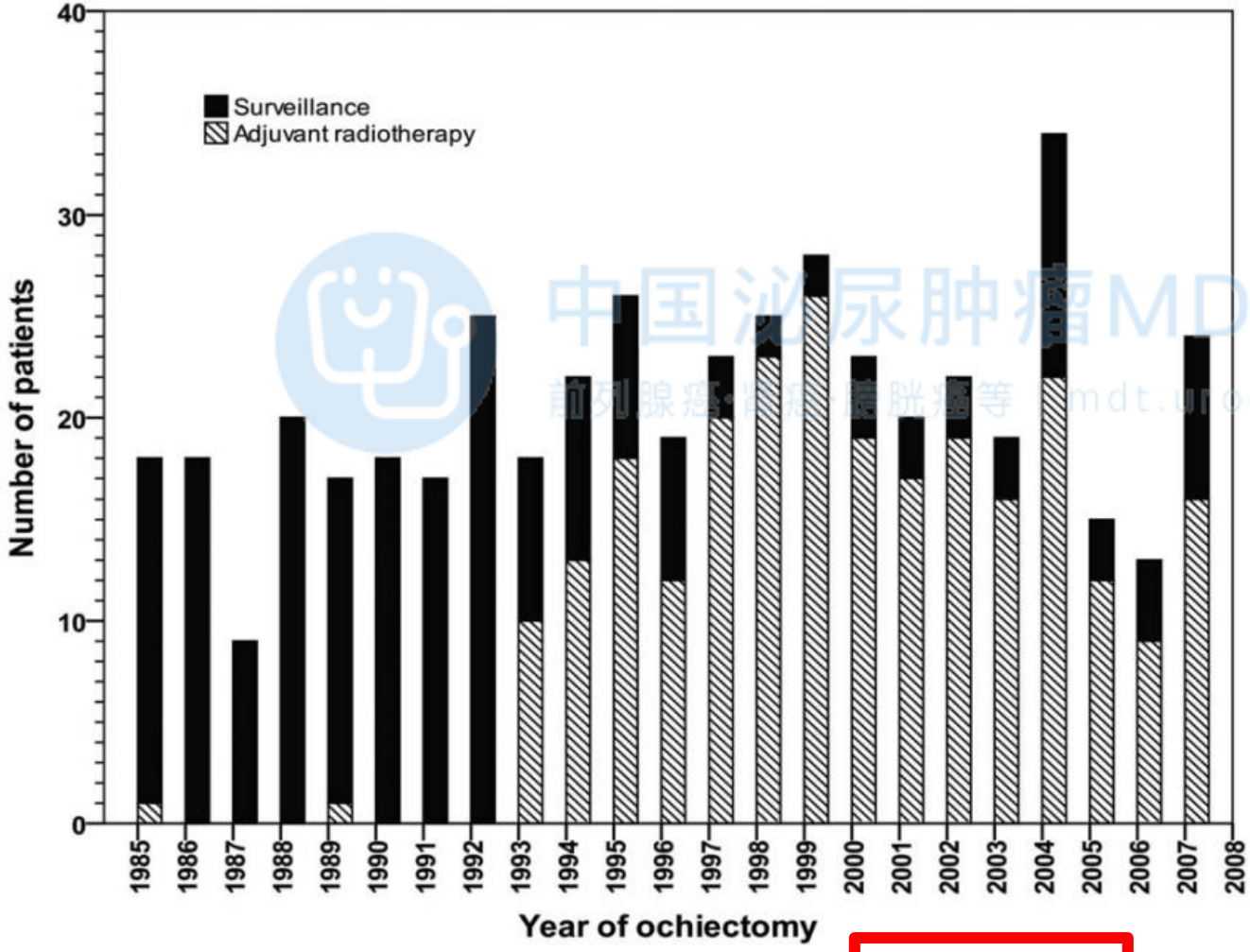


Figure 1. The Danish treatment strategy for patients with high-risk seminoma (tumor size ≥ 6 cm) during the study period.

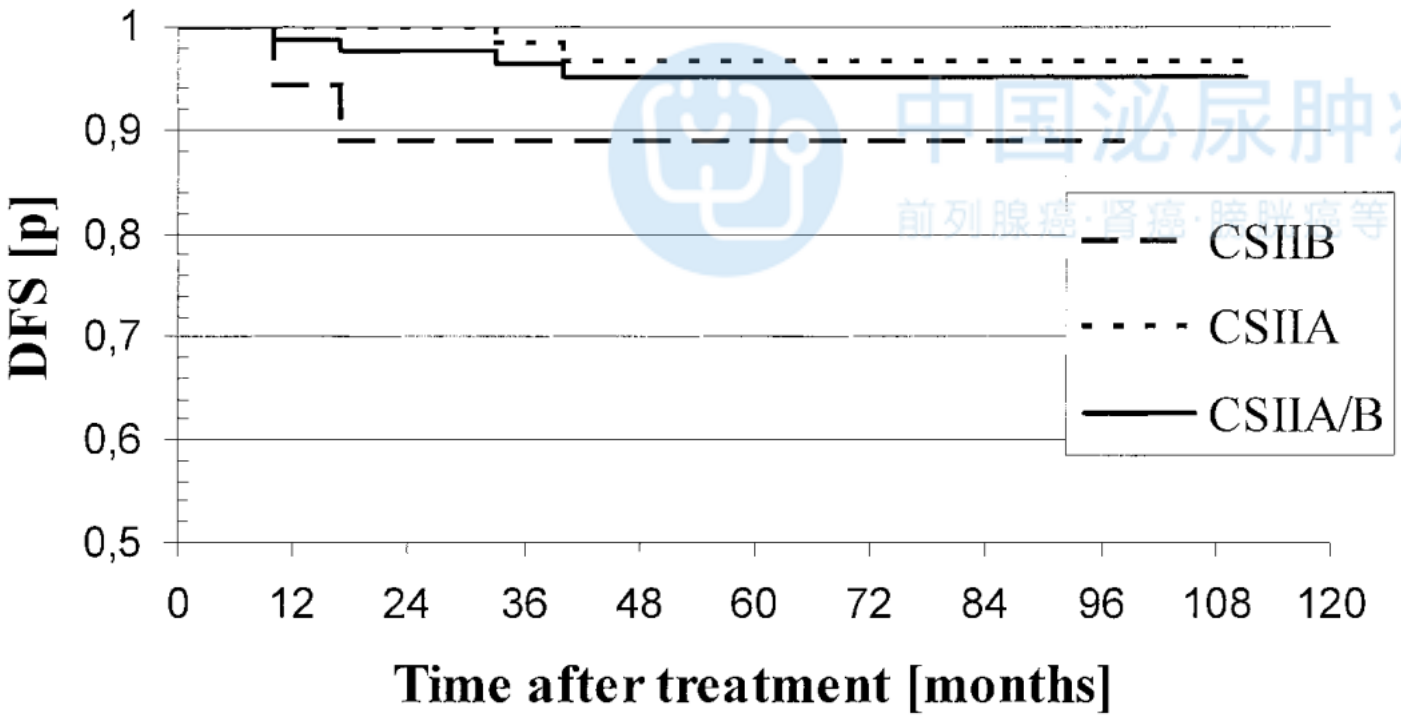
Cancer 2017;123: 1212–8

- Ⅰ 期精原细胞瘤 (pT1-T4 N0 M0 SX)
- Ⅱ 期精原细胞瘤 (Any pT/TX N1-3 M0 SX)

JCO：前瞻性研究显示II期精原细胞瘤放疗安全有效

Radiotherapy for Stages IIA/B Testicular Seminoma: Final Report of a Prospective Multicenter Clinical Trial

- 94 patients. 66 stage IIA / 21 stage IIB



- 6y-DFS was 95.3% and 88.9% for stage IIA and IIB
- No late toxicity was observed
- Maximum acute side effects were 8% grade 3 nausea for stage IIA and 10% grade 3 nausea and diarrhea for stage IIB

Table 3. Maximum Acute Toxicity of Radiotherapy Assessed for Skin, Nausea, and Diarrhea

	Skin (%)		Nausea (%)		Diarrhea (%)	
RTOG/WHO Grade	IIA	IIB	IIA	IIB	IIA	IIB
0	91	76	27	24	70	57
1	9	24	53	52	15	10
2	0	0	12	14	9	24
3	0	0	8	10	6	10
4	0	0	0	0	0	0

Abbreviations: RTOG, Radiation Therapy Oncology Group; WHO, World Health Organization.

J Clin Oncol, 2003. 21: 1101

EAU：II期精原细胞瘤放疗有效

- 5年无复发生存率：75~95%

European Urology

European Urology 45 (2004) 754–760

Stage	RT
IIA	49
IIB	30
IIC	16
Total	95

Stage II Testicular Seminoma: Patterns of Recurrence and Outcome of Treatment

Candidate prognostic factors for RT patients

Variable	*N* (# of events)	% 2-year RFR (SE)	% 5-year RFR (SE)	Log-rank *p*-value
Lymphovascular invasion				$p = 0.83$
Yes	38 (6)	84.2 (5.9)	84.2 (5.9)	
No	41 (6)	87.8 (5.1)	85.1 (5.6)	
Not stated	16 (4)			
Rete testis invasion				$p = 0.27$
Yes	30 (7)	83.2 (6.9)	75.9 (8.0)	
No	13 (1)	92.3 (7.4)	92.3 (7.4)	
Not stated	52 (8)			
Age at surgery				$p = 0.83$
≤ median (35)	50 (8)	88.0 (4.6)	83.2 (5.4)	
> median (35)	45 (8)	82.1 (5.8)	82.1 (5.8)	
Tumor size				$p = 0.02$
≤ median (5.5 cm)	43 (10)	81.4 (5.9)	76.7 (6.5)	
> median	40 (2)	95.0 (3.4)	95.0 (3.4)	
Not stated	12 (4)			

II 期精原细胞瘤　放疗vs 化疗

800+cases MATA分析显示放疗 & 化疗无显著疗效差异

Annals of Oncology

reviews

Annals of Oncology 26: 657–668, 2015
doi:10.1093/annonc/mdu447
Published online 11 September 2014

Radiotherapy or chemotherapy for clinical stage IIA and IIB seminoma: a systematic review and meta-analysis of patient outcomes†

13 studies 607 patients receiving RT and 283 patients CT

The pooled relapse rate (RR) was similar between the RT（0.11） and CT（0.08） groups

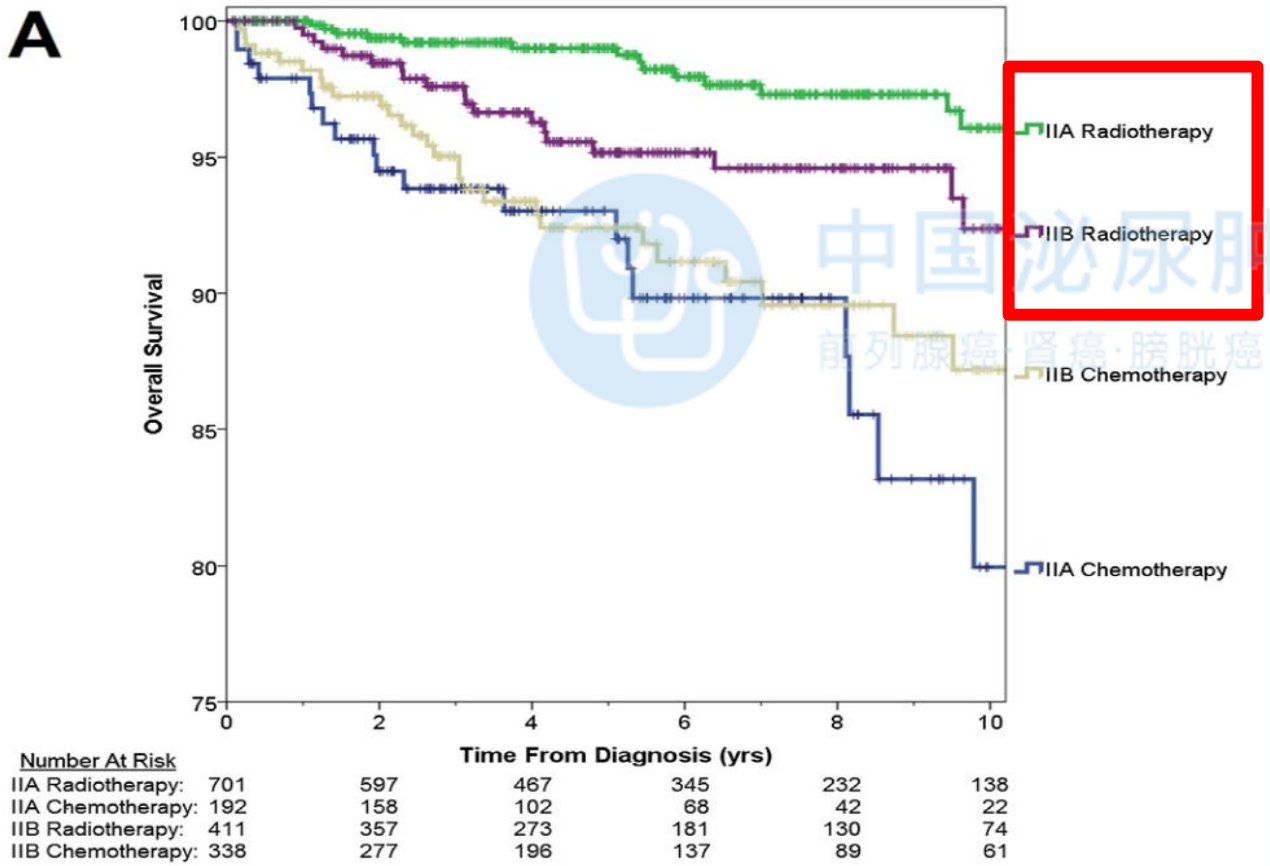
Study selection	Radiotherapy		Chemotherapy	
	No. of studies	Relapse rate (95% CI)	No. of studies	Relapse rate (95% CI)
Primary analysis	11	0.11 (0.08–0.14)	6	0.08 (0.01–0.15)
Including only clinical stage IIA	9	0.05 (0.02–0.07)	5	0.14 (0.02–0.27)
Including only clinical stage IIB	8	0.14 (0.09–0.18)	6	0.08 (0.02–0.15)
Including only paraortic/paracaval + iliac RT and PEB/EP CT in the primary analysis	7[a]	0.10 (0.06–0.14)	3	0.04 (0–0.09)
Including only paraortic/paracaval + iliac RT and PEB/EP CT in the clinical stage IIA	5	0.05 (0.02–0.07)	3	0.07 (0–0.19)
Including only paraortic/paracaval + iliac RT and PEB/EP CT in the clinical stage IIB	4	0.12 (0.06–0.17)	3	0.05 (0–0.11)
Including only RT dose ≥30 Gy in the primary analysis	8	0.12 (0.07–0.16)	–	–
Including only RT dose ≥30 Gy in the clinical stage IIA	6	0.04 (0.02–0.06)	–	–
Including only RT dose ≥30 Gy in the clinical stage IIB	7	0.14 (0.08–0.20)	–	–
Including only RT dose <30 Gy in the primary analysis	1	0.10 (0–0.21)	–	–
Including only RT dose <30 Gy in the clinical stage IIA	2	0.09 (0.03–0.15)	–	–
Including only RT dose <30 Gy in the clinical stage IIB	0	–	–	–
Including only clinical study with more than 50 patients	5	0.10 (0.06–0.14)	3	0.08 (0–0.19)

[a]Including six studies of paraortic + iliac RT only and Patterson's study which reported on data relative to the population of paraortic + iliac RT only.
CI, confidence interval; EP, etoposide, cisplatin; PEB, cisplatin, etoposide, bleomycin; RT, radiotherapy CT, chemotherapy.

Ann Oncol, 2015. 26: 657

2400+cases NCDB：
单因素分析显示II期 放疗优于化疗

Stage II Testicular Seminoma: Patterns of Care and Survival by Treatment Strategy☆



NCDB 2437 stage IIA-IIC seminoma patients

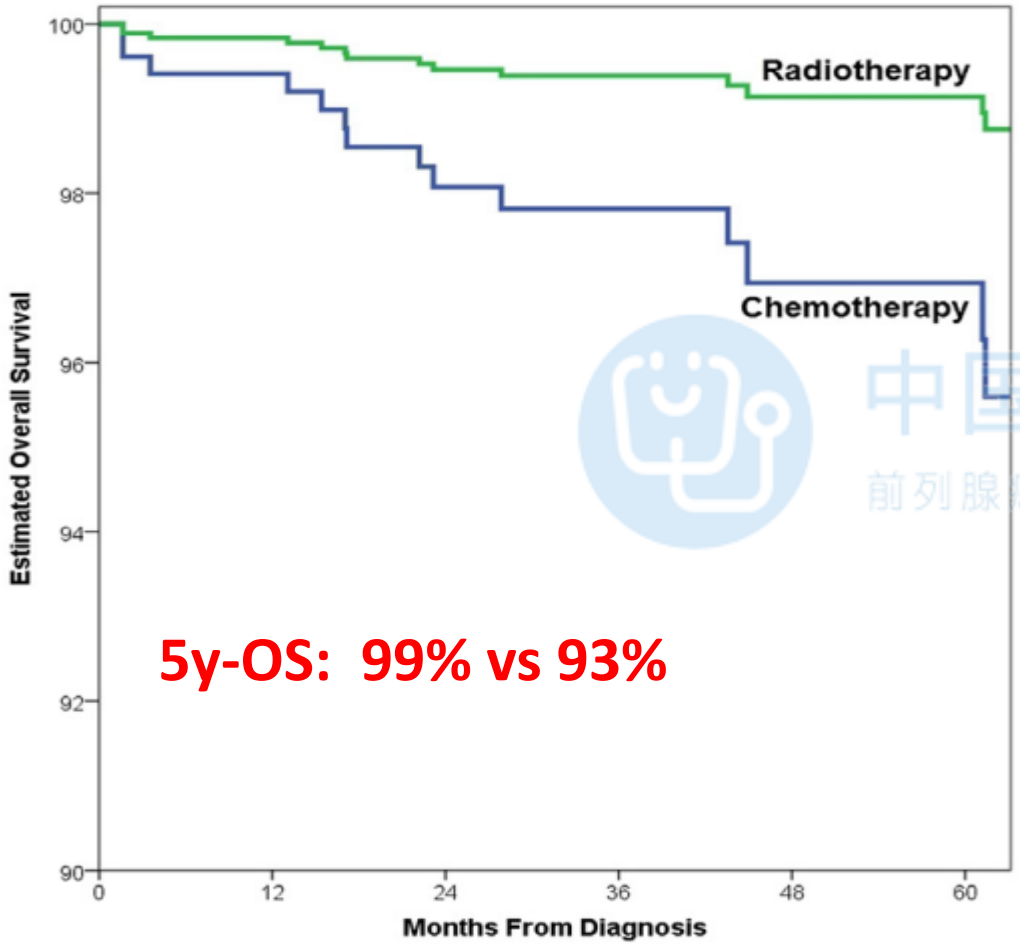
Unadjusted Kaplan-Meier survival analysis by stage and treatment.

Clin Oncol (R Coll Radiol) 2016;28:513-521.

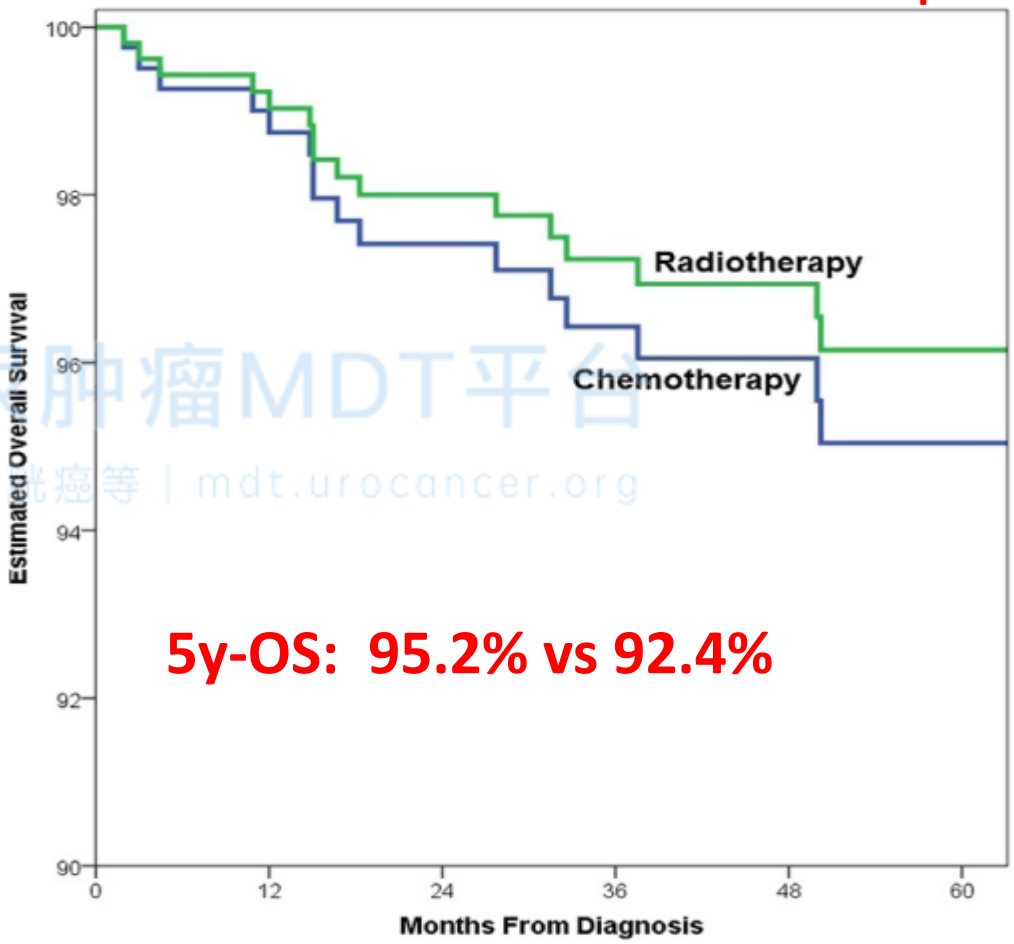
亚组分析显示IIA期 放疗显著优于化疗
IIB期无显著差异

长晴大爱 健康中国

NCDB 2437 stage IIA-IIC seminoma patients



5y-OS: 99% vs 93%



5y-OS: 95.2% vs 92.4%

propensity score-adjusted OS probability

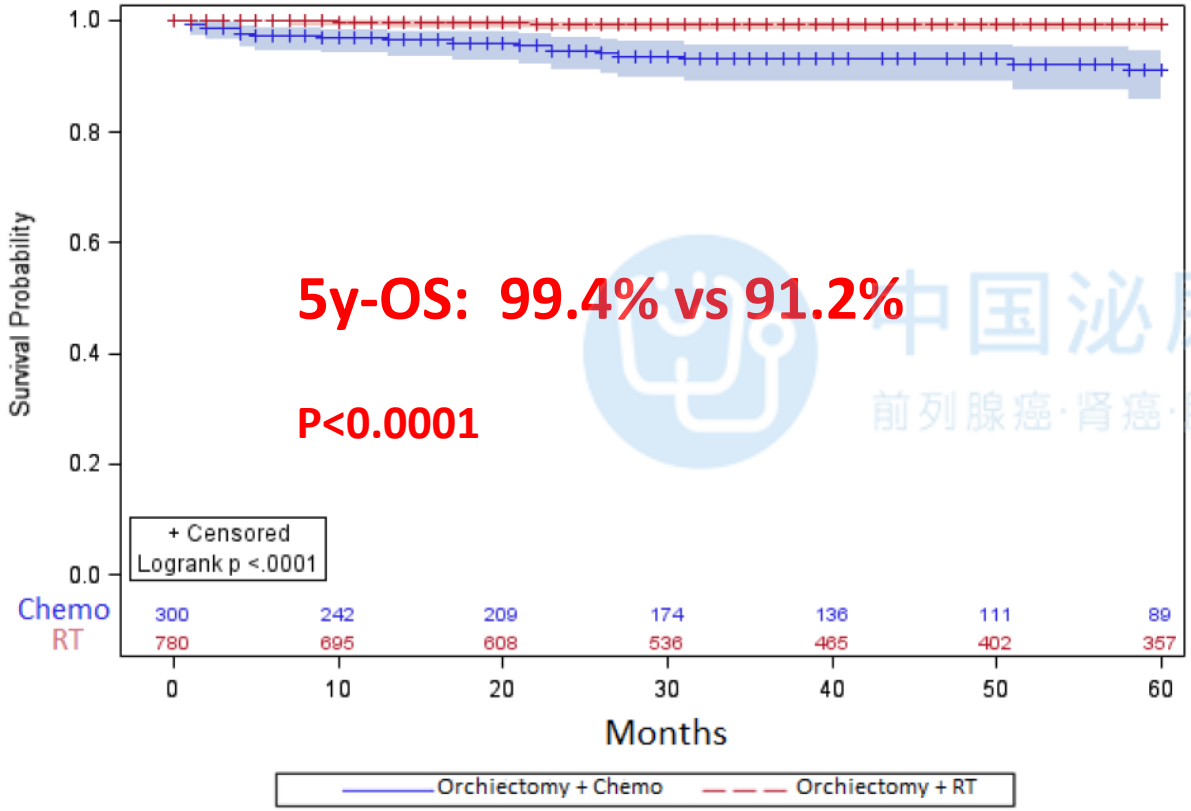
stage II A

stage II B

Clin Oncol (R Coll Radiol) 2016;28:513-521.

亚组分析显示IIA期 放疗显著优于化疗，IIB期无显著差异

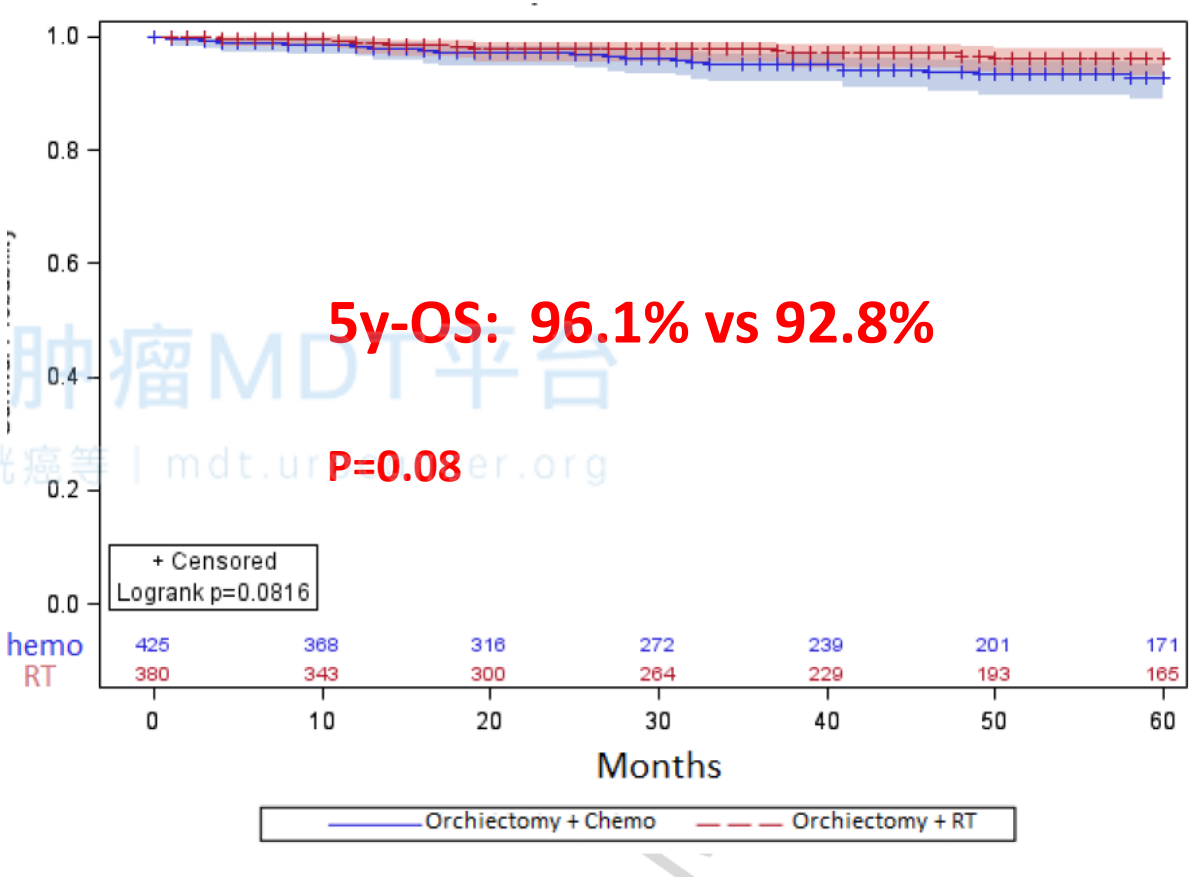
NCDB 1885 stage IIA/B seminoma patients



5y-OS: 99.4% vs 91.2%

P<0.0001

stage II A



5y-OS: 96.1% vs 92.8%

P=0.08

stage II B

Pract Radiat Oncol 2016;6:249-258

RT or CT ? Trends in treatment selection between RT & CT

Stage II Testicular Seminoma: Patterns of Care and Survival by Treatment Strategy☆

NCDB 2437 stage II seminoma patients

2437 stage II seminoma patients (IIA = 960, IIB = 812, IIC = 665)

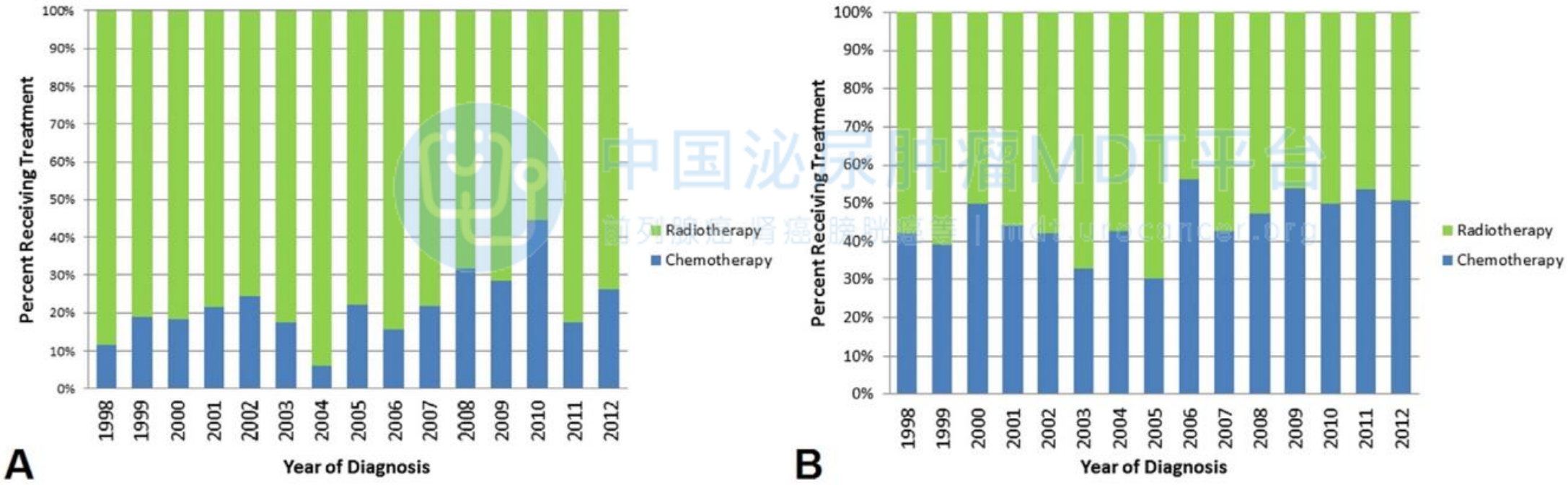


Fig 1. Trends in treatment selection over time: (A) stage IIA, (B) stage IIB.

stage II A

stage II B

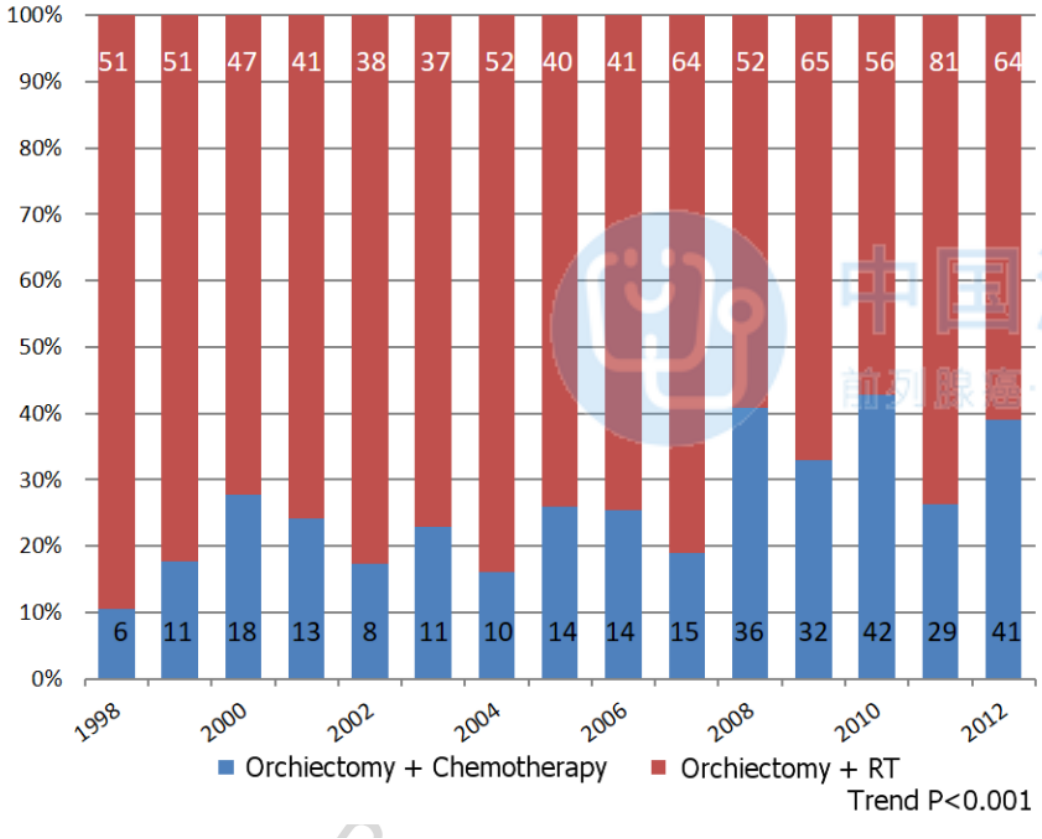
Clin Oncol (R Coll Radiol) 2016;28:513-521.

RT or CT ? Trends in treatment selection between RT & CT

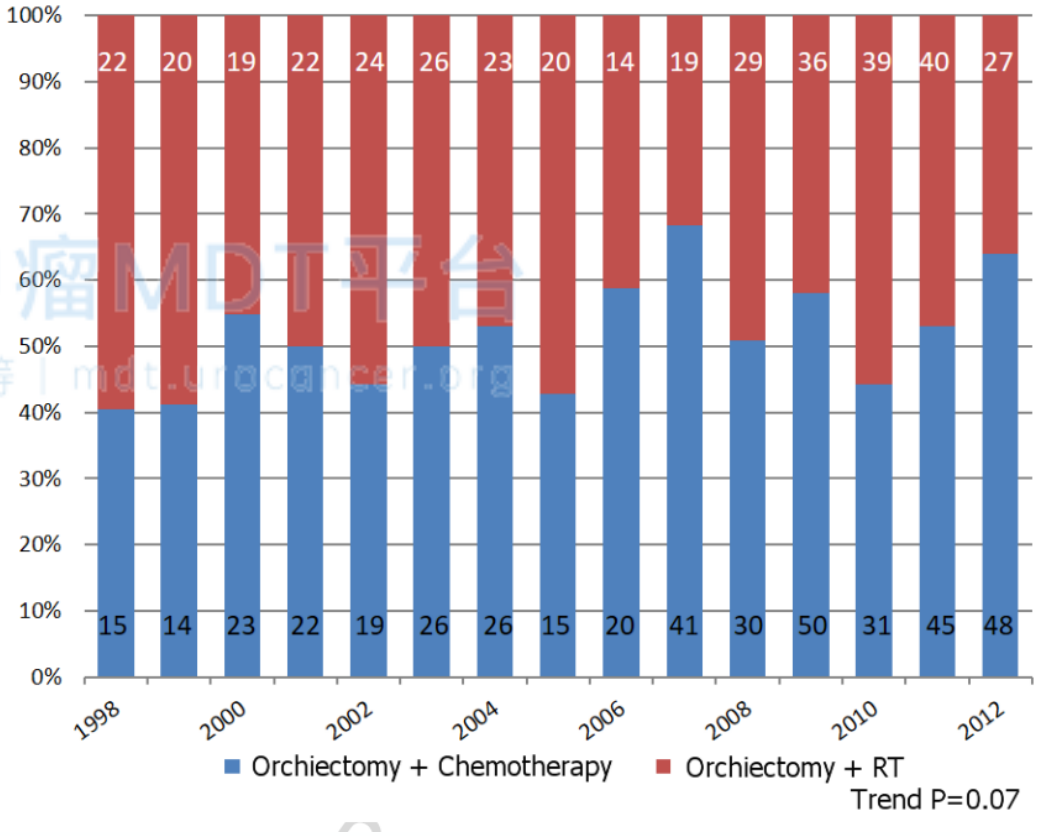
长晴大爱 健康中国

Management and Outcomes of Clinical Stage IIA/B Seminoma: Results from the National Cancer Data Base 1998-2012

NCDB 1885 stage IIA/B seminoma patients



stage II A



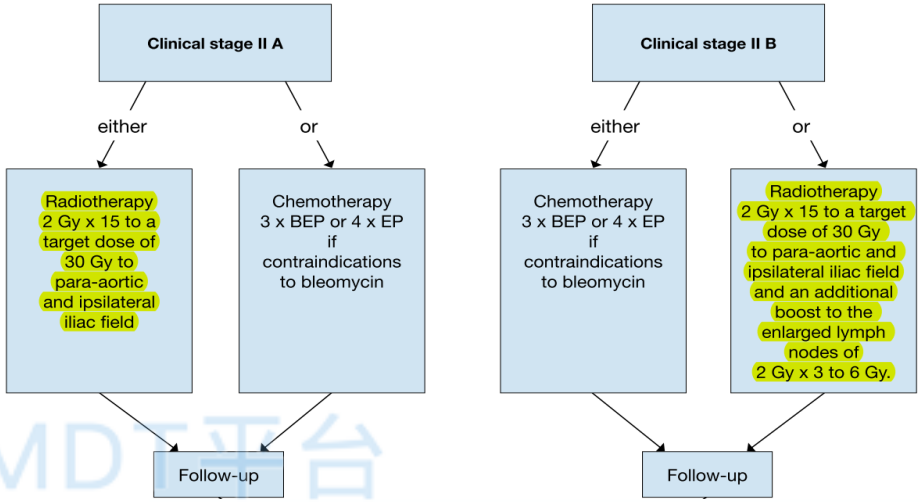
stage II B

中国泌尿肿瘤MDT会诊公益行动

Pract Radiat Oncol 2016;6:249-258

II期精原细胞瘤：推荐放疗 & 化疗

Figure 2: Treatment options in patients with seminoma clinical stage IIA and B



National Comprehensive Cancer Network®

NCCN Guidelines Version 2.2020
Testicular Cancer - Pure Seminoma

CLINICAL STAGE[w]	PRIMARY TREATMENT[o]	FOLLOW-UP
Stage IIA	RT to include para-aortic and ipsilateral iliac lymph nodes to a dose of 30 Gy[r]	See Follow-up for Seminoma, Table 3 (TEST-A 2 of 2)
	or	
	Primary chemotherapy:[z] BEP[aa] for 3 cycles or EP for 4 cycles	See Post-Chemotherapy Management and Follow-up (T
Stage IIB	Primary chemotherapy (preferred):[z] BEP[aa] for 3 cycles or EP for 4 cycles	
	or	
	RT in select non-bulky (≤3 cm) cases to include para-aortic and ipsilateral iliac lymph nodes to a dose of 36 Gy[r]	See Follow-up for Seminoma, Table 3 (TEST-A 2 of 2)

小结：

- I期精原细胞瘤，术后辅助放疗/化疗可降低复发率，副反应可接受。
- I期精原细胞瘤，基于RCT结果，化疗非劣于放疗，第二原发癌发生略低，但现代放疗技术条件下的比较，尚缺乏证据。
- IIA-IIB期精原细胞瘤，术后放疗/化疗安全有效。

中国泌尿肿瘤MDT会诊平台
前列腺癌·肾癌·膀胱癌等 | mdt.urocancer.org

长晴大爱 健康中国

中国泌尿肿瘤MDT会诊公益行动

病例汇报

北京和睦家医院 朱刚

和睦家医疗
United Family Healthcare

机器人睾丸癌化疗后腹膜后淋巴结清扫+腔静脉癌栓切取+腔静脉重建术

主刀医生：朱刚
助手：张凯 李鸿波

泌尿外科
北京和睦家医院

朱刚 主任医师、教授、博导

北京和睦家医院医疗副总监

大外科及泌尿外科主任

CACA-GU副主任委员、微创学组组长

CUA国际交流委员会副主任

中国前列腺癌、膀胱癌和良性前列腺增生指南编委

EAU-ICUD肾癌、前列腺癌指南编委

NCCN前列腺癌、肾癌、膀胱癌亚洲共识编委

睾丸癌流行病学

1. 睾丸癌欧美发病率为3-10/10^5
2. 睾丸癌占男性肿瘤的1%，泌尿系肿瘤的5%
3. 诊断时1-2%为双侧，主要病理类型为生殖细胞肿瘤（GCT，90-95%）
4. 非精元细胞瘤或混合型GCT高发年龄为30岁，纯精原细胞瘤为40岁

2014年睾丸癌发病率为男性泌尿恶性肿瘤发病第4位

Table 1 Estimated numbers of new cancer cases and incidence rates by sex in China, 2014

ICD-10	Site	All			Male		
		Cases ($\times 10^4$)	Crude incidence ($1/10^5$)	ASIRW ($1/10^5$)*	Cases ($\times 10^4$)	Crude incidence ($1/10^5$)	ASIRW ($1/10^5$)*
C61	Prostate	6.9	5.02	2.92	6.9	9.80	6.10
C62	Testis	0.3	0.23	0.20	0.3	0.45	0.39
C64–66, 68	Kidney	6.8	4.99	3.40	4.3	6.09	4.28
C67	Bladder	7.8	5.71	3.56	6.1	8.65	5.70

欧美国家睾丸癌发病率：**3-10/10万**

Chen et al. 2014 annual report of cancer in China. Chin J Cancer Res 2018;30(1):1-12
2020 EAU guidelines

中美癌症患者5年生存率比较 (2015)

中美癌症5年相对生存率比较			
癌症部位	中国	美国	
乳腺癌	73.1%	89%	
甲状腺癌	67.5%	98%	
膀胱癌	67.3%	78%	
肾癌	62.0%	72%	
子宫癌	55.1%	83%	
前列腺癌	53.8%	99%	
喉癌	51.7%	——	
睾丸癌	48.0%	95%	
结直肠癌	47.2%	65%	结直肠癌
		65%	小肠癌
宫颈癌	45.4%	68%	
所有其他癌症	44.9%	——	
鼻咽癌	43.8%	——	
口咽癌	42.2%	62%	

https://zhuanlan.zhihu.com/p/23515587

男性，35岁

1. 2017年11月外院行右睾丸高位切除术
2. 2018年5月患者因CT检查发现腹膜后淋巴结转移，进一步检查发现肺、肝、腹膜后、及腔静脉癌栓13cm
3. 北京和睦家医院会诊病理：右侧睾丸混合性生殖细胞瘤（70%胚胎癌，30%精原细胞癌），多灶性淋巴血管浸润。pT2
4. AFP4.3ug/L，HCG0.9U/L, LDH 252U/L
5. 2018年6月接受4个疗程BEP化疗
6. 2018年8月PET-CT：肝、肺转移消失，后腹膜淋巴结缩小，腔静脉瘤栓消失

残留肿瘤的切除-非精原细胞瘤

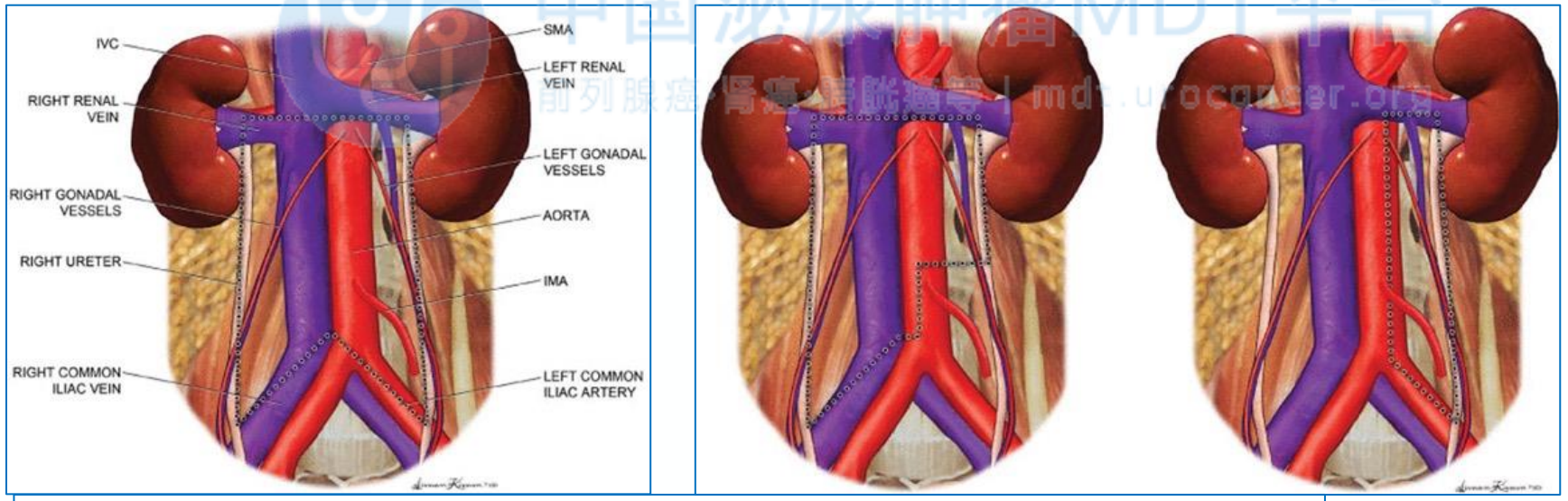
- BEP一线化疗后，6-10%的残存病灶有活的癌细胞，其中50%有成熟的畸胎瘤，40%的为坏死纤维化组织
- CT上> 1 cm 的残存病灶都需要进行残存病灶切除。对于挽救性患者，即使病灶< 1 cm，也有切除残存病灶的适应证
- 当有外科手术适应证时，应该在化疗后2-6周实施原发转移灶范围的完整切除，不应该进行只切除残存肿瘤（肿块切除术）的手术
- 应该进行双侧保留神经的手术。但越来越多的证据支持经选择的患者单侧保留神经的切除范围取得的长期结果和双侧保留神经的手术有可比性
- 同时存在腹膜后和肺残存病灶，腹膜后出现坏死纤维化通常提示肺部的病变90%出现了同样的病理变化

Perform surgical resection of residual masses after chemotherapy in NSGCT in the case of visible residual masses and when serum levels of tumour markers are normal or normalising.	Strong

EAU Guidelines on Testicular Cancer

European Association of Urology

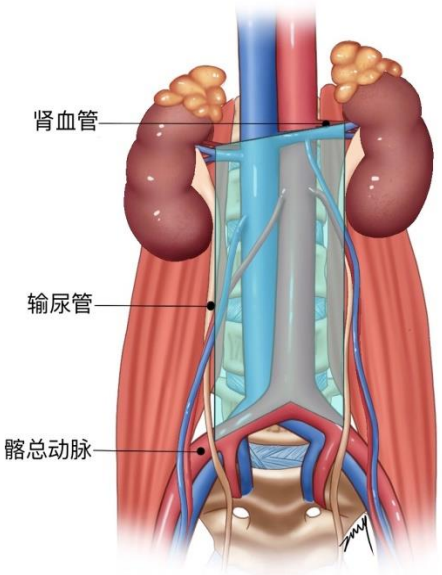
- RPLND范围包括主动脉和腔静脉周围一直延伸到头侧的肾门上和尾侧髂内区域的淋巴结
- 为了降低手术并发症并保留术后前方射精功能，发展了改良的切除范围和保留神经技术
- 应用睾丸肿瘤研究组的清扫范围进行RPLND ，超过26%的患者有清扫范围外的转移灶



Donohue JP, et al. Retro- peritoneal lymphadenectomy for clinical stage A testis cancer (1965 to 1989): modifications of technique and impact on ejaculation. J Urol 1993;149:237–43. Cho JS, et al. Modified retroperitoneal lymph node dissection for post-chemother- apy residual tumour: a long-term update. BJU Int 2017;120:104–8.

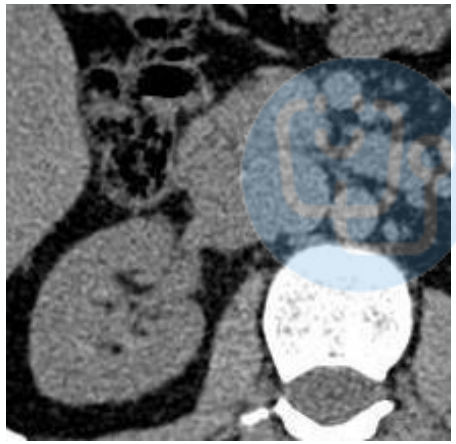
- 符合适应证的患者，应该实施完全的双侧清扫范围的RPLND
  - 右侧改良的清扫范围，避免清扫肠系膜下动脉以下的腹主动脉周围淋巴结，存在争议
  - 左侧改良的清扫范围，避免清扫腔静脉周围，腔静脉前，腔静脉后和腔静脉和主动脉间淋巴结，存在争议

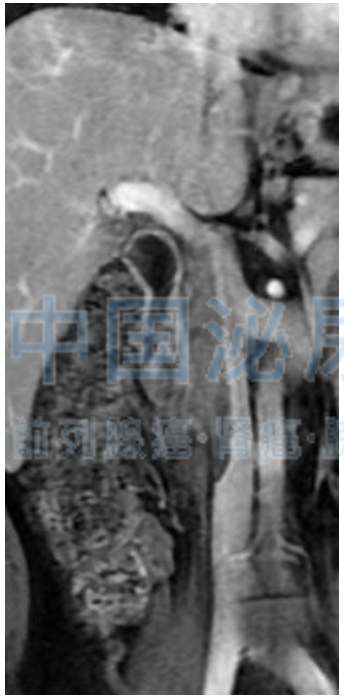
- 对有要求保留射精功能的经过选择的患者，应该提供保留神经的RPLND，但不能损害RPLND的质量
- 在清扫范围内的主动脉后，腔静脉后的淋巴结应该进行分离腰静脉的清扫
- 头侧的上限是肾动脉，尾侧的下限是输尿管跨越髂总动脉处
- 同侧的精索静脉应该切除

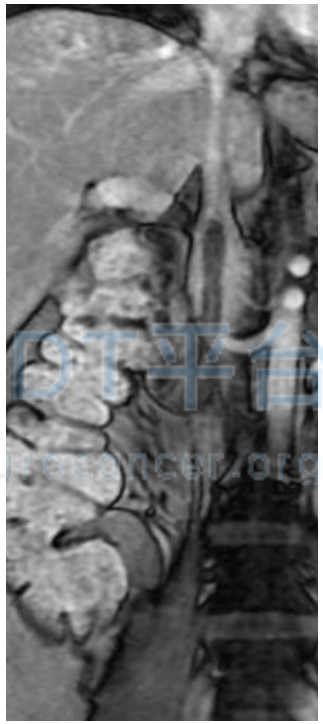


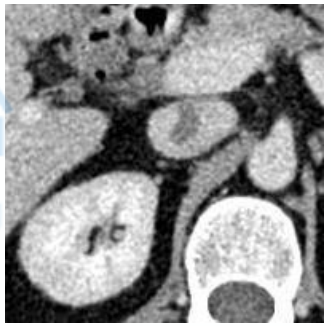
AUA GUIDELINES

Diagnosis and treatment of early stage testicular cancer. AUA Guidelines. 2019





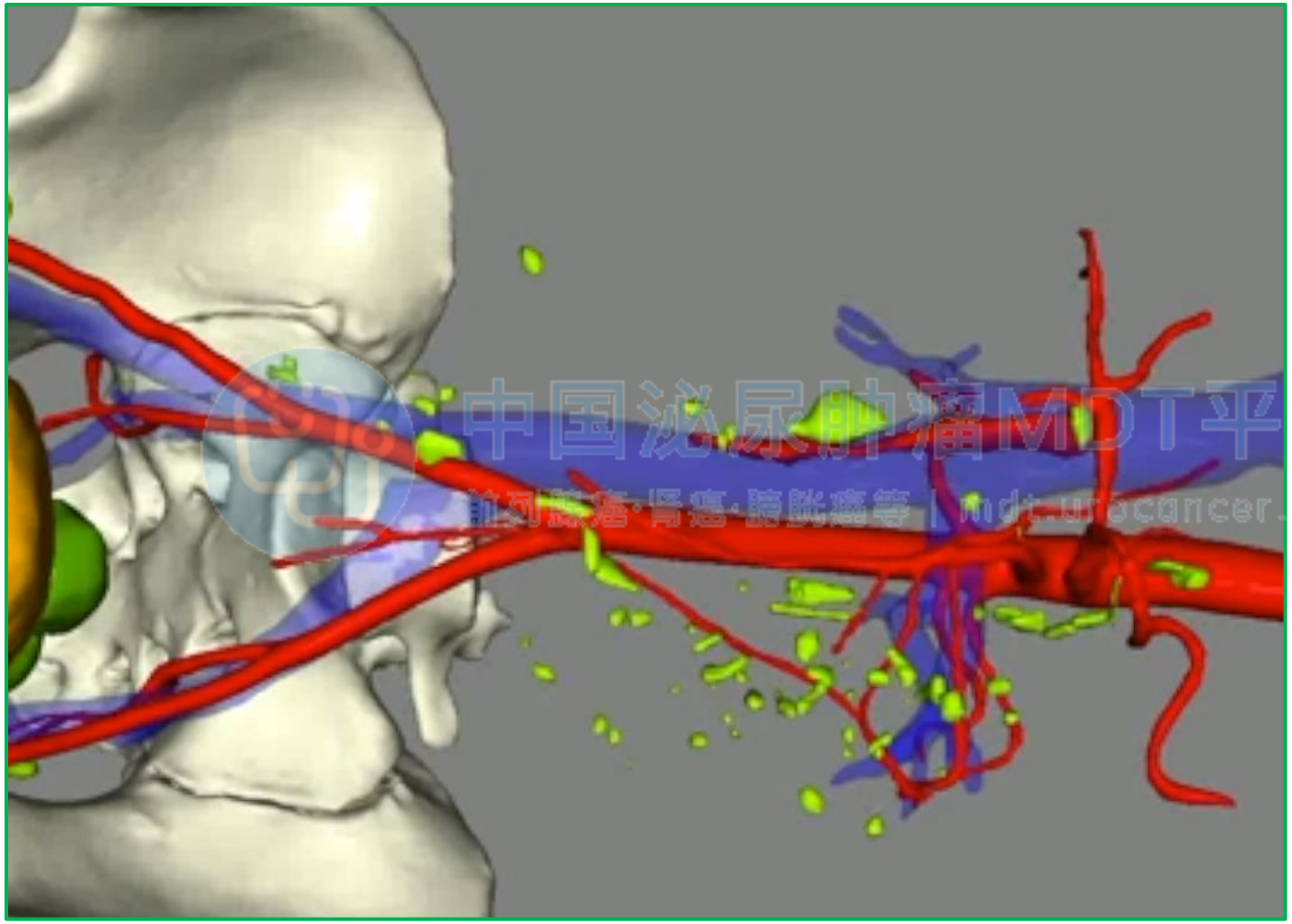




2018.05.25 CT：
腔静脉旁肿大淋巴结
化疗前

2018.07.10 MRI：
瘤栓长13cm
BEP 2个周期后

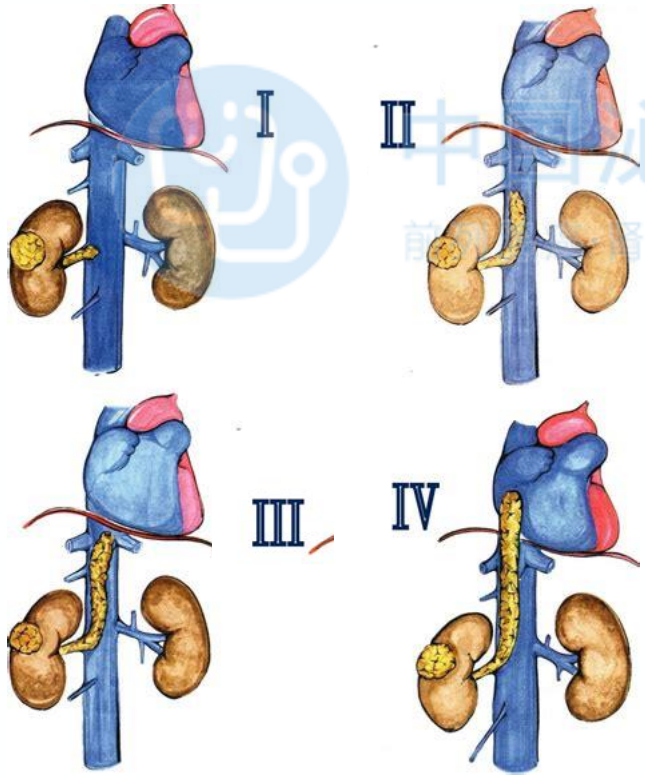
2018.09.10 MRI：
瘤栓长9.8cm
BEP 4个周期后

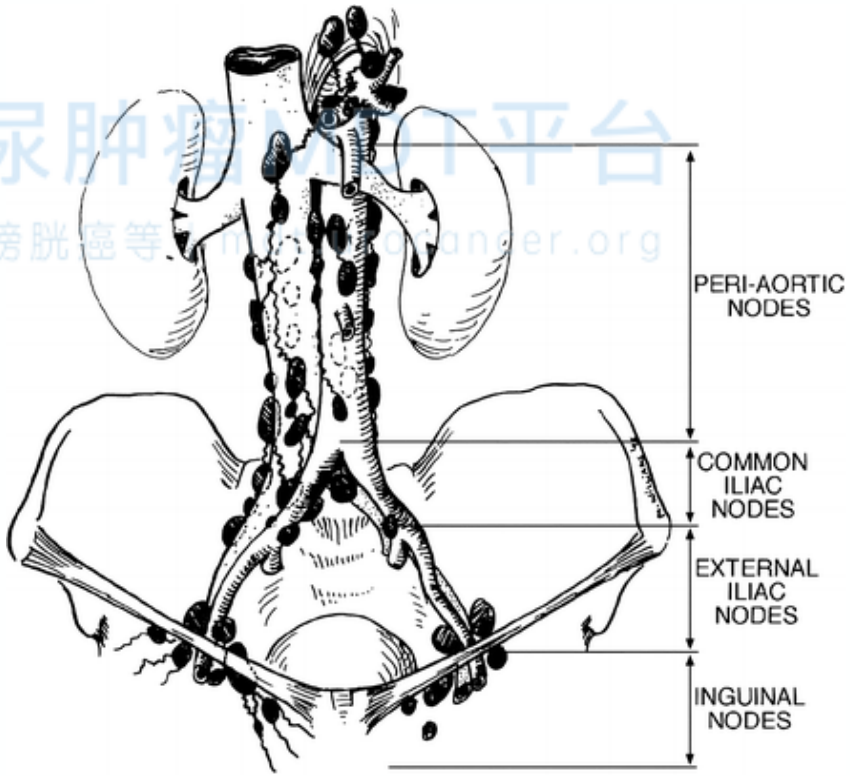


手术日期：2018.09.12

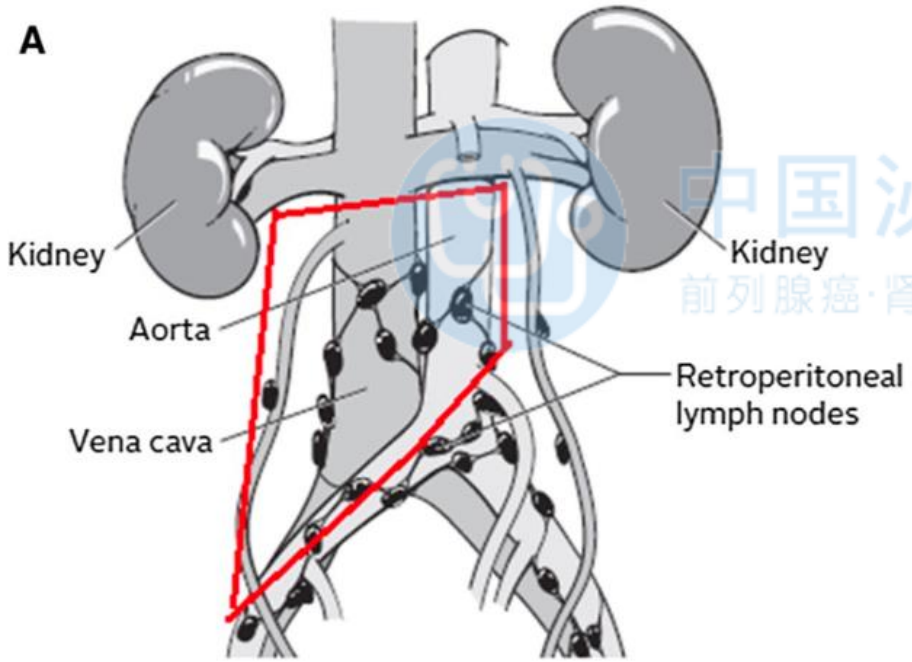
- 诊断：

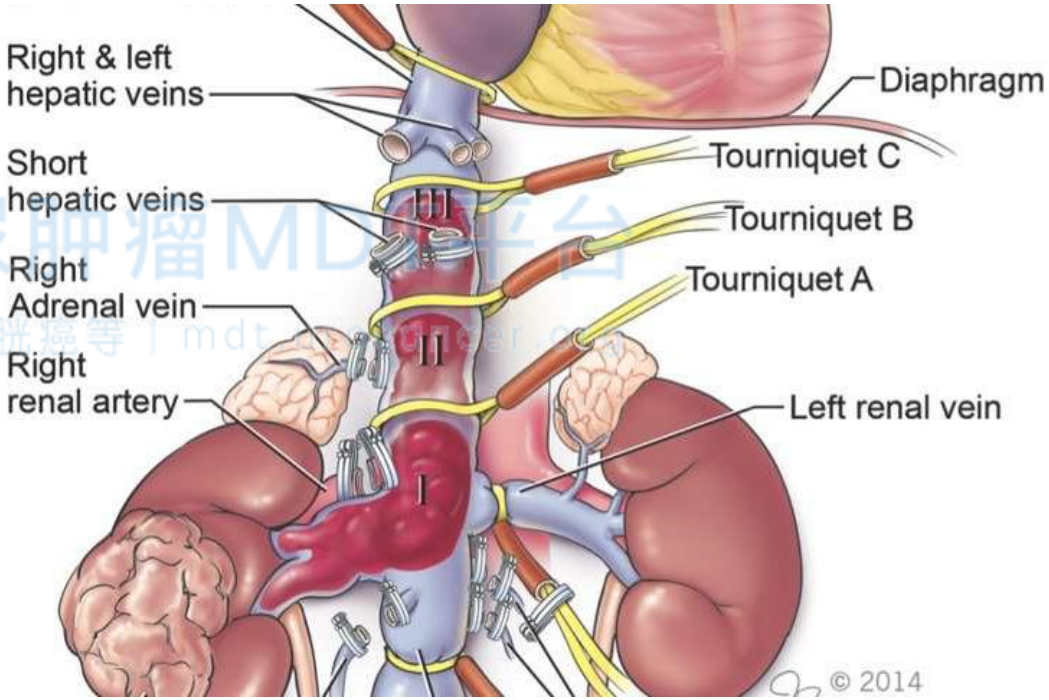
1. 右睾丸混合型生殖细胞癌，cT2N3M1b S1
2. 腹膜后淋巴结转移，腔静脉癌栓IIIa





治疗计划
机器人后腹膜淋巴结清扫+腔静脉瘤栓切取+腔静脉重建术





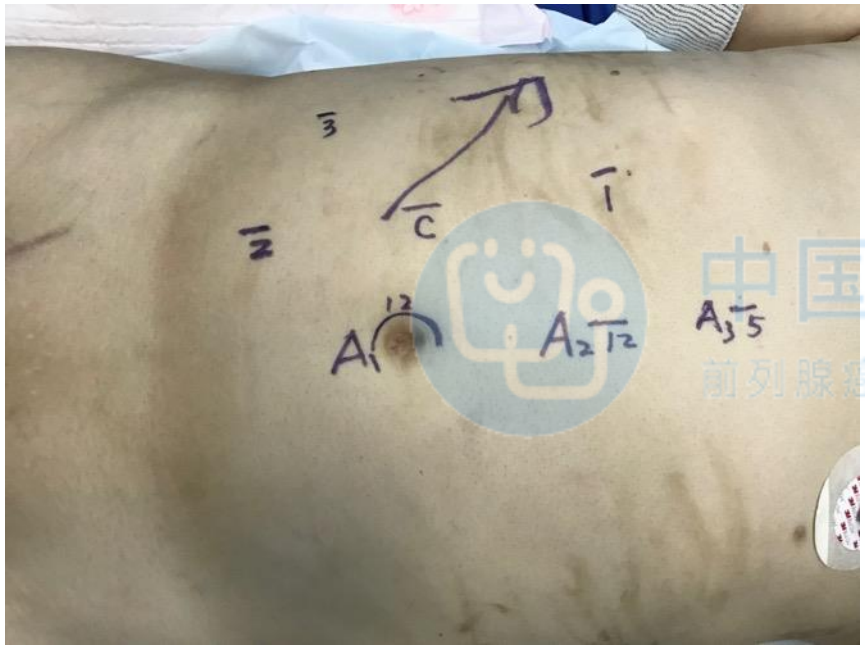
手术日期：2018.09.12

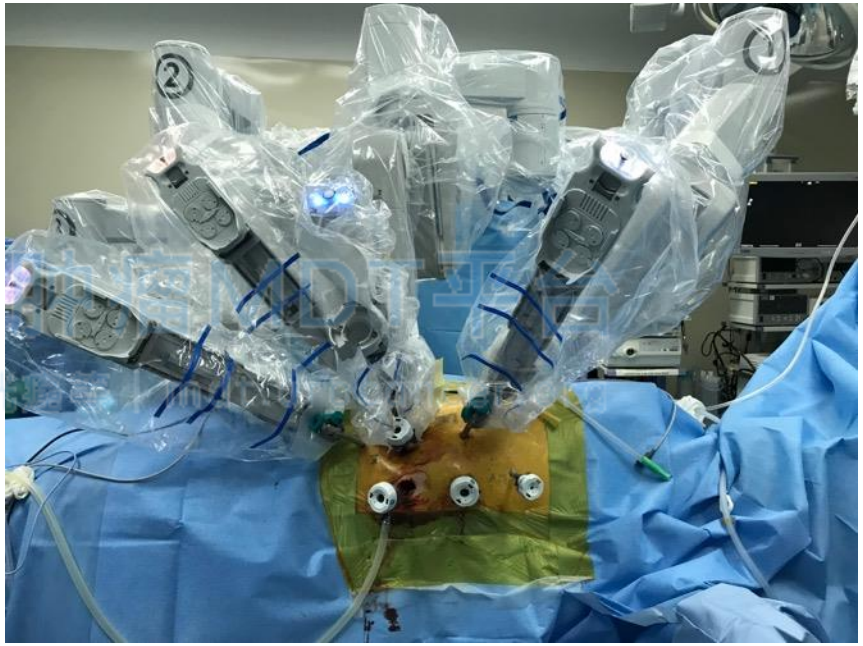
机器人后腹膜淋巴结清扫+腔静脉瘤栓切取+腔静脉重建术

- 瘤栓长度超过9.8cm，位于肠系膜下动脉到腹主干之间
- 需要切开下腔静脉超过10cm
- 大出血
- 附壁瘤栓，瘤栓脱落，肺栓塞等
- 术中麻醉医生，超声科医生，血管外科医生现场支持
- 术后ICU等团队支持

手术日期：2018.09.12

• 患者体位及腹腔镜通道位置





操作通道位置及机器人泊位

C：镜头。A1，2：12mm 助手通道。A3：牵肝通道，1，2，3：机器人手臂通道

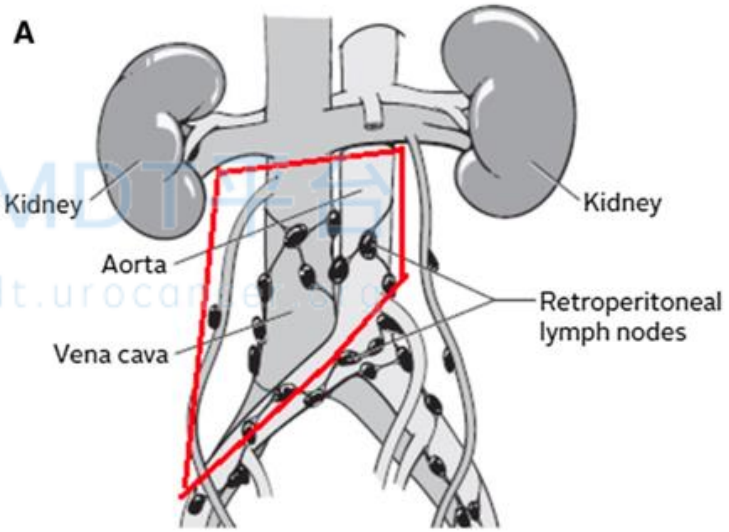
患者左侧卧位，机器人自背侧泊位

机器人后腹膜淋巴结清扫

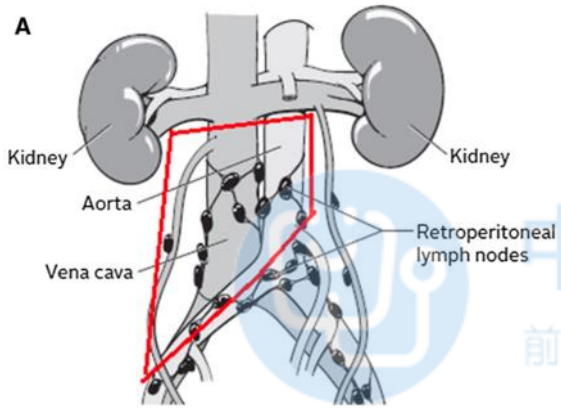
Retroperitoneal lymph node dissection:

1. For right-sided templates, remove the gonadal vein, right common iliac LNs, paracaval, precaval, retrocaval, interaortocaval, and preaortic to the level of the inferior mesenteric artery

2. The superior border of dissection was the renal hilum and the lateral border was the ureter.



机器人后腹膜淋巴结清扫



视频页面

手术日期：2018.09.12

机器人腔静脉瘤栓切取+腔静脉重建术

Main operative steps:

1. Retroperitoneal lymph node dissection
2. IVC exposure
3. Lumbar veins exposure and ligation
4. Right renal vein exposure
5. Right renal artery exposure
6. Left renal vein exposure
7. Short hepatic vein ligation
8. Adrenal gland vein exposure and ligation
9. Anesthesia is alerted that caval blood flow will be temporarily halted
10. Pt heparinized with heparin 0.5 mg/kg
11. Clamp of right renal artery and vein
12. Left renal vein control
13. Distal IVC control
14. Proximal IVC control
15. IVC occlusion
16. Cavotomy
17. Vena cavosocopy by flexible ureteroscope
18. Removal of thrombus
19. Vascular reconstruction
20. Tourniquets are released sequentially (left renal vein, right renal vein, right renal artery, suprarenal IVC, infrarenal IVC) and cava flow restored

腔静脉属支分离

视频页面

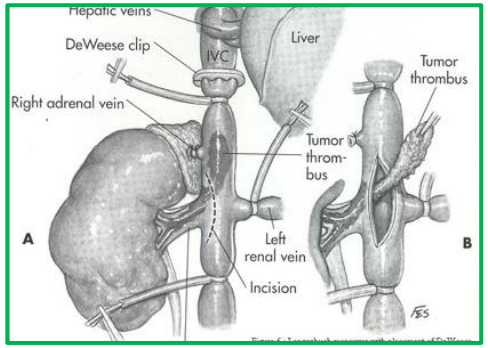
手术日期：2018.09.12

机器人超声探头确定腔静脉内瘤拴界限-new

视频页面

控制腔静脉

视频页面



腔静脉瘤拴切取术

视频页面

手术日期：2018.09.12

腔静脉重建

视频页面

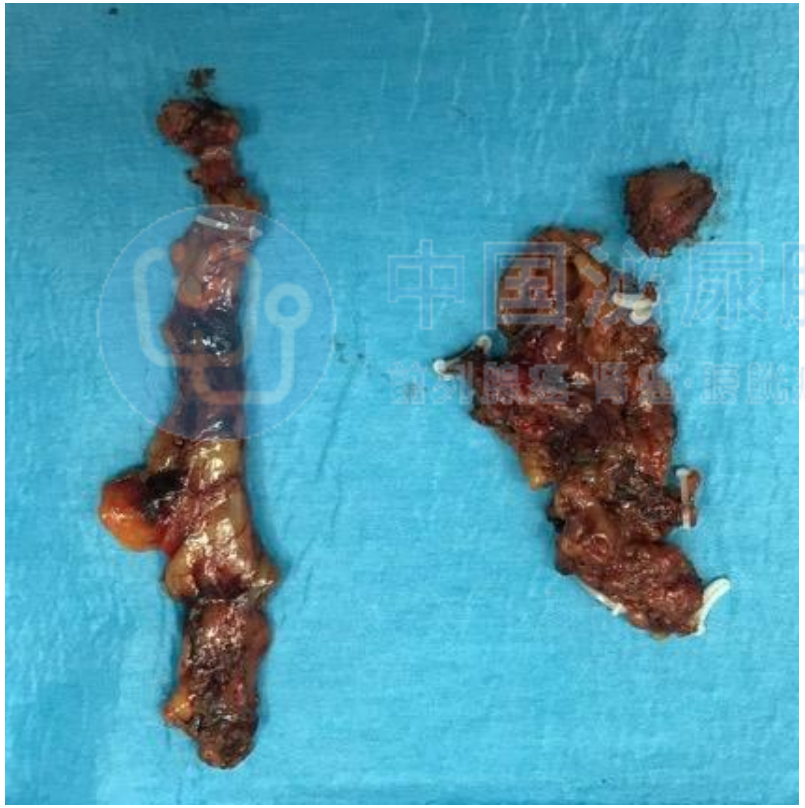
手术日期：2018.09.12

腔静脉重建后检查

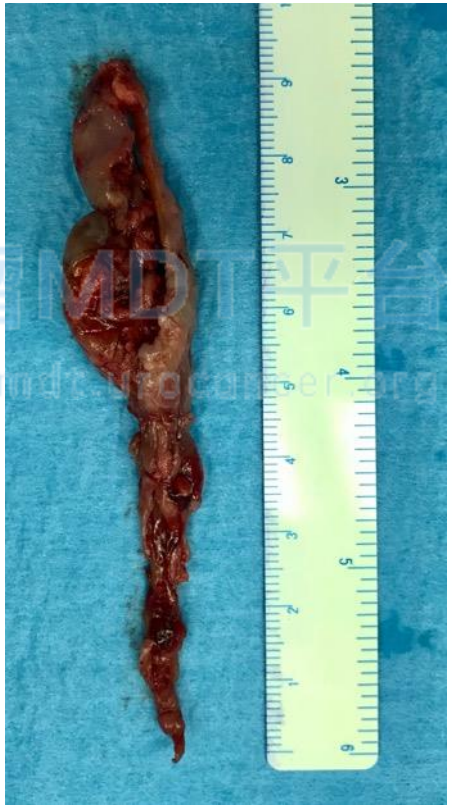
视频页面

手术日期：2018.09.12

- **机器人后腹膜淋巴结清扫+腔静脉瘤栓切取+腔静脉重建术**



腹膜后淋巴组织



下腔静脉瘤栓

手术日期：2018.09.12

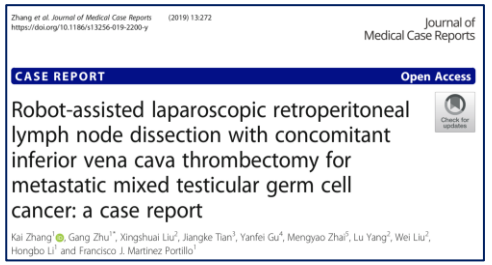
• 机器人后腹膜淋巴结清扫+腔静脉瘤栓切取+腔静脉重建术

- 手术时间：550min
- 术中出血量：2300 ml，术中输血：RBC 10单位 ， 血浆 800ml
- 围手术期并发症：无
- 住院时间： 7天
- 术后病理：
  1. 精索静脉及周围组织：未见恶性肿瘤证据。
  2. 腹膜后淋巴结切除活检：未见具有活性的癌症细胞，11枚淋巴结
  3. 腔静脉瘤栓：血管伴腔内黏附栓子，未见具有活性的癌症细胞
- 术后19个月：肿瘤标记物正常范围，MRI无腹部复发，CT肺部结节无变化，无转移。无逆行射精

手术日期：2018.09.12

• 机器人后腹膜淋巴结清扫+腔静脉瘤栓切取+腔静脉重建术

- 首例机器人睾丸癌化疗后后腹膜淋巴结清扫+腔静脉瘤栓切取+腔静脉重建术
- 创新点：
  1. 3D影像重建协助瘤栓定位
  2. 机器人术中超声定位瘤栓
  3. 软输尿管镜进行下腔静脉瘤栓状况检查-腔静脉镜
- 机器人术中超声，经食道超声，软输尿管镜，特殊缝线等
- 缝合下腔静脉时注意避免将将腔静脉内腔缩小过度
- 抗凝：术中控制腔静脉前和术后3个月


Journal of Medical Case Reports

CASE REPORT Open Access

Robot-assisted laparoscopic retroperitoneal lymph node dissection with concomitant inferior vena cava thrombectomy for metastatic mixed testicular germ cell cancer: a case report


EAU19 BARCELONA 15-19 March 2019

Abstract(s)

#AM19-1120

手术日期：2018.09.12