ISMIVS

2020
2021

ANNUAL REPORT

international Society of Minimally Invasive and Virtual Surgery (ISMIVS)

CONTENT

I.
OPENING REMARKS

1.1 From the President, Prof. David Cranston

I am delighted to write the second annual report of the International Society for Minimally Invasive and Virtual Surgery.
The world has been hit by the Covid pandemic which has restricted travel and personal attendance at conferences, nevertheless a lot has been done through the virtual and online technology.
As physicians it is very important to realise the importance of personal interaction with our patients and in the increasing world of technologies we must not forget the importance of human interaction, the power of touch and significance of personal communication care and compassion.
And it is important for those of us who are involved in innovations to prove that they harm less than the treatments they are aimed at treating and think first about the patient and second about the disease.
Sun-Tzu in his famous book "The Art of Warfare" spoke of courage, wisdom, humanity and integrity as being the traits of a true commander, and as doctors we are fighting a war against disease, and not just Covid, so these traits should be seen in us too, and as we find better and less invasive ways to treat diseases with courage, wisdom and integrity. Let us also remember our humanity and treat every patient as an important individual.

David Cranston D.Phil., FRCS.
Oxford University
President
International Society of Minimally Invasive and Virtual Surgery (ISMIVS)

1.2 From the Secretary-General, Prof. Lian Zhang

Dear Colleagues,

We are glad to see that the COVID-19 pandemic is better controlled in 2021 with the growing rate of vaccination and other countermeasures in place. We can see the light at the end of the tunnel.

This is the second annual report of ISMIVS. We hope the summery of the works we had done in 2021 and updates shared in the report will help our members and followers to better use the minimally invasive and noninvasive technologies for the benefits of the patients.

In 2021, we have organized 10 webinars and 1 international women's day (IWD) event. These webinars focused on laparoscopic technology and high intensity focused ultrasound (HIFU) technology to treat gynecological diseases and malignant tumors, improve the health of African women and preserve female fertility. The 2021 IWD event connected 128 hospitals together globally to perform focused ultrasound ablation for 128 patients on that day as a public benefit activity, continuing the advocacy of caring for women's healthcare.

ISMIVS worked jointly with International Journal of Hyperthermia and published the first HIFU special issue in august, 2021. Apart from common subjects including HIFU ablation for uterine fibroids, liver cancer, and pancreatic cancer, the 14 articles in this special issue also covered some newly expanded indications such as desmoid tumor and recurrent ovary cancer. Furthermore, a meta-analysis comparing the efficacy of HIFU, UAE and myomectomy on uterine fibroids and also Asian perspectives on HIFU were included. Experience from UK, Germany, Spain, China was shared in these articles.

Unfortunately, we have to postpone the biannual meeting of ISMIVS-Yangtze International Summit of Minimally Invasive and Noninvasive Medicine together with the board meeting for another year as we consider face to face gathering is essential and we expect it will happen in 2023 in Chongqing, China. However, our academic discussions will be continued via online webinars, so please follow us to get updated on our latest webinars.

We are happy to announce that we have decided not to postpone our Training Workshop on HIFU for another year. Instead, we will change the training site from Pleven, Bulgaria to Melaka, Malaysia and it will take place in November, 2022. For doctors interested in this workshop, please contact our secretariat.

As a Chinese saying goes, "Knowledge is infinite and there is no end for learning" . Despite various challenges ahead, ISMIVS will steer to the ideology of ISMIVS and continue share the most-up=to-date new knowledge with our peers and colleagues.

Best Regards !
Prof. Lian Zhang
Secretariat General
ISMIVS

1.3 From the Vice-President of Société de Chirurgie Gynécologique et Pelvienne (SCGP), Philippe Descamps

HIFU, the future of surgery is today!
The spectacular development of Ultrasound guided HIFU (USgHIFU) over the last 15 years is linked to its effectiveness, its low complications rate and the numerous advantages for patients: rapidity of the procedure, absence of scars, no haemorrhages, no adhesions, no general anesthesia but simple sedation, and ambulatory surgery for all patients with rapid return to work.
USgHIFU is a completely non-invasive, out-patient procedure for conservative treatment of solid tumors.
In gynecology, the preferred indications are fibroids, adenomyosis and parietal endometriosis, but this technology has been successfully used

to treat placenta accreta, fibroadenoma of the breast, breast cancer and isthmic pregnancies.
There are many data showing very interesting results in infertility patients.
The safety of this procedure has been evaluated and, as an example, the complication rate in case of laparotomy or laparoscopic myomectomies is 50 times higher.
Patients undergoing USgHIFU treatment of uterine fibroids can achieve full-term pregnancies with few intrapartum or post-partum complications, with no uterine rupture or placenta accreta as published in the literature.
Due to its non-invasive approach, USgHIFU is becoming the first therapeutic option in women with uterine fibroids type 3-5, especially when they wish a pregnancy, with obvious advantages compared with myomectomy or uterine artery embolization.
I am happy to announce that reimbursement has recently been accepted in France, which will allow many patients to be treated with this technology. I am also happy to have such solid cooperation with ISMIVS, a society that promote this noble technology.
In conclusion, as a laparoscopic surgeon, I strongly believe that USgHIFU and laparoscopy are complementary.
Covid experience has shown us that the absence of general anesthesia and strict ambulatory hospitalization has many advantages for the patients.

Prof. Philippe Descamps,
Vice-President of SCGP
Council Member of FIGO

1.4 From the Vice President, Prof. Bin Lin

Dear colleagues,
Clinical medicine is like a long river that flows slowly along with the progress of human civilization.
Surgery is a method of treating disease, but it is the last resort for the doctors, since the best way to treat a disease is not by means that harm the patient.
When the attacking enemy has reached the city gates, Chinese wisdom advocates that "the supreme art of war is to subdue the enemy without fighting", a philosophy that can also be applied in surgery. In clinical practice, the emphasis on "Treatment – minimize harm to patients" is a compassionate humanistic concern.
Minimally invasive and noninvasive medicine is a philosophy and a realm that we pursue, and it is gratifying that more and more doctors have joined us and put it into clinical practice for the benefit of patients. Undoubtedly, the development of minimally invasive and

noninvasive medicine has accorded with the will of the people and represented an inexorable trend.

In 2014, the Minimally Invasive and Noninvasive Medicine Committee (hereinafter referred to as "the Committee") of Chinese Medical Doctor Association (CMDA) was officially established, which is a milestone in the development of minimally invasive and noninvasive medicine in China. It marks that Chinese doctors working in this field finally have their own organization. I was honored to be the first Director of the Committee and deeply remembered the mandate of Prof. Yanling Zhang, then the President of CMDA: "Minimally invasive and noninvasive medicine is a major discipline featured with interdisciplinarity, multidisciplinarity and transdisciplinarity; it is a general trend of historic significance and a pioneer in medical development."

At present, the Committee has developed into a big family with 1 youth group and 26 academic groups, gathering about 1500 physicians in gynecology, urology, general surgery (breast, colorectal, hepatobiliary, pancreatic, etc.), oncology, intervention, imaging, pathology and other medical specialties.

The Committee has successfully held six annual meetings, among which the 2015, 2017 and 2019 annual meetings were jointly held with the Yangtze International Summit of Minimally-invasive and Noninvasive Medicine, focusing on medical technology innovation, medical talent training and international connectivity of cutting-edge technology. Nearly 100 experts from home and abroad were invited to give lectures and medical discussions, building a global hub of minimally invasive and noninvasive medicine for academic exchanges.

In January 2022, China-Japan Friendship Hospital and the National Telemedicine and Connected Healthcare Center established the "Integrated Healthcare Association of Minimally-invasive and Noninvasive Therapy of China-Japan Friendship Hospital" (hereinafter referred to as "the Integrated Healthcare Association") and the "Expert Committee of Minimally-invasive and Noninvasive Therapy of the National Telemedicine and Connected Healthcare Center" in Beijing, aiming to integrate domestic medical resources, and use the Telemedicine to carry out outpatient clinic, doctor consultation, intraoperative consultation, two-way referral, medical teaching

and other tasks in an easy and orderly way for the members of the Integrated Healthcare Association, so as to promote the sinking of medical technology, enhance the capacity building of primary medical institutions and improve the implementation of the Healthy China 2030.

In the spirit of "lifelong learning, service delivering, truth seeking and dedication to life" of the CMDA and guided by the philosophy of minimally invasive and noninvasive medicine, the committee will unite global experts to serve the health of all human beings as the goal in order to promote the development of minimally invasive and noninvasive medicine and build a home for all the doctors in this field!

Prof. Bin Lin
Director of the Minimally Invasive and Noninvasive Medicine Committee of Chinese Medical Doctor Association (CMDA)
Vice President of ISMIVS

II.
THE PURPOSE OF ISMI*V*S

The goal of the International Society of Minimally Invasive and Virtual Surgery (ISMIVS, previously known as International Society of Minimally Invasive and Noninvasive Medicine) is to promote and develop the highest standards of clinical practice in the field of minimally-invasive and noninvasive therapeutic medicine through education and research, under the guidance of the ideology of minimally-invasive and noninvasive medicine, i.e. "Diseases that harm require therapies that harm less."

ISMIVS seeks to provide physicians and allied health scientists and technologists with scientific and educational programs and materials of the highest quality, and to constantly improve the content and value of these scientific and educational activities. ISMIVS seeks to promote research in all aspects of minimally invasive and noninvasive medicine and related sciences, including clinical research in the promotion of quality and personalized healthcare.

ISMIVS seeks to foster closer fellowship among all members in the different branches of minimally-invasive and noninvasive medicine and greater cooperation among all members and allied healthcare professionals.

ISMIVS seeks to promote the concept of heath defined by the World Health Organization: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity"

III.
ISMIVS: *ANNUAL REVIEW* 2021

Our work in 2021, in numbers:

1 non-profit events;

10 online academic symposiums, with nearly **8000** participants;

325 active members;

Publication of the 1st Annual Report (2020), covering more than **4,500** colleagues;

Joint publication of HIFU Special Issue with International Journal of Hyperthermia, with **14** SCI articles discussing **5** HIFU indications;

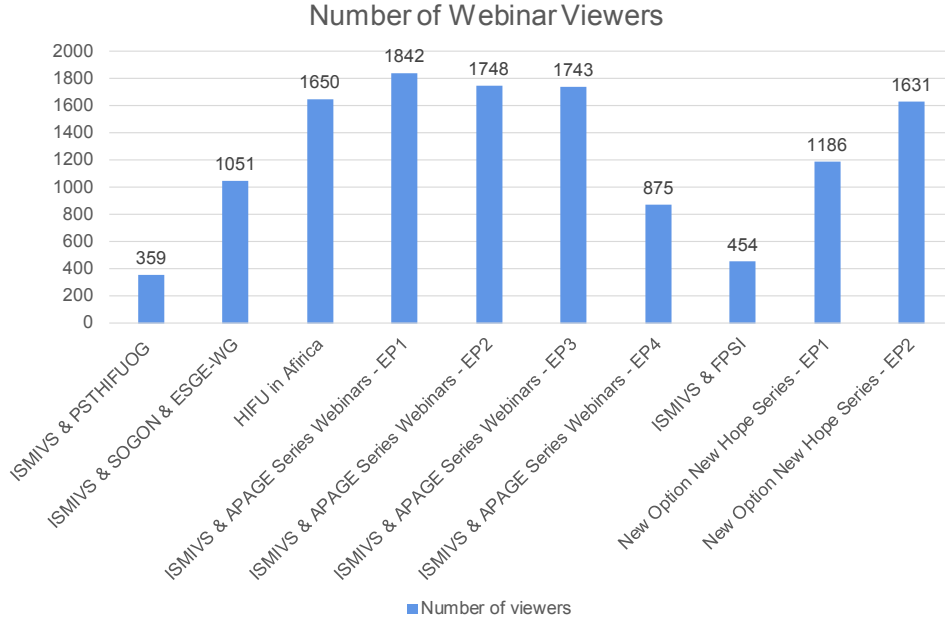
6 bimonthly newsletters with a readership of more than **25000** professionals;

Over **7000** visitors on ISMIVS.com;

63 posts on LinkedIn and Facebook, hitting **32605** reads;

22 academic videos released on Youtube

Number of Webinar Viewers				
Webinar	Live Broadcast		Playback	Total
	Zoom	Da Yi Wei Ke*	Youtube	
ISMIVS-PSTHIFUOG Webinar: High Intensity Focused Ultrasound Application in Obstetrics and Gynecology	280	/	79	359
ISMIVS & SOGON & ESGE-WG: Non-surgical Treatments of Uterine Disorders	907	59	85	1051
How can HIFU help to transform women's healthcare in Africa	64	1230	356	1650
Episode 1: APAGE-ISMIVS HIFU Series Webinars 2021	173	1458	211	1842
Episode 2: APAGE-ISMIVS HIFU Series Webinars 2021	134	1458	156	1748
Episode 3: APAGE-ISMIVS HIFU Series Webinars 2021	112	1458	173	1743
Episode 4: APAGE-ISMIVS HIFU Series Webinars 2021	109	658	108	875
ISMIVS-FPSI: Recent Advances in the Management of Uterine Fibroids and Adenomyosis	25	360	69	454
Episode 1: HIFU treatment for liver and pancreatic cancer – new option, new hope	65	1000	121	1186
Episode 2: HIFU treatment for liver and pancreatic cancer – new option, new hope	92	1528	110	1631


Number of Webinar Viewers
2000
1800
1600
1400
1200
1000
800
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400
200
0
359
1051
1650
1842
1748
1743
875
454
1186
1631
ISMIVS & PSTHIFUOG
ISMIVS & SOGON & ESGE-WG
HIFU in Africa
ISMIVS & APAGE Series Webinars - EP1
ISMIVS & APAGE Series Webinars - EP2
ISMIVS & APAGE Series Webinars - EP3
ISMIVS & APAGE Series Webinars - EP4
ISMIVS & FPSI
New Option New Hope Series - EP1
New Option New Hope Series - EP2
Number of viewers

3.1 One non-profit event

3.1.1 International Women’ s Day – HIFU Event 2021 (IWD HIFU 2021)

To continue the philanthropic event of IWD-HIFU 2020 and the care for women's health, ISMIVS and NERCUM organized IWD-HIFU 2021, the World's Second Multicenter Telemedicine Womb-Preserving Campaign, which was held on March 2, 2021 and themed on Focusing on Women's Health and Inspiring the World with Compassion. 128 HIFU Centers participated and provided noninvasive uterus-sparing HIFU treatment for more than 120 patients with uterine fibroids and/or adenomyosis. It was broadcast live by NERCUM and witnessed by news media.

Meanwhile, a 30-minute Summit Meeting on Noninvasive Uterus-Sparing Treatment convened, inviting six world leading experts to talk about the impacts of the COVID-19 on global women's health and the countermeasures we've taken, the special features of HIFU procedures and their perspective on the future of minimally-invasiveand noninvasive medicine and therapies for women's health.

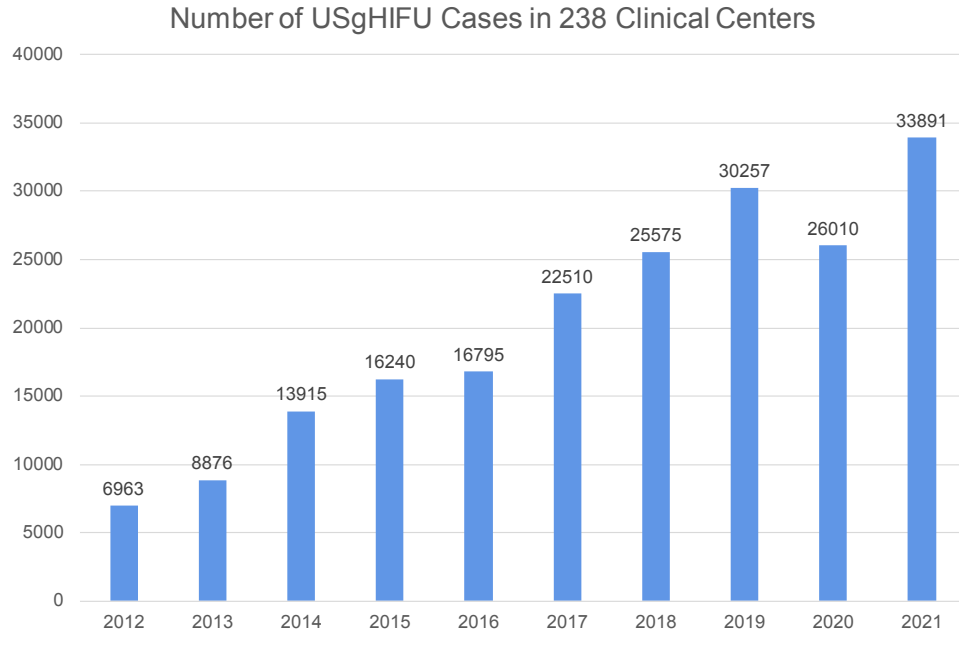
Prof Gian Carlo Di Renzo, Past Secretary-General of FIGO, said that "although over 120 million people have been infected in the world, if we look maternal fetal medicine, this is an area which has not been touched so much, young age and hormone may be the reasons. Very few pregnant women died due to COVID-19 but most of the death are caused by lack of appropriate care. The transmission of the virus is very unlikely to the fetus." And then he shared his treatment experience.

Professor Philippe Descamps, FIGO Executive Board Member, shared the impact of the pandemic on obstetric and gynecological surgery. The pandemic has posed a challenge to surgery, but fortunately, academic societies have provided guidelines on the arrangement of priority surgeries when facing emergency surgery and cancer patients. Besides, in order to prevent surgeons from the cross-infection, a series of measures, surgical habits and the selection of surgical modalities have been established against the backdrop of the pandemic and these measures may be continued for the post-pandemic era.

Prof. David Cranston, President of International Society of Minimally Invasive and Virtual Surgery (ISMIVS), said that the HIFU treatment number in 2020 was extremely impressive, for emergency and selective

surgeries were slashed in many European countries with longer waiting periods due to the pandemic. The HIFU treatment number in 2020 highlighted the advantages of HIFU therapies, that is, contact-free (very safe), no cutting-open (noninvasive), no bleeding, no need of anaesthesia, only sedation and analgesia required, which would reduce the risk of transmission and infection of COVID-19. He believed that more and more people would see the advantages of noninvasive HIFU therapy as being repeatable and fertility-preserving.

Prof. Zhibiao Wang, Director of National Engineering Research Center of Ultrasound Medicine (NERCUM) of China, said that the HIFU treatment number over the past 21 years showed that the HIFU ablation technology and its commercialization were developing well and rapidly, especially for the treatment of benign uterine diseases. HIFU procedures were less affected by the pandemic with only a small decline in the HIFU cases in 2020 compared to 2019, which highlighted the advantages of HIFU treatment. However, the number of HIFU treatments stood no comparison with that of conventional treatments. He hoped to strengthen cooperation with global institutions in the future and work together to benefit more women with this non-invasive technology so as to avoid surgical injury and even the removal of their uterus.



Prof. Rudy Leon De Wilde, Past President & Director of the European Society of Gynecological Endoscopy (ESGE), reviewed the surgical development from major open surgery to minimally invasive endoscopic surgery. He said that endoscopic surgery still caused surgical injury although it was minimally-invasive and significantly reduced the surgical injury. In his opinion, the increasing maturity of HIFU treatment in gynecology signified the possibility and potential of noninvasive treatment for gynecological diseases. And therefore, ESGE has established a Working Group on "Non-surgical ablative therapy of benign uterine disease" to promote the noninvasive technology.

Prof. Jinghe Lang, President of Chinese Obstetricians and Gynecologists Association (COGA), China, gave a presentation on the development of minimally invasive and noninvasive medicine and humanities from the perspective of the management of uterine fibroids. He believed that medicine was a people-oriented discipline and that patients' organs and functions should be protected to the greatest extent. Uterine fibroids are the tumors that best embody the "four criteria" of treatment: standardization, individualization, minimal invasion and humanization. Although the management of uterine fibroids are being constantly optimized, the annual number of hysterectomies is still shocking. Prof. Lang called on doctors not to stick to one treatment modality, to think more, consider more alternative treatments and provide the best care for patients with womb-preserving modalities that best fit them. He hoped to see more extensive dissemination of noninvasive technologies featured by HIFU in the future.

The Women Care Move of SUPER-MOM Philanthropic Program of China Women's Development Foundation (CWDF) also initiated a non-profit activity at IWD-HIFU 2021, launching Sister Card to 100,000 women in China in 2021, to facilitate the assistance to prevention and treatment of major health-threatening cancers in the chest and the uterus, as well as diagnosis and treatment of major quality-of-life-influencing benign uterine diseases, such as fibroids and adenomyosis.

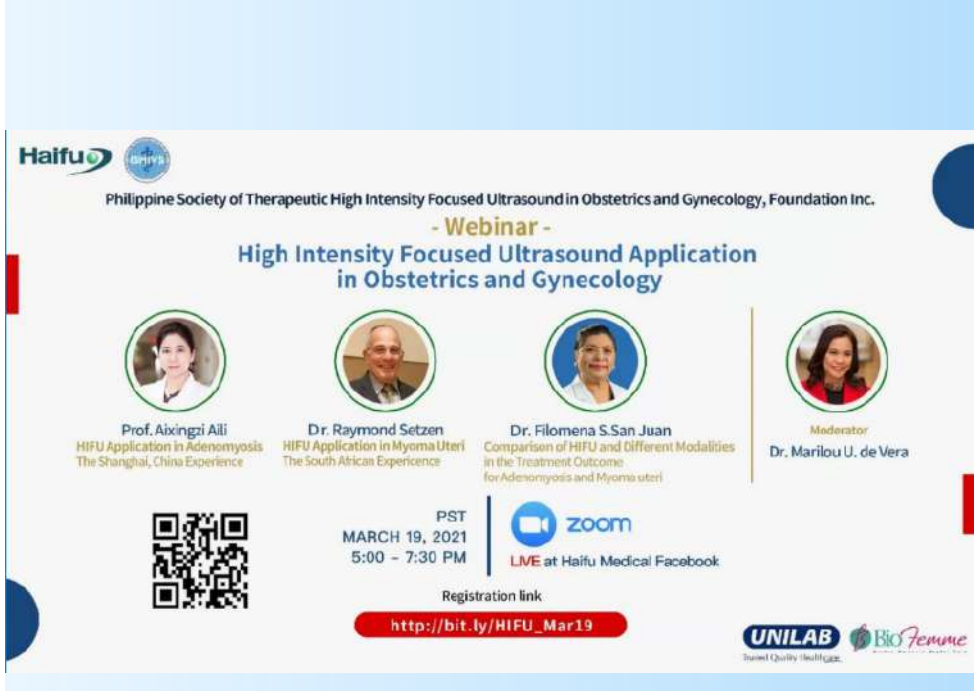
3.2 Online Academic Conferences

ISMIVS together with other 4 Societies hosted 10 online conferences. If you are interested, please watch the playback or refer to Appendix 1 for the summaries of the lectures.

3.2.1 ISMIVS-PSTHIFUOG Webinar: High Intensity Focused Ultrasound Application in Obstetrics and Gynecology

A virtual conference on high intensity focused ultrasound ablation of uterine fibroids and adenomyosis was delivered jointly by ISMIVS and Philippine Society of Therapeutic High Intensity Focused Ultrasound in Obstetrics and Gynecology (PSTHIFUOG) on March 19, 2021. 4 obstetrician gynecologists were the guest speaker of this webinar.

Watch the playback: https://www.youtube.com/watch?v=8kC2yTRpgqM



3.2.2 ISMIVS & SOGON & ESGE-WG: Non-surgical Treatments of Uterine Disorders

Together with the Society of Gynaecology and Obstetrics of Nigeria (SOGON) and European Society for Gynaecological Endoscopy – Uterine Fibroids WG (ESGE-WG), ISMIVS held a webinar on April 24, 2021.

Watch the playback: https://youtu.be/pfLyuMD0DUw

3.2.3 How can HIFU help to transform women’ s healthcare in Africa

On May 28, 2021, ISMIVS initiated an online symposium on HIFU in the treatment of gynecological diseases, bringing together experts from South Africa, Egypt, Nigeria, Ethiopia and Zambia to share the latest insights on HIFU.

Watch the playback: https://youtu.be/mM90BcwOy6w

3.2.4 APAGE-ISMIVS HIFU Series Webinars 2021: HIFU and Fertility, Potential or Not?

To foster academic exchanges in the field of minimally invasive and noninvasive surgeries and facilitate scientific and educational dialogues across continents, the Asia-Pacific Association for Gynecologic Endoscopy and Minimally Invasive Therapy (APAGE) and the International Society of Minimally Invasive and Virtual Surgery (ISMIVS) have been co-organizing APAGE - ISMIVS HIFU (AIH) Webinar Series 2021, which is themed on "HIFU and Fertility, Potential or Not?" and consists of 4 episodes starting from July and ended in December, 2021.

Episode 1

Watch the playback: https://youtu.be/WBvTWN_4qBk

Episode 2

Watch the playback:https://youtu.be/VoKcw9kzpHU

Episode 3

Watch the playback: https://youtu.be/gc3IKpWqZNI

Episode 4

Watch the playback: https://youtu.be/2fC5KlyQAvU

3.2.5 ISMIVS-FPSI: Recent Advances in the Management of Uterine Fibroids and Adenomyosis

Co-hosted with Fertility Preservation Society of India, ISMIVS hosted a webinar on November 14, 2021, with 5 international specialists discussing the progress in the management of uterine fibroids and adenomyosis.

Watch the playback: https://youtu.be/jqCShG4Dsjw

3.2.6 HIFU treatment for liver and pancreatic cancer – new option, new hope

Treatment options for liver and pancreatic cancer have always been a vital part of cancer research and clinical management of cancer. For now, patients with unresectable liver or pancreatic tumors are usually administered with local treatment. As high intensity focused ultrasound (HIFU) offers unique advantages of noninvasiveness, repeatability and availability of combined therapy, it has emerged as a new option for the treatment of liver and pancreatic tumors. Therefore, International Society of Minimally Invasive and Virtual Surgery (ISMIVS) launched "New Option, New Hope" webinars to discuss the safety and efficacy of HIFU for liver and pancreatic cancer with global experts, as well as deepen the understanding of its clinical value and application prospect.

Episode 1

Watch the playback: https://youtu.be/CkOABaKAVVo

Episode 2

Watch the playback: https://youtu.be/Pc7OqcM2vgk

3.3 HIFU Special Issue

We are delighted to announce that International Journal of Hyperthermia, the HIFU Special Issue (i.e. Volume 38, 2021), which was partially supported by ISMIVS, was officially released in September 2021. The Special Issue includes 15 peer-reviewed articles which collectively provide the scientific evidence of the status and prospects of the clinical applications of high intensity focused ultrasound for the management of benign and malignant tumors.

Introduction to a special issue of the International Journal of Hyperthermia: "the status and prospects of the clinical applications of high intensity focused ultrasound" (Extract)

Wendy Zhang & Lian Zhang

We are fortunate to live in a period of accelerated technological advancement and to be able to enjoy the benefits this brings. At the same time, we are fortunate to be directly involved in this technology revolution and to be able to use our work to bring changes to the world we live in.

High intensity focused ultrasound (HIFU) is a revolutionary piece of technology. The principle of HIFU treatment involves using ultrasound's ability to penetrate human skin and organs without harming these structures in the process. The ultrasound beams are generated outside of the human body and can be converted from mechanical energy to thermal energy, ultimately targeting a specific part of a tumor inside the human body, achieving noninvasive treatment.

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Because of the limited amount of articles, there are many other indications that could not be included in this issue. However we hope that with this special issue, we can give readers an insight into the unique clinical applications of HIFU. HIFU is an emerging technology that can continue to benefit patients as technology continues to improve. As can be seen, people engaged in the research and development and application of HIFU technology have already changed the world through hard work. We think we should be proud of the work being done in this emerging field.

Lastly, we would like thank the International Society of Minimally Invasive and Virtual Surgery (ISMIVS) for partially supporting this Special Issue. ISMIVS was founded in 2013 and envisions accelerating progress in minimally invasive and noninvasive medicine. With the help of the ISMIVS, we were able to include more articles in this special issue and show the readers more clinical applications of this technique. We hope to continue cooperating with ISMIVS in the future to promote the development of minimally invasive and noninvasive medicine through research, education, and international collaboration.

Articles:

1.The Asian perspective on HIFU
Keen Whye Lee
https://www.tandfonline.com/doi/full/10.1080/02656736.2021.1889697

2.Pregnancy outcomes after ultrasound-guided high-intensity focused ultrasound (USgHIFU) for conservative treatment of uterine fibroids: experience of a single institution
J. Rodríguez, J. Isern, N. Pons, A. Carmona, E. Vallejo, J. Cassadó, J. A. De Marcos, M. Paraira, N. Giménez & A. Pessarrodona
https://www.tandfonline.com/doi/full/10.1080/02656736.2021.1908633

3.Preliminary study on ultrasound-guided high-intensity focused ultrasound ablation for treatment of broad ligament uterine fibroids
Yiran Wang, Yonghua Xu, Felix Wong, Yi Wang, Yu Cheng & Lixia Yang
https://www.tandfonline.com/doi/full/10.1080/02656736.2021.1921287

4.Efficacy of ultrasound-guided high-intensity focused ultrasound (USgHIFU) for uterine fibroids: an observational single-center study
Milka Marinova, Shiwa Ghaei, Florian Recker, Tolga Tonguc, Olga Kaverina, Oleksandr Savchenko, Dmitrij Kravchenko, Marcus Thudium, Claus C. Pieper, Eva K. Egger, Alexander Mustea, Ulrike Attenberger, Rupert Conrad, Dariusch R. Hadizadeh & Holger Strunk
https://www.tandfonline.com/doi/full/10.1080/02656736.2021.1939444

5.MRI features and clinical outcomes of unexpected uterine sarcomas in patients who underwent high-intensity focused ultrasound ablation for presumed uterine fibroids
Qian Wang, Xiuying Wu, Xiaogang Zhu, Jian Wang, Feng Xu, Zhenjiang Lin, Chunmei Gong, Min He & Lian Zhang
https://www.tandfonline.com/doi/full/10.1080/02656736.2021.1921288

6.Efficacy and safety of magnetic resonance-guided focused ultrasound treatment for refractory chronic pain of medial knee osteoarthritis
Motohiro Kawasaki, Shudai Muramatsu, Hirofumi Namba, Masashi Izumi, Masahiko Ikeuchi, Shin Yaogawa, Kazuo Morio & Takahiro Ushida
https://www.tandfonline.com/doi/full/10.1080/02656736.2021.1955982

7.US-guided high-intensity focused ultrasound (HIFU) of abdominal tumors: outcome, early ablation-related laboratory changes and inflammatory reaction. A single-center experience from Germany
Tolga Tonguc, Holger Strunk, Maria A. Gonzalez-Carmona, Florian Recker, Dieter Lütjohann, Marcus Thudium, Rupert Conrad, Marc U. Becher, Oleksandr Savchenko, Darya Davidova, Guido Luechters, Alexander Mustea, Christian P. Strassburg, Ulrike Attenberger, Claus C. Pieper, Jürgen Jenne & Milka Marinova
https://www.tandfonline.com/doi/full/10.1080/02656736.2021.1900926

8.The safety and ablation efficacy of ultrasound-guided high-intensity focused ultrasound ablation for desmoid tumors
Rong Zhang, Jin-Yun Chen, Lian Zhang, Ke-Quan Li, Zhi-Bo Xiao, Shao-Jiang Mo, Li Chen & Wen-Zhi Chen
https://www.tandfonline.com/doi/full/10.1080/02656736.2021.1894359

9.Effectiveness of focused ultrasound for high risk human papillomavirus infection-related cervical lesions
Wenping Wang, Yujuan Liu, Yang Pu, Chengzhi Li, Honggui Zhou & Zhibiao Wang
https://www.tandfonline.com/doi/full/10.1080/02656736.2021.1910736

Reviews:

1.The comparison of myomectomy, UAE and MRgFUS in the treatment of uterine fibroids: a meta analysis
Fan Xu, Lihong Deng, Lijun Zhang, Huiquan Hu & Qiuling Shi
https://www.tandfonline.com/doi/full/10.1080/02656736.2021.1933216

2.High-intensity focused ultrasound ablation of liver tumors in difficult locations
Simon H. Tsang, Ka Wing Ma, Wong Hoi She, Ferdinand Chu, Vince Lau, Shuk Wan Lam, Tan To Cheung & Chung Mau Lo
https://www.tandfonline.com/doi/full/10.1080/02656736.2021.1933217

3.Is high-intensity focused ultrasound (HIFU) an option for neoadjuvant therapy for borderline resectable pancreatic cancer patients? – a systematic review
Nadya Stanislavova, Martin Karamanliev, Tsvetomir Ivanov, Tsanko Yotsov, Kun Zhou & Dobromir Dimitrov
https://www.tandfonline.com/doi/full/10.1080/02656736.2021.1909150

4.Oxford’ s clinical experience in the development of high intensity focused ultrasound therapy
Ishika Prachee, Feng Wu & David Cranston
https://www.tandfonline.com/doi/full/10.1080/02656736.2021.1899311

IV.
ISMIVS: WORK PLAN 2022

4.1 IWD-HIFU 2022

Date: March 7, 2022
Event: IWD-HIFU 2022
Theme: Empowering Women Health through Technology
The Campaign will be co-hosted by State Key Laboratory of Ultrasound in Medicine and Engineering of China (SKLUME), National Engineering Research Center of Ultrasound Medicine of China (NERCUM) and the International Society of Minimally Invasive and Virtual Surgery (ISMIVS) in Liangjiang District, Chongqing, China, with 147 global HIFU centers joining online and together deliver HIFU treatment, an innovative noninvasive therapy, for women with uterine fibroids and/or adenomyosis. The Campaign will also witness the world’ s first trans-provincial HIFU surgery using 5G technology.

4.2 Online Sessions

4.2.1
Date: March 16, 2022
Webinar: "HIFU: Game Changer of Uterine Fibroid Management"
Co-organized by ISMIVS and Thai Society of Gynecologic Endoscopists (TSGE)

Date: May 19 – Aug 18, 2022
Topics:
1.Management of endometriosis, especially patients with fertility desire
2.Treatment for placenta accreta and cesarean scar pregnancy
3.Treatment for vulva and cervical diseases-new options
4.Adenomyosis and fertility
Co-organized by ISMIVS and the Asia-Pacific Association for Gynecologic Endoscopy and Minimally Invasive Therapy (APAGE)

Episode 1

Date: May 19, 2022

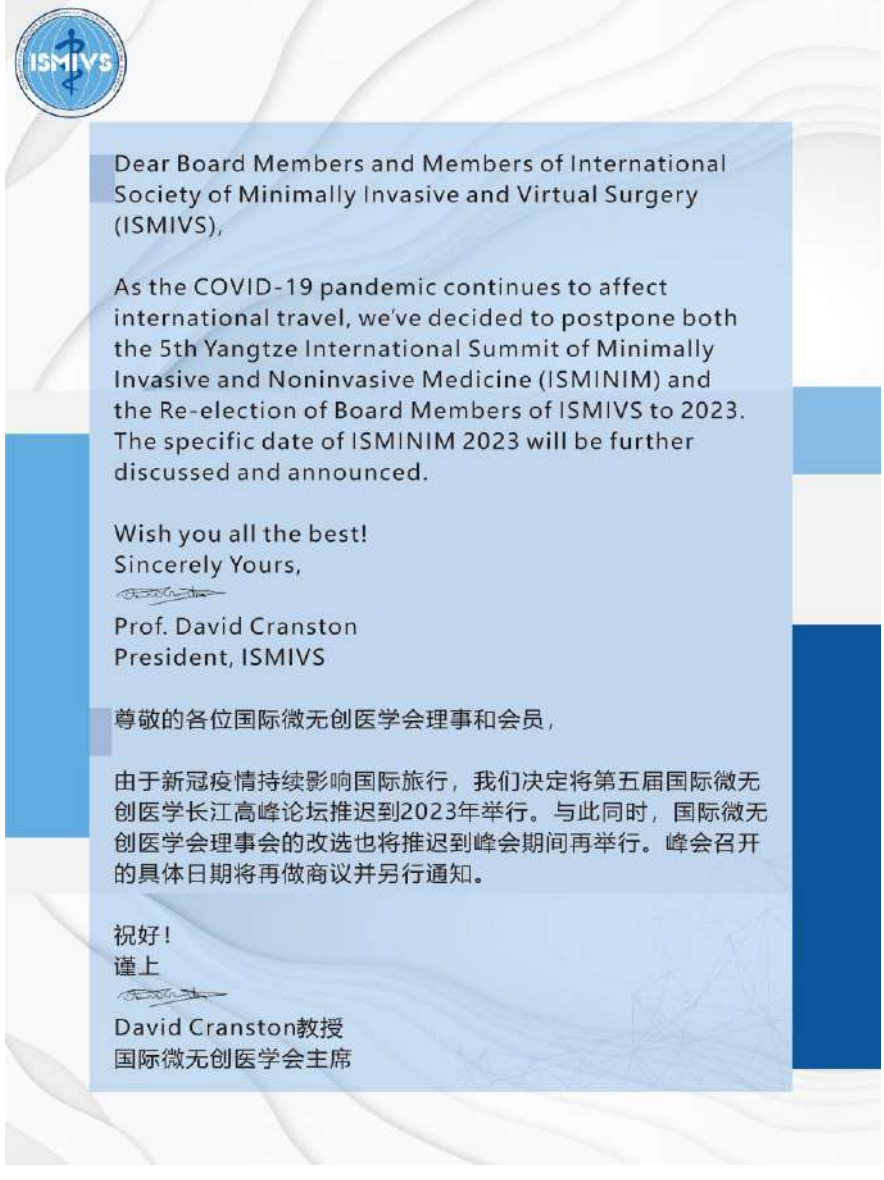
Theme: Management of Endometriosis, Especially Patients with Fertility Desire

4.3 Online Training Courses

ISMIVS is pleased to announce the availability of a series of online training courses on the clinical application of noninvasive focused ultrasound therapy. A variety of courses related with ultrasound-guided high intensity focused ultrasound (USgHIFU) ablation of uterine fibroids will enlighten doctors about the physics and biological effect of HIFU, case screening, clinical protocol, anesthesia plan, nursing care, etc.
In 2022, 5 courses listed below on focused ultrasound therapy of different diseases will be released on www.ismivs.org.
a) From Osler to Noninvasive (EN)
b) Case Study: HIFU in the Treatment of Uterine Fibroids and Adenomyosis (CN)
c) Clinical Application of HIFU for Liver and Pancreatic Cancer (CN&EN)
d) Nursing Care of HIFU Treatment of Malignant Tumors (CN&EN)
e) HIFU in the Treatment of Breast Cancer and Breast Benign Tumor (CN&EN)
The training courses are accessible only to ISMIVS members. If interested, please contact the Secretariat: hannahxu@isminim.org

4.4 The 5th Yangtze International Summit of Minimally-Invasive and Noninvasive Medicine: Postponed to 2023

Due to the restrictions on international travel caused by COVID-19 Pandemic, the 5th Yangtze International Summit of Minimally Invasive and Noninvasive Medicine, originally planned in July, 2021, is now postponed to 2022. Specific schedule will hinge on the lift of travel restrictions. Please wait for future announcement.



Dear Board Members and Members of International Society of Minimally Invasive and Virtual Surgery (ISMIVS),

As the COVID-19 pandemic continues to affect international travel, we've decided to postpone both the 5th Yangtze International Summit of Minimally Invasive and Noninvasive Medicine (ISMINIM) and the Re-election of Board Members of ISMIVS to 2023. The specific date of ISMINIM 2023 will be further discussed and announced.

Wish you all the best!
Sincerely Yours,

Prof. David Cranston
President, ISMIVS

尊敬的各位国际微无创医学会理事和会员，

由于新冠疫情持续影响国际旅行，我们决定将第五届国际微无创医学长江高峰论坛推迟到2023年举行。与此同时，国际微无创医学会理事会的改选也将推迟到峰会期间再举行。峰会召开的具体日期将再做商议并另行通知。

祝好！
谨上

David Cranston教授
国际微无创医学会主席

4.5 The Third International Training Workshop on Focused Ultrasound Therapy for Tumors

The 2020 workshop which was planned to be held in Pleven, Bulgaria was postponed due to the COVID-19 Pandemic, now as the pandemic is better controlled, we plan to organize the 2022 Training Workshop in Malacca, Malaysia.
More information about the Workshop:
http://www.isminim.com/uploads/2022/07/051532036785.pdf

V.
THE CLINICAL DEVELOPMENT OF HIFU

In order to know the latest clinical development of high-intensity focused ultrasound ablation therapy, ISMIVS retrieved and analyzed HIFU literature published in 2020 and 2021 for your reference.

5.1 HIFU Literature Retrieval and Analysis: 2020-2021

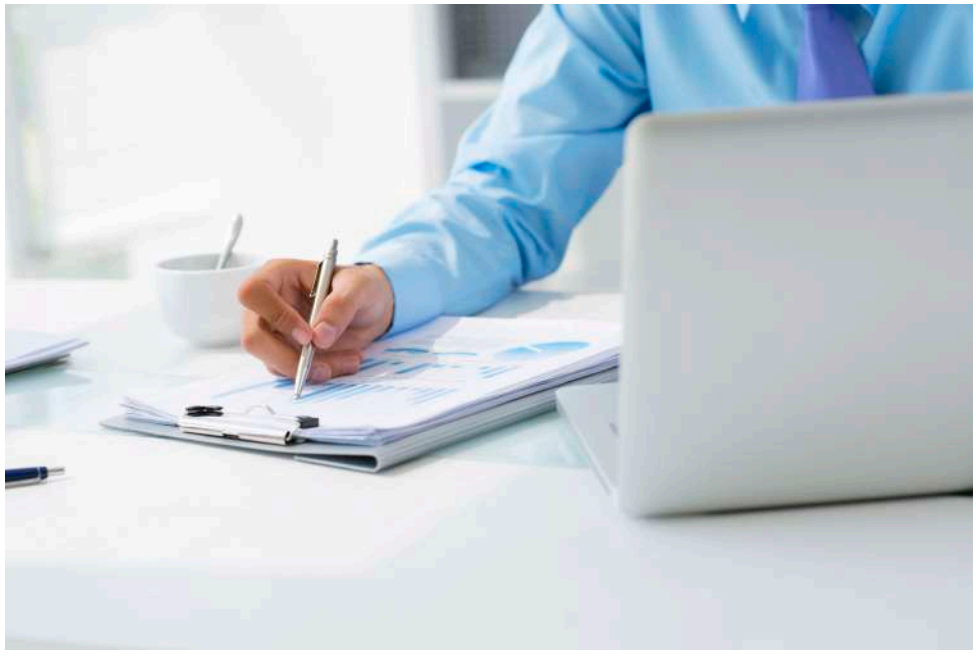
Screening methods and criteria

The PubMed database was searched with key words and the abstracts and/or full texts of search results were reviewed to determine content relevance. The timeline set of the results was: January, 2020—December, 2021. The electronic system was interrogated with the key words: high-intensity focused ultrasound. The following inclusion criteria were applied: 1. research in this area written in English; 2. review articles and research articles on clinical application or clinical research (i.e. treatment in humans). Meanwhile, the following exclusion criteria were applied: 1. research published in non-English languages; 2. the non-human treatment research, that is, the HIFU treatment was not performed in humans, such as animal research, stereoscopic tissue research, computer simulation treatment or predictive analysis. The included studies consist of review articles and research articles. Statistics is made for the indica-

tions for HIFU treatment mentioned in the included studies. And statistics is also made for the number of treated cases with HIFU mentioned in the included research articles (including the number of cases treated with HIFU alone and that with HIFU combined other treatments).
HIFU Literature Analysis: 2020-2021

5.1.1 HIFU Literature Analysis: 2020
Date of Publication: Between January 1, 2020 and December 31, 2020
Key words: high intensity focused ultrasound
351 articles were retrived using the PubMed database with the key words of high intensity focused ultrasound. 234 articles were excluded. Among the **117** included articles, **31** indications were involved, including 7 indications in the OBGYN field.

5.1.2 HIFU Literature Analysis: 2021
Date of Publication: Between January 1, 2021 and December 31, 2021
Key words: High Intensity Focused Ultrasound
378 articles were retrived using the PubMed database with the key words of High Intensity Focused Ultrasound. 254 articles were excluded. Among the **124** included articles, **43** indications were involved, including **7** indications in the OBGYN field.



5.1.3 Indications Mentioned in the 2020 HIFU Literature

Glaucoma	Thyroid nodules
Prostate cancer	Skin rejuvenation
Varicose veins and venous leg ulcers	Soft tissue sarcoma
Desmoid tumor	Breast fibroadenoma
Adenomyosis	Epilepsy
Abdominal wall endometriosis	Graves' disease
Uterine fibroid	Sacroiliac Joint
C-scar pregnancy	Psychiatric disorders
Cervical pregnancy	Movement disorder
uterine arteriovenous malformation	Chronic pain
Twin-reversed arterial perfusion sequence	Brain tumor
Pancreatic cancer	Benign prostatic hyperplasia
Tremor	Neuropathic pain
Parkinson's disease	Obsessive compulsive disorder
Allergic rhinitis	Bone metastasis
Kidney tumor	Osteoid osteoma
Bone tumor	Facet joint osteoarthritis
Liver tumor	Breast cancer

5.1.4 Indications Mentioned in the 2021 HIFU Literature

Glaucoma	Thyroid nodules
Prostate cancer	Skin rejuvenation
Varicose veins and venous leg ulcers	Soft tissue sarcoma
Desmoid tumor	Breast fibroadenoma
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Tremor	Neuropathic pain
Parkinson's disease	Obsessive compulsive disorder
Allergic rhinitis	Bone metastasis
kidney tumor	Osteoid osteoma
Bone tumor	Facet joint osteoarthritis
retroperitoneal lymphatic metastases	Low-flow vascular malformations
Liver tumor	Pain management of osteoarthritis
Liver alveococcosis	Breast cancer
Glaucoma	Thyroid nodules
Prostate cancer	Skin rejuvenation
Varicose veins and venous leg ulcers	Soft tissue sarcoma
Desmoid tumor	Breast fibroadenoma
Adenomyosis	Epilepsy
Abdominal wall endometriosis	Graves' disease
Uterine fibroid	Sacroiliac Joint
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Parkinson's disease	Obsessive compulsive disorder
Allergic rhinitis	Bone metastasis
Kidney tumor	Osteoid osteoma
Bone tumor	Facet joint osteoarthritis
Liver tumor	Breast cancer

5.1.5 New Indications in 2021 compared to 2020

Retroperitoneal lymphatic metastases	Low-flow vascular malformations
Pain management of osteoarthritis	Liver alveococcosis

Top 10 Indications with the Largest Number of Research Articles: 2020-2021

2020

No.	Indication	Number of Research Articles	Total Number of Cases
1	Uterine fibroid	28	2923
2	Prostate cancer	23	1120
3	Pancreatic cancer	7	568
4	Bone tumor	5	104
5	Liver tumor	5	298
6	Thyroid nodules	5	689
7	Adenomyosis	4	1305
8	Glaucoma	4	102
9	Tremor	3	7
10	Abdominal wall endometriosis	3	98
Retroperitoneal lymphatic metastases			Low-flow vascular malformations
Pain management of osteoarthritis			Liver alveococcosis

Indication	Number of Research Articles	Total Number of Cases
Uterine fibroid	28	2923
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Adenomyosis	4	1305
Glaucoma	4	102
Tremor	3	7
Abdominal wall endometriosis	3	98

Number of Research Articles on HIFU for OBGYN Diseases: 2020-2021

2020

Indication	Number of Research Articles	Total Number of Cases	The Largest Number of Cases Mentioned	Article Information
Uterine fibroids	24	2973	508	Non-contrast enhanced MRI for assessment of uterine fibroids' early response to ultrasound-guided high-intensity focused ultrasound thermal ablation. Liao D, Xiao Z, Lv F, Chen J, Qiu L. Eur J Radiol. 2020 Jan;122:108670. doi: 10.1016/j.ejrad.2019.108670. Epub 2019 Nov 10. PMID: 31778966 DOI: 10.1016/j.ejrad.2019.108670
Placenta-accreta	1	63	63	High-intensity focused ultrasound versus uterine artery embolization for patients with retained placenta accreta. Jiang J, Wang C, Xue M. Eur J Obstet Gynecol Reprod Biol. 2020 Sep;252:82-86. doi: 10.1016/j.ejogrb.2020.06.003. Epub 2020 Jun 8. PMID: 32590166 DOI: 10.1016/j.ejogrb.2020.06.003
Mixed conditions: fibroid + adenomyosi-s	1	53	53	500 Cases of High-intensity Focused Ultrasound (HIFU) Ablated Uterine Fibroids and Adenomyosis. (404 fibroids, 149 adenomyosis and 53 mixed conditions) Jeng CJ, Ou KY, Long CY, Chuang L, Ker CR. Taiwan J Obstet Gynecol. 2020 Nov;59(6):865-871. PMID: 33218403 doi: 10.1016/j.tjog.2020.09.013.

Indication	Number of Research Articles	Total Number of Cases	The Largest Number of Cases Mentioned	Article Information
Uterine fibroid	25	2713	1012	Quan S, Yang J, Dun W, Wang K, Liu H, Liu J. Prediction of pain intensity with uterine morphological features and brain microstructural and functional properties in women with primary dysmenorrhea. Brain Imaging Behav. 2021 Jun;15(3):1580-1588. doi: 10.1007/s11682-020-00356-w. PMID: 32705468.
Adenomyosis	5	1249	660	
Abdominal wall endometriosis	2	62	33	Yang MJ, Yu RQ, Chen JY, Wang ZB. Comparison of Dose and Effectiveness of a Single-Session Ultrasound-Guided High-Intensity Focused Ultrasound Ablation of Uterine Fibroids With Different Sizes. Front Oncol. 2021 Dec 21;11:725193. doi: 10.3389/fonc.2021.725193. PMID: 34993130; PMCID: PMC8724518.
C-scar pregnancy	3	302	102	Ji J, Liu J, Chen Y, Liu X, Hao L. Analysis of high intensity focused ultrasound in treatment of uterine fibroids on ovarian function and pregnancy outcome. J Clin Ultrasound. 2022 Feb;50(2):202-208. doi: 10.1002/jcu.23116. Epub 2021 Dec 29. PMID: 34965313.

Cervical pregnancy	1	9	9	Anneveldt KJ, Verpalen IM, Nijholt IM, Dijkstra JR, van den Hoed RD, Van't Veer-Ten Kate M, de Boer E, van Osch JAC, Heijman E, Naber HR, Ista E, Franx A, Veersema S, Huirne JAF, Schutte JM, Boomsma MF. z Insights Imaging. 2021 Dec 18;12(1):188. doi: 10.1186/s13244-021-01128-w. PMID: 34921657; PMCID: PMC8684568.Int J Hyperthermia. 2019;36(1):273-276. PMID: 30676110 DOI: 10.1080/02656736.2018.1563914
Uterine arteriovenous malformation	1	3	3	Recker F, Thudium M, Strunk H, Tonguc T, Dohmen S, Luechters G, Bette B, Welz S, Salam B, Wilhelm K, Egger EK, Wüllner U, Attenberger U, Mustea A, Conrad R, Marinova M. Multidisciplinary management to optimize outcome of ultrasound-guided high-intensity focused ultrasound (HIFU) in patients with uterine fibroids. Sci Rep. 2021 Nov 23;11(1):22768. doi: 10.1038/s41598-021-02217-y. PMID: 34815488; PMCID: PMC8611035.
Twin-reversed arterial perfusion sequence	2	12	2	Wang W, Chen Y, Yang Y, Qu D, Jiang J. High-intensity focused ultrasound compared with uterine artery chemoembolization with methotrexate for the management of cesarean scar pregnancy. Int J Gynaecol Obstet. 2021 Nov 19. doi: 10.1002/ijgo.14036. Epub ahead of print. PMID: 34797925.

Please see Appendix 4 for excerpts from selected articles

5.2 Clinical Application of HIFU in 2021

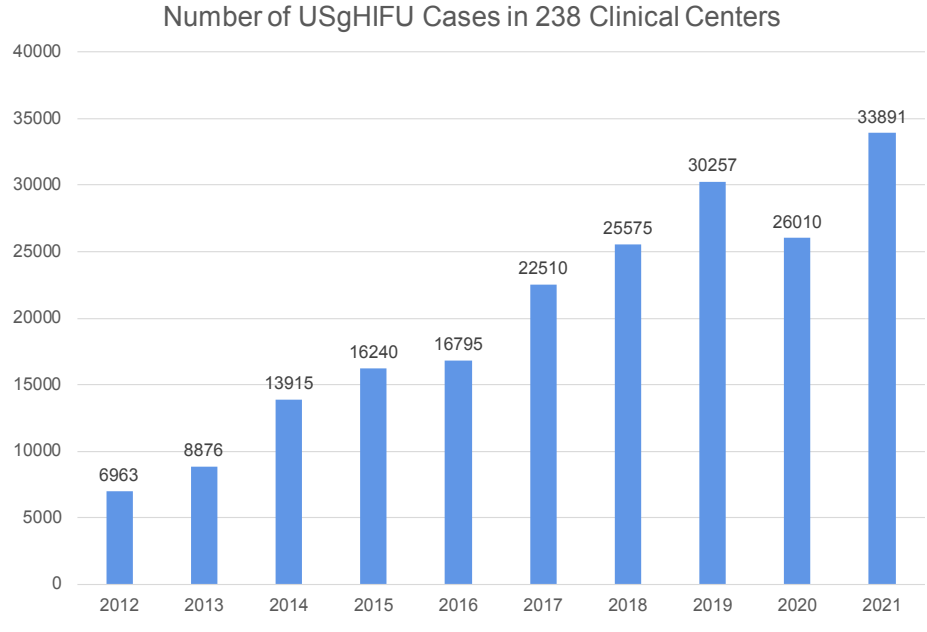
Therapeutic ultrasound, which is undergoing a boom in basic research, clinical studies and clinical implementations, marks the start of the era of noninvasive medicine. High-intensity focused ultrasound (HIFU) ablation, in particular, has been increasingly applied in the treatment of a variety of tumors and disease conditions, and its clinical development has enjoyed steady progress.

In 2021, selective surgeries in hospitals around the world have been put off or canceled due to the COVID-19 pandemic. The number of HIFU ablation procedures performed has also been affected, but to a lesser degree. The difference can be ascribed to the unique advantages of HIFU ablation in treating benign gynecological diseases: performed as a day surgery procedure, no cutting-open, no bleeding, shorter hospital stay, and quicker recovery. HIFU ablation has gaining more and more recognitions by doctors and patients during the pandemic.

5.2.1. Clinical Data of HIFU Treatments

Global Big Data from National Engineering Research Center of Ultrasound Medicine (NERCUM)

The National Engineering Research Center of Ultrasound Medicine has recorded the number of cases treated with ultrasound-guided HIFU in **238** clinical centers across 29 countries and regions. By December 31st, 2021, the total number of treated cases between 2010 and 2021 has amounted to **209,660** in which **33891** cases were performed in the year of 2021.

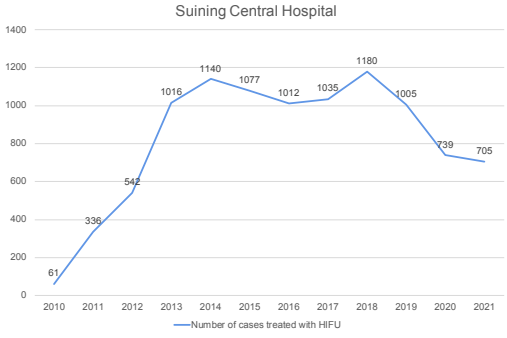


Suining Central Hospital, with **9,853** cases treated, ranks the first in the world in terms of the number of cases treated with HIFU ablation; followed by the Third Xiangya Hospital of Central South University with **7,179** cases treated ranking the second and Chongqing Haifu Hospital with **7,053** cases treated ranking the third.

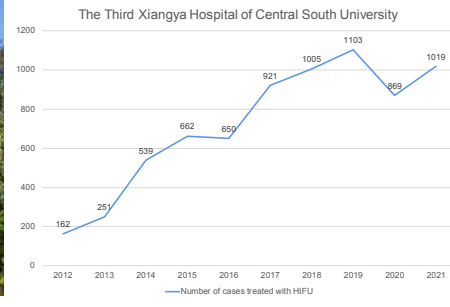
5.2.2 11 HIFU Centers Awarded by NERCUM in 2021

HIFU Center	Number of Cases Treated with HIFU in 2021
The Third Xiangya Hospital of Central South University	1019
Chongqing Haifu Hospital	1001
Suining Central Hospital	705
Mianyang Central Hospital	671
Affiliated Hospital of Zunyi Medical University	652
Changsha Hospital for Maternal & Child Health Care	552
Affiliated Hospital of North Sichuan Medical College	490
Zigong Fourth People's Hospital	411
Foshan Women and Children Hospital	405
Qingdao Women and Children's Hospital	403
Suining Municipal Hospital of TCM	372

The top three clinical centers with the largest number of cases treated with HIFU in 2021 were the Third Xiangya Hospital of Central South University (1019 cases), Chongqing Haifu Hospital (1001 cases) and Suining Central Hospital (705 cases).



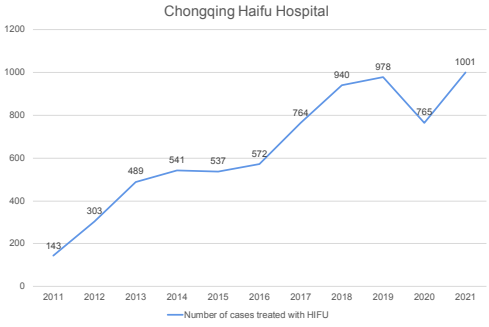
Suining Central Hospital has started HIFU treatment service since 2010. By December 31st, 2021, it has performed 9,853 HIFU ablation procedures, ranking the first in the world in terms of the cumulative total number of HIFU cases. 11 indications are in different stages of clinical research or being provided as paid medical treatments. The 11 Clinical Indications of HIFU Treatment and research at Suining Central Hospital:
Gynaecology: uterine fibroids, adenomyosis, abdominal wall endometriosis, placenta accreta, cesarean scar pregnancy, dysfunctional endometrial hemorrhage
Surgery: fibroadenoma of breast, liver cancer, pancreatic cancer, bone tumors, soft tissue tumor



The Third Xiangya Hospital of Central South University has started HIFU treatment service since April 24th, 2012. By December 31st, 2021, it has performed 7,179 cases with HIFU ablation (1,019 cases in 2021), ranking the second in the world in terms of the cumulative total number of HIFU cases and the first in the world in terms of the number of HIFU procedures performed in 2021. 17 indications are in different stages of clinical research or being provided as paid medical treatments.

The 17 Clinical Indications of HIFU Treatment and research at the Third Xiangya Hospital of Central South University were: Gynaecology: uterine fibroids, adenomyosis, caesarean scar pregnancy, placenta accreta, abdominal wall endometriosis, cervical pregnancy, intramural pregnancy, uterine arteriovenous fistula, cornual pregnancy, gestational trophoblastic tumors, diffuse myomatosis of uterus, granulosa cell tumors

Surgery: pancreatic cancer, liver cancer, abdominal wall metastatic tumors, retroperitoneal tumor

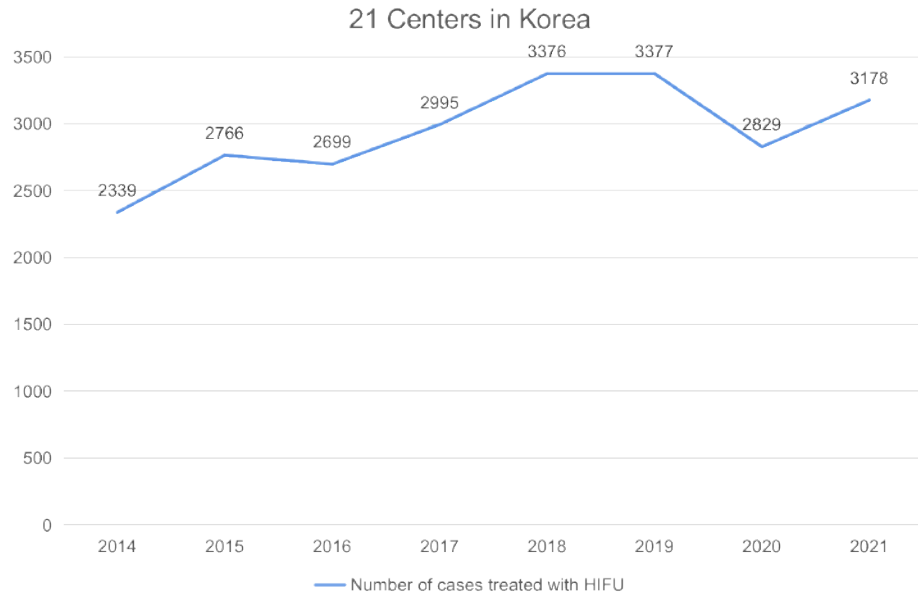


Chongqing Haifu Hospital has started HIFU treatment service since 2011. By December 31st, 2021, it has performed 7,053 HIFU ablation procedures (1,001 cases in 2021), ranking the third in the world in terms of the cumulative total number of HIFU cases and the third in number of HIFU cases in 2021 alone. Now over 8 indications are in different stages of clinical research or being provided as paid medical treatments.
Clinical Indications of HIFU Treatment and research at Chongqing Haifu Hospital: uterine fibroids, adenomyosis, abdominal wall endometriosis, placenta accreta, liver cancer, osteosarcoma, desmoid fibroma, breast fibroadenoma.

5.2.3 Data from Clinical Centers Outside Mainland China

The number of treated cases of 36 clinical centers from Hong Kong, China, Taiwan, China, South Korea, Singapore, Nigeria, Malaysia, Russia, Spain and Britain is 4,831 in 2021. Now the clinical indications for HIFU treatment in the 9 regions are: uterine fibroids, adenomyosis, placenta accreta, abdominal wall endometriosis, liver cancer, pancreas cancer, etc.

Taking the 21 clinical centers in South Korea for example, the number of cases treated with HIFU clinical treatment has been increasing steadily yearly from 2014 to 2021, growing slowly but steadily.



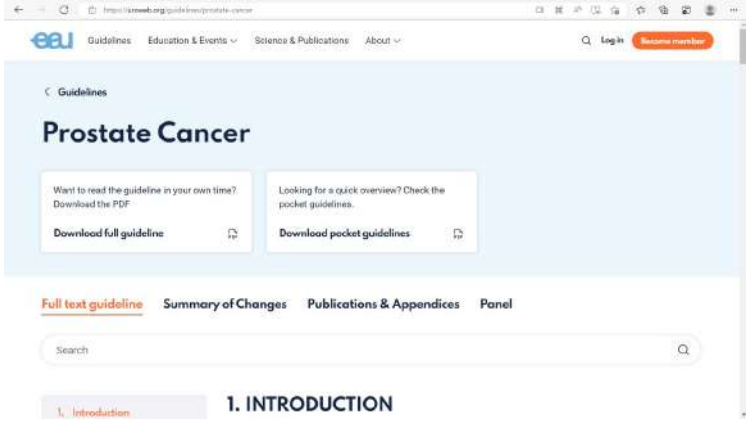
5.2.4 HIFU Training

According to the statistics from High-intensity Focused Ultrasound Tumor Treatment Training Base authorized by the Ministry of Health of China, 1,963 medical professionals have received HIFU clinical training and 523 doctors have been certified to perform the ultrasound-guided HIFU procedure independently. From 2012 to 2021, the international training workshops organized by Chongqing Medical University has provided basic HIFU clinical training courses to more than 200 clinicians from nearly 40 countries




5.3 Indications that has been included into clinical guidelines or experts' consensus by the end of 2021

5.3.1 2022 EAU Guidelines updated new treatment techniques for the management of prostate cancer-HIFU part



In March, 2022, the European Association of Urology (EAU) updated the guideline for the treatment of prostate cancer. HIFU is considered an investigational therapy in this guideline.

The major adverse effects of HIFU include acute urinary retention (10%), ED (23%), urethral stricture (8%), rectal pain or bleeding (11%), recto-urethral fistula (0–5%) and urinary incontinence (10%). Disadvantages of HIFU include difficulty in achieving complete ablation of the prostate, especially in glands larger than 40 mL, and in targeting cancers in the anterior zone of the prostate. Similar to cryosurgery, the lack of any long-term prospective comparative data on oncological outcomes prevents whole-gland HIFU from being considered as a reasonable alternative to the established curative treatment options.

There is a lack of high-certainty data which prohibits any recommendations regarding the indications for salvage HIFU in routine clinical practice. There is also a risk of significant morbidity associated with its use in the salvage setting. Consequently, salvage HIFU should only be per-

formed in selected patients in experienced centres as part of a clinical trial or well-designed prospective cohort study.
Side effects: In terms of toxicity , there are insufficient data on urinary incontinence, ED or bowel dysfunction to draw any conclusions, although at one year , HIFU had lower incontinence rates than RP (OR: 0.06, 95% CI: 0.01–0.48).

Read More : https://uroweb.org/guidelines/prostate-cancer

5.3.2 The 2021 ACOG Practice Bulletin for the Management of Symptomatic Uterine Leiomyomas updated the Focused Ultrasound Surgery part.

In June, 2021, the American College of Obstetricians and Gynecologists (ACOG) published the Practice Bulletin number 228: Management of Symptomatic Uterine Leiomyomas, updated the Focused Ultrasound Surgery (FUS) part, adding Ultrasound guided FUS to the existing MRI guided FUS.
The Bulletin published that limited, low-quality data suggest that magnetic resonance-guided focused ultrasound and high-intensity focused ultrasound are associated with a reduction in leiomyoma and uterine size (20, 65). However, small randomized comparative trial data suggest that compared with UAE, magnetic resonance-guided focused

ultrasound is associated with less improvement in symptoms and quality-of-life measures and a higher risk of reintervention (66). In a recent meta-analysis, the rate of reintervention at 60 months was 53.9% (55). Additional data are needed before recommendations can be made regarding the use of this treatment for uterine leiomyomas.
Read More:
https://journals.lww.com/greenjournal/Fulltext/2021/06000/Management_of_Symptomatic_Uterine_Leiomyomas__ACOG.36.aspx

5.3.3 NICE guideline on High-intensity focused ultrasound for glaucoma

On 25 September, 2019, the National Institute for Health and Care Excellence (NICE), UK, published guidance and evidence-based recommendations on the safety and efficacy of high-intensity focused ultrasound for glaucoma.
This procedure uses high-intensity focused ultrasound (HIFU) to partially destroy the ciliary body to reduce the production of aqueous humor and thereby decrease the intraocular pressure. Evidence on the safety and efficacy of high-intensity focused ultrasound for glaucoma is inadequate in quality and quantity. Therefore, this procedure should only be used in the context of research. Research should ideally take the form of randomised controlled trials comparing this procedure with standard therapies and should report safety events and long-term outcomes.
Read More: https://www.nice.org.uk/guidance/ipg66

5.3.4 4. NICE guidelines for symptomatic benign thyroid nodules

In 2019, the National Institute for Health and Care Excellence (NICE), UK, published guidelines on symptomatic benign thyroid nodules
The evidence on the safety of high-intensity focused ultrasound for symptomatic benign thyroid nodules raises no major safety concerns, however the current evidence on its efficacy is limited in quantity and quality. Therefore, this procedure should only be used with special arrangements for clinical governance, consent, and audit or research.

1.2 Clinicians wishing to do high-intensity focused ultrasound for symptomatic benign thyroid nodules should:
• Inform the clinical governance leads in their NHS trusts.
•Ensure that patients understand the procedure's safety and efficacy, as well as any uncertainties about these. Provide them with clear written information to support shared decision making. In addition, the use of NICE's information for the public on high-intensity focused ultrasound for symptomatic benign thyroid nodules is recommended.
• Audit and review clinical outcomes of all patients having high-intensity focused ultrasound for symptomatic benign thyroid nodules.
1.3 Further research should report details of patient selection, nodule size and position, and whether the nodule is cystic.
Read More: https://www.nice.org.uk/guidance/ipg643

5.3.5 NICE Guideline for High-intensity focused ultrasound for symptomatic breast fibroadenoma

On September 2017, NICE published the guidance on HIFU for symptomatic breast fibroadenoma.

1.1 The evidence on high-intensity focused ultrasound for symptomatic breast fibroadenoma raises no major safety concerns. Evidence on its efficacy is inadequate in quantity and quality. Therefore, this procedure should only be used with special arrangements for clinical governance, consent and audit or research.
1.2 Clinicians wishing to do high-intensity focused ultrasound for symptomatic breast fibroadenoma should:
• Inform the clinical governance leads in their NHS trusts.
• Ensure that patients understand the uncertainty about the procedure's efficacy and provide them with clear written information. In addition, the use of NICE's information for the public is recommended.
• Audit and review clinical outcomes of all patients having high-intensity focused ultrasound for symptomatic breast fibroadenoma.
1.3 Patients should be informed about all the alternative treatment options, which could include conservative treatment.
1.4 Further research should include publication of patient-reported outcome measures and studies with long-term follow-up.
Read More: https://www.nice.org.uk/guidance/ipg592

5.3.6 French guidelines updated the Therapeutic management of uterine fibroid tumors

In June 2012 , an updated French guidelines on the therapeutic management of uterine fibroid tumors was published by The College National des Gynecologues et Obstetriciens Francais on the European Journal of Obstetrics & Gynecology and Reproductive Biology. The recommendations on the use of HIFU in the updated Guideline are as follows , MRI- or ultrasound-guided focused ultrasound treatment is a new possibility, and current results are encouraging, after the learning curve. Rigorous selection of patients is essential with treatment of a single fifibroid or two at the most, anterior, between 5 and 12 cm, with a T2-weighted hypointense signal T2 on MRI; approximately 10% of fifibroids are accessible to this technique to obtain devascularization greater than 45%, which is correlated with intermediate-term symptom relief in the order of 60–70% (LE3). On the other hand, the reduction of fibroid volume seems less substantial (15–40%) than with the other techniques (LE4). None of the current techniques can be recommended for myolysis; the technique that is most advanced, least aggressive and monitored most effectively seems to be focused ultrasound. Clinical research into these techniques must continue, with trials comparing them to surgery or uterine artery embolization, to obtain an evidence level sufficient to justify a recommendation. Patients treated with these techniques must be included in research protocols.

Read More:

https://www.ejog.org/article/S0301-2115(12)00349-1/fulltext

5.3.7 NICE guideline on focal therapy using high-intensity focused ultrasound for localised prostate cancer IPG424

On 26 April, 2012, the National Institute for Health and Care Excellence (NICE), UK, published guideline and evidence-based recommendations on focal therapy using high-intensity focused ultrasound (HIFU) for localised prostate cancer.

1.1 Current evidence on focal therapy using high-intensity focused ultrasound (HIFU) for localised prostate cancer raises no major safety concerns. However, evidence on efficacy is limited in quantity and there is a concern that prostate cancer is commonly multifocal. Therefore, this procedure should only be used with special arrangements for clinical governance, consent and audit or research.

1.2 Clinicians wishing to undertake focal therapy using HIFU for localised prostate cancer should take the following actions.

• Inform the clinical governance leads in their Trusts.

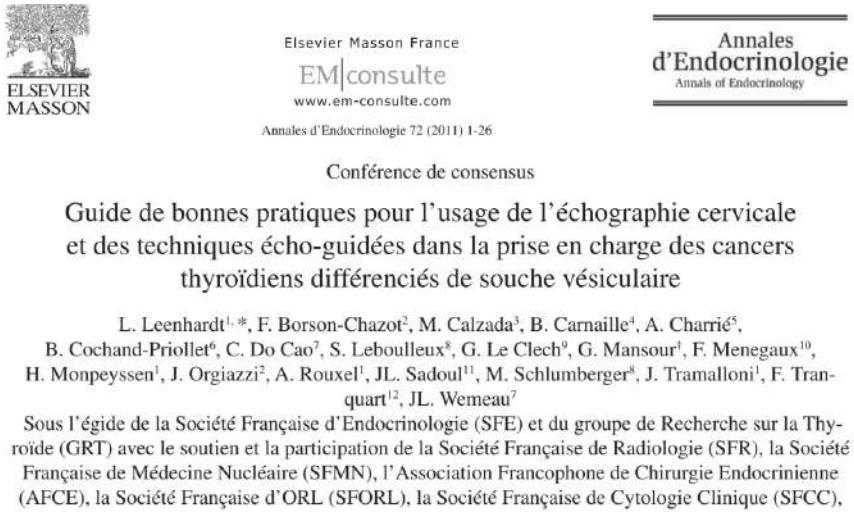
• Ensure that patients and their carers understand the uncertainty about the procedure's efficacy and the risks (specifically the risk of sexual dysfunction), and provide them with clear written information. In addition, the use of NICE's information for patients (Understanding NICE guidance) is recommended.

1.3 Patient selection and treatment should be carried out by a multidisciplinary urological cancer team.

1.4 NICE encourages further research into focal therapy using HIFU for localised prostate cancer. This should take the form of controlled studies comparing the procedure against other forms of management.

Studies should clearly define patient selection criteria and should report outcomes including local recurrence in the long term.
1.5 Clinicians should collect data on all patients undergoing focal HIFU (including details of case selection, methods of follow-up and outcomes) for local audit and for submission to national and/or international registers when these become available.
Read More: www.nice.org.uk/guidance/ipg424

5.3.8 French Society of Endocrinology (SFE) and the Thyroid Research Group (GRT) published best practices guideline for the use of neck ultrasonography and echo-guided techniques in the management of differentiated thyroid cancers of the follicular type



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Conférence de consensus

Guide de bonnes pratiques pour l'usage de l'échographie cervicale et des techniques écho-guidées dans la prise en charge des cancers thyroïdiens différenciés de souche vésiculaire

L. Leenhardt[1,*], F. Borson-Chazot[2], M. Calzada[3], B. Carnaille[4], A. Charrié[5], B. Cochand-Priollet[6], C. Do Cao[7], S. Leboulleux[8], G. Le Clech[9], G. Mansour[1], F. Menegaux[10], H. Monpeyssen[1], J. Orgiazzi[2], A. Rouxel[1], JL. Sadoul[11], M. Schlumberger[8], J. Tramalloni[1], F. Tranquart[12], JL. Wemeau[7]

Sous l'égide de la Société Française d'Endocrinologie (SFE) et du groupe de Recherche sur la Thyroïde (GRT) avec le soutien et la participation de la Société Française de Radiologie (SFR), la Société Française de Médecine Nucléaire (SFMN), l'Association Francophone de Chirurgie Endocrinienne (AFCE), la Société Française d'ORL (SFORL), la Société Française de Cytologie Clinique (SFCC),

Recommendations for the treatment of follicular differentiated thyroid cancer were recently published by the French Society of Endocrinology (SFE) and the Thyroid Research Group (GRT) following the French con-

sensus meeting. This ultrasound-focused practice guideline is very consistent with the European and American consensus.
The objectives were presented and the texts were discussed at working group meetings held at the Pitié Hospital in Paris in March, June and September 2008. The work was carried out in 6 multidisciplinary teams involving endocrinologists, radiologists, nuclear physicians, biologists, oncologists, etc., as well as those involved in the management of thyroid cancer or with practical experience with ultrasound scanning doctor. In these six expert groups who are working in different research directions, the expert group on other applications and developments of ultrasound proposed that anhydrous alcohol refraction, radiofrequency, laser, and HIFU can be used for the treatment of thyroid recurrence.
Read More: https://www.sciencedirect.com/science/article/abs/pii/S0003426611700014?via%3Dihub

5.3.9 Congress of the Association Française d'Urologie (AFU) 2004 published prostate cancer management

Annales d'urologie 39 (2005) S1-S16

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Congrès de l'Association française d'urologie (AFU) 2004 : prise en charge du cancer de la prostate

Congress of the Association française d'urologie (AFU) 2004: prostate cancer management

F. Bruyère [a,*], O. Traxer [b]

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In 2004, the 98th congress of the Association française d'urologie (AFU) was held in Paris and the prostate cancer was the topic of communications, round tables and plenary sessions. Using HIFU for the treatment of prostate cancer was mentioned in the congress.

117 patients with prostate cancer were treated with HIFU, and after two years, 97 patients were reexamined, 34 patients underwent second treatment, none of the patients had symptoms of urinary incontinence after treatment. Post-biopsy result showed negative for 48% of the patients. Postoperative follow-up will be performed for 2 years after this treatment.

118 prostate cancer patients were treated with HIFU with EDAP's Ablatherm device in Kahn, France, and 70 patients were evaluated for efficacy and safety over a 12-month period. No recurrence was observed within one year.

Lyon's team treated 282 patients with HIFU over 6 years, 190 of whom had undergone urethrectomy. The average treatment time was 110 minutes, and 30% of patients were unable to have sex within 2 to 3 months after treatment. Among the 100 patients in the first batch, 71 patients had a negative biopsy result after one treatment, and 85 patients had a negative biopsy after the second and third treatment, so the author believes that HIFU is a good option for people in their 70s.

Read More: https://pubmed.ncbi.nlm.nih.gov/16008113/

VI:
NEW DEVELOPMENTS IN MINIMALLY INVASIVE LAPAROSCOPIC AND HYSTEROSCOPIC GYNECOLOGICAL SURGERY

Laparoscopy and hysteroscopy have been hailed as game changers in the treatment of gynecological diseases in 21st century. Gynecological endoscopy, a thriving technology, which can be used in both medical diagnosis and treatment of gynecological conditions, has attracted increasing attention.

Indications for gynecological endoscopic surgery include:

1. All kinds of ectopic pregnancy, and obstruction, distortion and adhesion of fallopian tubes;
2. Infertility, uterine perforation and migration of intrauterine contraceptive devices (IUDs);
3. Ovarian cysts, tumors, rupture of corpus luteum, polycystic ovary syndrome (PCOS);
4. Uterine fibroids, uterine prolapse, dysfunctional uterine bleeding;
5. Endometriosis, adenomyosis, chocolate cysts;
6. Pelvic inflammation and abscess;
7. Pre- and intraoperative diagnosis of chronic pelvic pain of unknown origin and mass of unknown nature, ovarian biopsy.

Source: https://baike.baidu.com/

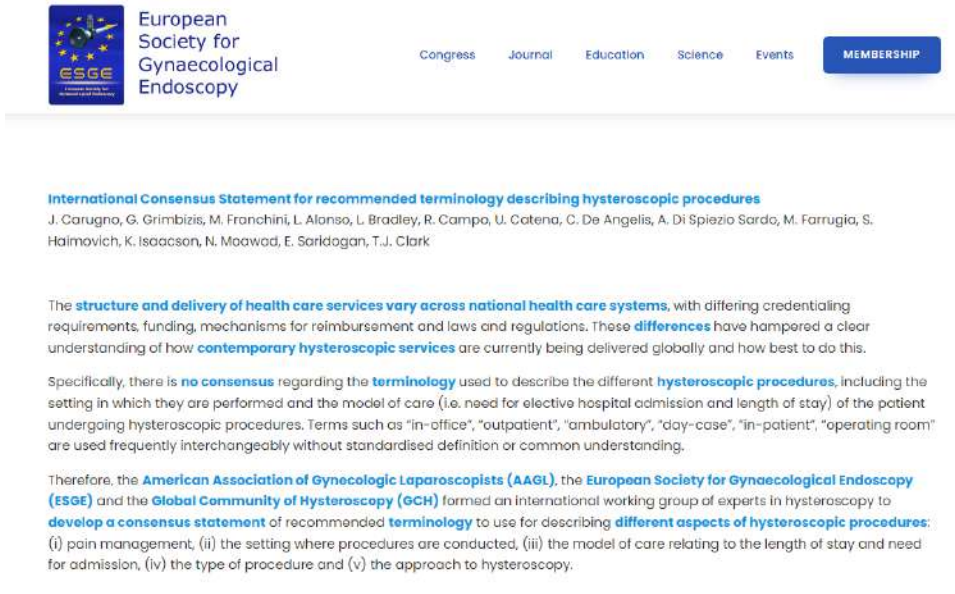
The following is the highlight of the advancements in gynecological laparoscopy and hysteroscopy in the past two years, based on the latest literature and information released by major academic societies

6.1 Major professional societies have released new guidelines/ recommendations for gynecological laparoscopic and hysteroscopic surgery during in 2021

6.1.1 International Consensus Statement for recommended terminology describing hysteroscopic procedures

The structure and delivery of health care services vary across national health care systems, with differing credentialing requirements, funding, mechanisms for reimbursement and laws and regulations. These differences have hampered a clear understanding of how contemporary hysteroscopic services are currently being delivered globally and how best to do this. Therefore, the American Association of Gynecologic Laparoscopists (AAGL), the European Society for Gynaecological Endoscopy (ESGE) and the Global Community of Hysteroscopy (GCH) formed an international working group of experts in hysteroscopy to develop a consensus statement of recommended terminology to use for describing different aspects of hysteroscopic procedures: (i) pain management, (ii) the setting where procedures are conducted, (iii) the model of care relating to the length of stay and need for admission, (iv) the type of procedure and (v) the approach to hysteroscopy.

Source: https://fvvo.eu/assets/959/FVVinObGyn-13-287.pdf



6.1.2 Enhanced Recovery and Surgical Optimization Protocol for Minimally Invasive Gynecologic Surgery: An AAGL White Paper

This is the first Enhanced Recovery after Surgery (ERAS) guideline dedicated to standardizing and optimizing perioperative care for women undergoing minimally invasive gynecologic surgery. It builds on the 2016 ERAS Society recommendations for perioperative care in gynecologic/oncologic surgery by serving as a more comprehensive reference for minimally invasive endoscopic and vaginal surgery for both benign and malignant gynecologic conditions. For example, the section on preoperative optimization provides more specific recommendations derived from the ambulatory surgery and anesthesia literature for the management of anemia, hyperglycemia, and obstructive sleep apnea. Recommendations pertaining to multimodal analgesia account for the recent Food and Drug Administration warnings about respiratory depression from gabapentinoids. The guideline focuses on workflows important to high-value care in minimally invasive surgery and tackles controversial issues in minimally invasive surgery. In these ways, the guideline supports our collective mission to elevate the quality and safety of healthcare for women through excellence in clinical practice.
Source: https://www.jmig.org/article/S1553-4650(20)30385-X/fulltext

6.1.3 Hysteroscopic myomectomy: The guidelines of the International Society of Gynecologic Endosc

With this publication, the International Society for Gynecologic Endoscopy (ISGE) aims to provide the clinicians with the recommendations arising from the best evidence currently available on hysteroscopic myomectomy (HM).

HM is the most effective conservative minimally invasive gynecologic intervention for submucous LM. The set of 14 ISGE recommendations can significantly contribute to the success of HM and the safety of patients for whom the choice of appropriate surgical technique, as well as the surgeon's awareness and measures to prevent complications are of the utmost importance :

Recommendation 1: The preoperative evaluation of patients planned to be submitted to HM should start with detailed history and physical examination (Grade 1A).

Recommendation 2: Ultrasonographic examination should be offered to all patients with uterine LMs (Grade 1A) while MUSA terms, definitions and measurements are recommended to be used for the description of scanning and sonographic findings (Grade 1B).

Recommendation 3: For planning HM, evaluation of the uterus with SIS or combined assessment by TVUS and diagnostic hysteroscopy is recommended (Grade 1A). MRI evaluation is appropriate when ultrasound-based assessment faces its limitations (e.g., patients with high body-mass-index, numerous LMs, very enlarged uterine size, coexistence of LMs and other uterine/pelvic lesions and uncertain nature of the uterine tumor) (Grade 1A).

Recommendation 4: Proper informed consent has to be given to the patient explaining alternative therapeutic strategies, the potential risks of HM, eventual need for a second intervention, and the likelihood of LM recurrence (Grade 1A).

Recommendation 5: The use of STEPW submucosal LM classification system is recommended to predict the complex surgeries, incomplete removal of the LM, long operative time, fluid overload and other major complications (grade 1B).
Recommendation 6: The preoperative treatment with GnRH analogues is not routinely recommended because it has not been proved to be useful to facilitate a complete resection of submucous LM, reduce operative time and fluid absorption, and avoid major complications (grade 2B).
Recommendation 7: For type 0 LMs, in addition to resectoscopy (slicing technique), morcellation is recommended, being faster and having a shorter learning curve with respect to resectoscopy (grade 1C).
Recommendation 8: For type 1–2 LMs, slicing technique is recommended at this moment in time, being feasible and reproducible with respect to morcellation alone (grade 1C).
Recommendation 9: No recommendation can be advanced concerning cold and thermal loop myomectomy for type 1–2 LMs (grade 2C).
Recommendation 10: Monopolar compared to bipolar type 1–2 LM resection is equivalent in terms of menstrual symptom relief and reproductive outcome (grade 2B).
Recommendation 11: The use of vaginal misoprostol prior to HM is not routinely recommended in order to reduce cervical trauma and perforation (grade 2B).
Recommendation 12: A fluid deficit of 1000 mL also in case of bipolar myomectomy with saline solution, in healthy women of reproductive age, contains low risk for major complications. Deficits of 1000 mL–2500 mL using saline solution need careful monitoring and termination of surgery at the slightest sign of possible embolism. Deficits of over 2500 mL need immediate termination of surgery (grade 1C).
Recommendation 13: Lower thresholds (750 mL) for fluid deficit should be considered in the elderly and in women with cardiovascular, renal or other co-morbidities (Grade 1B)
Recommendation 14: Routine hyaluronic acid gel application is recommended after HM, particularly in case of multiple myomectomies (Grade1B).

Hysteroscopic myomectomy: The guidelines of the International Society for Gynecologic Endoscopy (ISGE)

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ABSTRACT

Objective: With this publication, the International Society for Gynecologic Endoscopy (ISGE) aims to provide the clinicians with the recommendations arising from the best evidence currently available on hysteroscopic myomectomy (HM).

Study design: The ISGE Task Force for HM defined key clinical questions, which led the search of Medline/PubMed and the Cochrane Database. We selected and analyzed relevant English-language articles, published from January 2005 to June 2021, including original works, reviews and the guidelines previously published by the European Society for Gynecological Endoscopy (ESGE) and the American Association of Gynecologic Laparoscopists (AAGL), in which bibliographies were also checked in order to identify additional references, using the medical subject heading (MeSH) term "Uterine Myomectomy" (MeSH Unique ID: D063186) in combination with "Myoma" (MeSH Unique ID: D009214) and "Hysteroscopy" (MeSH Unique ID: D015907). We developed the recommendations through multiple cycles of literature analysis and expert discussion.

Source: https://pubmed.ncbi.nlm.nih.gov/34902749/

6.2 American Congress of Obstetricians and Gynecologists (ACOG) released a Committee Opinion of Uterine Morcellation for Presumed Leiomyomas

Uterine morcellation is a surgical technique that is performed to remove a uterus or leiomyomas through small incisions and facilitates minimally invasive surgical approaches. Morcellation may be performed during vaginal, laparoscopic, or abdominal surgery using a scalpel, scissors, or a power morcellator. A commonly used alternative to morcellation of an enlarged uterus is an abdominal hysterectomy. However, compared with minimally invasive approaches, abdominal hysterectomy is associated with higher morbidity and mortality and diminished quality of life. For women undergoing surgery for presumed leiomyomas, the higher procedural risk of abdominal hysterectomy or myomectomy (to avoid the risk of spreading malignant cells from an unsuspected leiomyosarcoma) must be balanced against the risk of morcellating an unanticipated malignancy and its associated morbidity and mortality. Based on existing data, this balance may favor a minimally invasive approach such as laparoscopic for younger women.

Source:

https://www.acog.org/clinical/clinical-guidance/committee-opinion/articles/2021/03/uterine-morcellation-for-presumed-leiomyomas

6.3 Gynecologic laparoscopic surgery can be continued with safety provided that precautions are taken to manage COVID-19 and corresponding complications

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Gynaecological surgeries in the era of COVID-19 pandemic: a prospective study

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This study aimed to determine the types of gynecological surgeries performed, difficulties encountered, and their outcomes in the setting of the COVID-19 pandemic. The authors concluded that gynecological surgeries could continue to be safely performed with all precautions in place against COVID-19 infection and related morbidities.

The following measures were observed as precautions during surgery:

• All surgeries were conducted by an experienced surgeon to ensure that all precautions were taken and to minimize the duration of surgery.

• Surgeons and personnel present in the operation theater were in the appropriate personal protective equipment (PPE).

• Disposable trocars were used, and the seals of trocars were properly checked for any leaks.

• Electrosurgical and ultrasonic devices were used in a low-power setting, and prolonged desiccation was avoided to minimize plume production.

• Laparoscopic suction was used to remove the surgical plume, and care was taken to prevent the spillage of pneumoperitoneum in the room.

In addition, care was taken to avoid rapid desufflation or loss of pneumoperitoneum, particularly during instrument exchange and specimen removal.

• Surgery was conducted at a low intra-abdominal pressure (10-12 mmHg) as much as feasible.

• Before extracting the uterus through the vault, the pneumoperitoneum was desufflated with closed suction to allow the minimum escape of carbon dioxide through the vault.

• Care was taken to minimize blood/fluid droplet spray or spread.

• Smoke evacuation systems were used to remove the surgical plume and to desufflate the abdominal cavity inside the operating room.

Source: https://ogscience.org/journal/view.php?doi=10.5468/ogs.21029

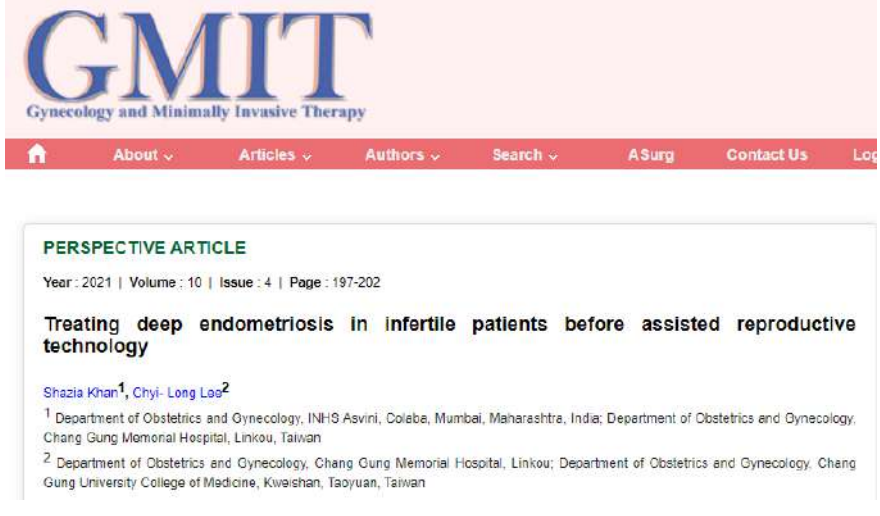
6.4 Laparoscopy for the treatment of infertile women with profound endometriosis before Assisted Reproduction Technology: a prospective study

he role of surgery in the treatment of infertile women with deep endometriosis (DE) has remained a matter of intense debate over the past decade. Available evidence is poor, as it amounts mostly from case series, which may probably be the cause of bias in the conclusions in previous studies.

With changing surgical practices and expertise in pelvic surgery improving, it is judicious to recommend DE surgery for infertile women. Women with DE should be counseled individually, and surgery tailored taking into consideration several factors. This not only includes the surgeons experience, but also presence of pelvic pain and other symptoms, age, lesion location, previous treatments (surgery and ART), as well as possible pregnancy complications. In this scenario, management by a skilled laparoscopic pelvic surgeon along with a multidisciplinary endometriosis team is a key factor in achieving successful outcomes. The surgeon should aim at one-stop surgery with the resolve to do complete excision of all lesions.

Excision of diseased tissue restores normal anatomy, significantly increasing the chance of spontaneous conception, enabling patients

to avoid ART treatment. Laparoscopic excision thus alleviates painful symptoms, improves sexual function, strengthens couple's relationships, and positively impacts a women's quality of life, further illustrating the benefits of surgical treatment for endometriosis-related infertility. However, in asymptomatic infertile women or in those in whom the pain symptoms can be effectively managed with medical treatment, surgery without excision of deep lesions or straight IVF may be considered.
Source:
https://www.e-gmit.com/article.asp?issn=2213-3070;year=2021;volume=10;issue=4;spage=197;epage=202;aulast=Khan;type=0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PERSPECTIVE ARTICLE
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Treating deep endometriosis in infertile patients before assisted reproductive technology

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6.5 Discussion of laparoscopic myomectomy suturing methods is gradually increasing, and women's health-oriented suturing techniques are also evolving

6.5.1 A suturing method without exposure of barbs on the wound surface using a unidirectional barbed monofilament absorbable suture (STRATAFIX™) in laparoscopic myomectomy: A feasibility study

In this retrospective study, 26 women underwent laparoscopic myomectomy (LM) for symptomatic uterine fibroids. The operative time, amount of blood loss, and number of threads used were compared between

conventional suture group (n=13) and barbed suture group (n=13).
This study showed that, when compared with conventional suturing, the new suturing method with a unidirectional barbed suture was feasible for LM. The new suturing method was superior in terms of shortening operative time and reducing the amount of blood loss; moreover, it was not inferior to the conventional method in terms of cost.
Source:
https://www.e-gmit.com/article.asp?issn=2213-3070;year=2021;volume=10;issue=2;spage=104;epage=108;aulast=Ota

6.5.2 Pregnancy outcomes of patients undergoing single-layer sutured laparoscopic myomectomy

In this retrospective study, the author aimed to investigate the pregnancy outcomes of 102 patients who underwent laparoscopic myomectomy (LM) with single-layer suturing. Twenty-four patients and thirty-two pregnancies meeting our criteria were included in the study. The mean age of the pregnant patients was 34 ± 8.2 years. The mean myoma diameter was 7.8 ± 3.4 cm.
What's known
One of the most important concerns about laparoscopic myomectomy is the theoretically increased risk of uterine rupture during pregnancy.

The tendency is in favour of multilayer suturing in laparoscopic myomectomy. There are no prospective randomised studies comparing single and double closure.

What's new

If there is sufficient surgical experience, the myometrium can be closed in one layer so that there is no dead space. According to pregnancy results of patients, single-layer suture is a safe technique to close the myometrium. Comprehensive randomised studies are needed in this regard. The author concluded that single-layer closure of the uterine defect in LM is safe for subsequent pregnancies, and the risk of uterine rupture is low.

Source: https://onlinelibrary.wiley.com/doi/10.1111/ijcp.14870


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regnancy outcomes of patients undergoing single-layer sutured aparoscopic myomectomy

erif Aksin, Cengiz Andan, Seyhmus Tunc, Mehmet Rifat Goklu,

6.6 Studies have shown that hysteroscopic surgery should be the treatment of choice for postpartum retention removal

Retained products of conception (RPOC) can occur after early or mid-trimester pregnancy termination and also following vaginal or cesarean delivery. It is frequently associated with continuous vaginal bleeding, pelvic pain, and infection. Late complications include intrauterine adhesions formation and infertility. Conventionally, the management of RPOC has been with blind dilation and suction curettage (D and C), however, considering that it is a "blind" procedure that could potentially damage the basal layer of the endometrium, exposing the uterus to unnecessary trauma, with risks of bleeding, uterine perforation, and

intrauterine adhesions (IUA) formation.

Hysteroscopic resection of RPOC is a safe and efficient alternative. This review analyzes the current available evidence regarding the use of hysteroscopic surgery for the treatment of RPOC comparing outcomes and complications of both traditional curettage and hysteroscopic technique, and concluded Operative hysteroscopy should be considered the treatment of choice in women with RPOC, as it is described as a safe and feasible procedure, with low rates of postoperative IUAs formation, and possible advantages in terms of future conception rates. Further studies are needed to better assess the future reproductive outcomes of patients after having pregnancies complicated with RPOC, mostly clarifying if different hysteroscopic approaches, such as the use of intrauterine morcellators, improve future fertility rates; since the current literature support superiority of hysteroscopy over traditional dilatation and curettage for treatment of RPOC.

Source:

https://www.e-gmit.com/article.asp?issn=2213-3070;year=2021;volume=10;issue=4;spage=203;epage=209;aulast=Foreste;type=0

6.7 Endoscopy in the management of gynecologic malignancies: A promising new future

In reviewing the application of gynecologic endoscopic surgery in 2021, Prof. Hua Duan, Director of the Center of Minimally Invasive Gynecology, Beijing Obstetrics and Gynecology Hospital, Capital Medical University, Editorial Board Member of APAGE-MIT, and Vice-president of Chinese Society of Gynecology Endoscopy (CSGE), mentioned that the application of minimally invasive gynecologic surgery in the treatment of malignant tumors has become more and more advanced and popular. The increasing clinical evidence and practice, and patient-recognized cases have greatly promoted the clinical application of minimally invasive endoscopic surgery that has also been well accepted by the majority of clinicians.

Gynecologic surgery on malignant tumors is highly anatomical, requiring a better operative field exposure. Endoscopy can magnify the field of view and clearly identify the position of blood vessels, nerves and organs. In the management of malignant tumors, endoscopy featured with the advantages of smaller incision, better view and less bleeding, which is very promising and valuable for clinical application and to explore.

Laparoscopic surgery for early-stage endometrial cancer is effective and has become a popular surgical method in clinical practice. A large number of clinical practices has confirmed that the postoperative complication rate of laparoscopic surgery for early-stage endometrial cancer patients is significantly lower than that of traditional open surgery, and the postoperative recovery time is also remarkably shorter. Even for patients with special types and late phase of endometrial cancer, the minimal invasiveness and application value of laparoscopic surgery are worth advocating.

In the surgical treatment of vulvar cancer, the traditional treatment of lymph node dissection in the inguinal region causes great incision to patients, and the wounds may not heal for a long time. Laparoscopic operation of lymph node dissection in the inguinal region can significantly reduce the incision and help patients to get better postoperative recovery.

Overall, the clinical benefits and development prospects of laparoscopic surgery in the treatment of patients with gynecologic malignancies are promising. The relevant controversial issues involved need more attention and discussion by clinicians to avoid unfavorable factors brought about by surgical operation, so as to maximize the advantages of minimally invasive surgery.
Source: http://www.cogonline.com/info/132905986601309231
*Extracted from Prof’s Hua Duan’s interview with "Obstetrics and Gynecology Online" on the review and outlook of gynecologic endoscopic surgery applications at China and overseas

6.8 Laparoscopy may be first choice for the treatment of endometriosis under a comprehensive evaluation

When sharing the opinion about further standardizing the clinical diagnosis and treatment of endometriosis, Prof. Jin-hua Leng, Editorial Board Member of APAGE-MIT, Chief Physician of Obstetrics and Gynecology Department in Peking Union Medical College Hospital, and Head of Laparoscopy Group of Chinese Obstetrics and Gynecology Association (COGA), indicated that surgery remains an important means for patients with endometriosis while there are many other management approaches, among which laparoscopy is preferred by clinicians. Careful preoperative evaluation and preparation, good surgical equipment and instruments, appropriate surgical approaches, skilled surgical techniques, and proper postoperative management plans are all vital to ensure the safety and improve the outcomes. Aiming to help patients benefit from surgery is the core to make surgical decisions, for example, when balancing the conflict between lesion removal and ovarian function preservation in the treatment of patients with endometriosis cysts, and deciding how to assess the potential impact of surgery on fertility (whether it is beneficial or harmful).
Source: http://www.cogonline.com/info/132905893834158795
*Extracted from Prof’s Jin-hua Leng’s interview with "Obstetrics and Gynecology Online" on the progress of the treatment of endometriosis

VII、
APPENDIXES

Appendix 1: Summary of 2021 Online Lectures by ISMIVS

1.1 PSTHIFUOG & ISMIVS Webinar: Application of HIFU in obstetrics and gynecology

Lecture 1
Speaker: Prof. Aixingzi Aili

Topic:
HIFU Application in Adenomyosis – The Shanghai, China Experience

Prof. Aixingzi Aili from China talked about HIFU Experience in Shanghai First Maternity and Infant Hospital (SFMIH), China. SFMIH has provided HIFU treatment service since August, 2015. By June 2020, it has performed 1550 HIFU ablation procedures, ranking the first in Shanghai in terms of the cumulative total number of HIFU cases. Currently, it performs around 500 HIFU treatments every year, mainly on the management of uterine fibroids and adenomyosis. Its research focuses on endometriosis and adenomyosis, whose classification is very important for HIFU treatment. Besides, Prof. Aili also shared her clinical protocol that integrates HIFU ablation with GnRH-a and LNG-IUS for the treatment of adenomyosis. Such combination approach is safe, effective and efficient, which can lower the risk of requiring hysterectomy and improve patients' quality of life, especially for those with localized adenomyosis.

Lecture 2
Speaker: Dr. Raymond Setzen

Topic:

HIFU Application in Myoma Uterine – The South African Experience

Dr. Raymond Setzen from South Africa shared his experience of HIFU treatment in the large teaching hospital of Chris Hani Baragwanath Hospital in Johannesburg serving mostly black communities. He has treated 485 cases of uterine fibroids with HIFU. The healthcare benefits of HIFU: reduces burden on healthcare system, including shorter hospital stay, freeing up theaters, lower running costs, decreasing exposure to HIV, and decreasing dependence on blood. Benefits for patients: preserves the uterus and retains fertility; noninvasive so it can decrease recovery period, and affords quicker return to work. The patients treated in his experience had higher weight (mean 79kg, range 43-115kg) and thicker abdominal wall (mean 49mm, range 33.3-64.7mm) comparing with other countries. The major adverse events were: 2 cases of 1st degree skin burn, 2 cases of nerve injury which restored spontaneously, no bowel injury, and no nerve injury. The Quality-of-Life Questionnaire showed that the average score increased from around 35 to almost 75 within 24 months after treatment, and for symptom severity score it dropped from 60 to below 20. The shrinkage rate found in follow-up after 1, 3, 6 and 12 months were 31%, 52%, 61%, 73% respectively. Fertility success: 16 cases, including 8 currently pregnant, 1 vaginal delivery, 7 term Caesarean deliveries. Dr. Setzen concluded that HIFU was safe and effective alternative treatment for UF in black women, resulted in promising, great potential for improving women's health, and alleviated burden on his hospital.

Lecture 3
Speaker: Dr. Filomena San Juan

Topic:

Comparison of HIFU and Different Modalities in the Treatment Outcome for Adenomyosis and Myoma Uterine

Dr. Filomena San Juan from Philippines made comparisons of HIFU with different modalities with respect to the treatment outcome for adenomyosis and uterine myoma. In her opinion, the development trend of modern medicine is from open surgery to minimally invasive therapy and then to noninvasive therapy. She shared her conclusion from the analysis of 12 articles:
For the treatment of fibroids,
Adverse effects are infrequent in HIFU;
Hospital stay is shorter and return to work is quicker;
USgHIFU has the lowest cost of procedure;
Reintervention rate in HIFU is lower;
HIFU is safe, effective, cost-effective and affords speedy recovery;
Long term clinical outcome of USgHIFU is better than uterine-sparing surgery and maybe safer;
USgHIFU shortens time to pregnancy, pregnancy ratio is comparable to laparoscopic myomectomy (LM);
Cesarean section rates, placenta previa and increta rates, uterine rupture rates are higher in LM;
Regarding the productive outcome of patients with adenomyosis and infertility treated with USgHIFU or LM, the results show no significant difference.

1.2 SOGON & ESGE-WG & ISMIVS Webinar: Non-Surgical Treatment of Uterine Disorders

Lecture 1
Speaker: Prof Hugo C. Verhoeven

Topic:
Non-Surgical Ablative Therapy for Benign Diseases of the Uterine Wall

Prof Hugo C. Verhoeven started his talk by sharing his experience of how he got to know High Intensity Focused Ultrasound (HIFU) and his understanding on HIFU treatment of uterine fibroids, adenomyosis and influence on fertility. His take-home messages were: HIFU treatment does not increase the complication rate during pregnancy and delivery, especially HIFU does not increase uterine rupture; Infertility patients with adenomyosis, conceive spontaneously after HIFU treatment and deliver term babies; HIFU is a safe treatment option for fertility patients.

Lecture 2
Speaker: Prof. Christopher O. Aimakhu

Topic: Drug Treatment for Fibroids and Adenomyosis

Prof. Christopher O. Aimakhu gave a lecture titled "Drug Treatment for Fibroids and Adenomyosis" in which the current available drugs and their advantages and disadvantages were discussed. He concluded that medical management of uterine fibroids may provide symptomatic relief of the uterine fibroids-related symptoms along with the opportunity to maintain fertility; that currently GnRH agonists and SPRMs were the most effective medical therapies, with the most evidence to support their reduction of fibroids and symptomatic improvement in menstrual bleeding; that the choice of treatment depended on the patient's personal treatment goals, as well as efficacy and need for repeated interventions; and that for treatment of adenomyosis, it should be tailored to the specific symptom or request of the individual patie

Lecture 3
Speaker: Dr. Hammed Ninalowo

Topic:
Uterine Artery Embolization in Uterine Fibroids

Dr. Hammed Ninalowo talked on "Uterine Fibroids and Interventional Radiology Management" , focused on uterine fibroid embolization (UFE). In his opinion, UFE has minimal complication rate and proven effectiveness in over 30 years and affords quick recovery. He shared how the procedure was done. Results showed that success rate for improving symptoms was approximately 85-95% and there was on average a 50-70% of uterine and dominant fibroid volume reduction in 3-6 months. The possible complications included post embolization syndrome which were self-limiting; bleeding at access site and endometrial infection were rare; vaginal discharge, fibroids shedding or expulsion depended on location of fibroids; chances of a complication leading to hysterectomy was < 0.5%. Studies showed that the probability of successful pregnancy with live birth at 1 and 2 years was 24.4% and 36.7% respectively.

Lecture 4
Speaker: Dr. Nuria Pons Serra

Topic:
HIFU in the Treatment of Fibroids and Adenomyosis

Dr. Nuria Pons Serra talked on "HIFU and Fertility" and shared her HIFU experience in the University Hospital Mutua de Terrassa (HUMT), Barcelona, Spain, which showed that the adverse events rate of HIFU was around 10% which were mainly skin burns, hematuria, vaginal bleeding etc. They witnessed 42 pregnancies including 41 singletons and 1 pair of twins. 90% got full-term deliveries. Based on their experience and the analysis of the studies, no uterine rupture occurred after HIFU, and the pregnancy rate was higher than laparoscopic surgery.

1.3 How can HIFU help to transform women's healthcare in Africa

Lecture 1

Speaker: Dr. Raymond Setzen

Topic: HIFU Application in South Africa

Dr. Raymond Setzen from South Africa shared his experience of HIFU treatment in the large teaching hospital of Chris Hani Baragwanath Hospital in Johannesburg serving for black people. He said that the traditional treatment of fibroids in health care system were usually accompanied by burdens such as lengthy hospital stay, higher costs, overcrowding wards, excessive use of blood, etc. However, with the development of fibroid treatment from hysterectomy to HIFU, hospitals could enjoy the health care benefits of no hospital admissions, no risk of HIV transmission and low risk of complications while patients were also able to enjoy HIFU advantages of quick recovery, no scars and uterus retained. He also mentioned that the recovery time of US-guided HIFU treatment was 1-2 days while the recovery time of hysterectomy was 4-6 weeks. Among the 485 cases he has treated, shrinkage rate found in follow-up after 1, 3, 6 and 12 months were 31%, 52%, 61%, 73% respectively, the average score of QOL increased from around 35 to almost 75 within 24 months after treatment, and the symptom severity score dropped from 60 to below 20. By comparing the pre-HIFU and post-HIFU MR images, he concluded that HIFU was a safe and effective alternative treatment for uterine fibroids in black women, which had great potential for improving women's health and alleviating burdens in his hospital.

Lecture 2

Speaker: Prof. Mohamed Hamed

Topic: HIFU Treatment in Egypt

Prof. Mohamed Hamed from Egypt shared his HIFU experience in HIFU Egypt, the first HIFU center in Middle East and Africa. So far, HIFU Egypt has treated 506 patients, among which there were 308 patients with uterine fibroids and/or adenomyosis and 198 patients with tumors (95 liver HCC, cholangiocarcinoma and metastases, 82 pancreas, 3 liposarcoma, 2 aggressive fibromatosis, 8 benign breast lesions, 3 bone metastases and 5 others). As an interventional oncologist, Prof. Hamed thought it was essential to find a new modality that is noninvasive and valid for difficult-to-treat tumors. He said that HIFU technology was approved by FDA in the treatment for bone metastases and was also approved outside US for essential tremors, osteoid osteoma, prostate cancer, breast cancer, kidney cancer, liver cancer and pancreatic cancer, which shows the high level of research and proof in this technology. He also shared five factors that doctors must master before working with HIFU, including anatomy, positioning, surgical approaches, direction of the power and the least power need. Prof. Hamed concluded that HIFU was a technology of the future and would take a good role in the treatment of benign and malignant tumors.

Lecture 3

Speaker: Dr. Abayomi Ajayi

Topic: Understanding HIFU Technology

Based on his clinical practice in gynecology, Dr. Abayomi Ajayi from Nigeria shared his thoughts on the clinical impact of HIFU on gynecology in Africa. He mentioned a survey by a tertiary health institution in South-south Nigeria, which showed that uterine fibroids accounted for 7.1% of gynaecological admissions and 21.2% of major gynaecological surgeries, and that most of the cases were seen in 30-39 age group and those with nulliparous status. And in a study of over 900 infertile black African women who had hysteroscopy between 2005 and 2014, open myomectomy was found as a significant factor for intrauterine adhesions. Consider the huge service gap and knotty post-operative complications, the HIFU technology rose in response in Africa. Dr. Ajayi shared a group of statistics in an IDEAL Study that among 1353 women received HIFU, 472 hysterectomies and 586 myomectomies, major adverse events occurred in 0.2% of HIFU and in 12.6% of surgical cases, which showed a significant less morbidity of HIFU than surgery. Dr. Ajayi concluded that HIFU was effective, safe with less complications than surgical treatment.

Lecture 4

Speaker: Dr. Andrei Klimash

Topic: Silk Road Hospital in Addis Ababa

Dr. Andrei Klimash from Russia mainly introduced the Silk Road General Hospital in Addis Ababa, Ethiopia in the following eight aspects: 1. healthcare services; 2. diagnostic devices; 3. operation theatre; 4. neurological and neurosurgical care; 5. orthopedic care; 6. surgical, gynecological and urological care; 7. general care; 8. professionals and team members. The Silk Road General Hospital is working on the HIFU project, aiming to bring the HIFU treatment to the patients in Ethiopia and clinical training to local doctors.

Lecture 5

Speaker: Dr. Muzaza A. M. Nthele

Topic: HIFU and Africa

Dr. Muzaza A. M. Nthele, Counselor-Health, Embassy of Zambia in China, shared his experience of making his second visit to Chongqing Haifu Medical and introduced the Zambian expert team. During his visit to Chongqing, Dr. Muzaza got to know the noninvasive HIFU technology using non-ionizing ultrasonic waves to heat or ablate tissue and decided to bring it to Zambia to treat the patients with uterine fibroids. He mentioned that open surgery was widely used in Zambia, but may easily cause blood shortage supply and affect fertility. Dr. Muzaza believed that the import of the HIFU technology would allow doctors in Zambia to treat uterine fibroids without the need for blood or competing with other urgent cases. He hoped to create hunger in the Zambia team for HIFU technology through this webinar.

1.4 APAGE-ISMIVS HIFU Series Webinars 2021: HIFU and Fertility, Potential or Not?

1.4.1 Episode 1

Lecture 1

Speaker: Dr. Sevellaraja Supermaniam)

Topic:
Influence of uterine fibroids on fertility and current treatment options

Dr. Selva (Sevellaraja Supermaniam), former President of APAGE, a Consultant Obstetrician and Gynecologist at Mahkota Medical Center, Melaka, Malaysia, who is involved in promoting HIFU technology and gynecological endoscopic surgery in Malaysia, shared the influence on fertility of the removal of non-cavity distorting (NCD) intramural fibroids. After showing the classifications of fibroids and demonstrating the pathophysiology that causes subfertility in patients with intramural (NCD) fibroids, Dr. Selva answered the questions on whether intramural (NCD) fibroids cause infertility and whether myomectomy improves pregnancy rates based on several papers. He concluded that myomectomy should not be the first-line treatment in patients with small intramural fibroids, and he provided five non-surgical alternatives including ulipristal acetate, GnRH agonist, atosiban, uterine artery embolisation (UAE), and HIFU, among which HIFU appears to be the most attractive option to shrink small intramural fibroids because it's a noninvasive technique with very few side effects.

Lecture 2

Speaker: Prof. Lian Zhang

Topic:
Pregnancy outcome of HIFU treatment of uterine fibroids and adenomyosis

Prof. Lian Zhang, Secretary-General of ISMIVS, Director of Chongqing Haifu Hospital and a Chief Editorial Board Member of International Journal of Hyperthermia, gave a speech themed on Pregnancy Outcomes of Patients with Uterine Fibroids or Adenomyosis after HIFU Treatment. He first introduced the working principles and application of HIFU treatment, then he presented pre-and post- HIFU MRI images of some cases with uterine fibroids and adenomyosis. Prof. Zhang Lian reported that 293 patients with uterine fibroids and 31 patients with adenomyosis that had been treated with HIFU in Chongqing Haifu Hospital got pregnant and delivered babies after HIFU treatment, and no complications occurred during their pregnancy or delivery. Based on the particular elaboration of several cases he has treated, Prof. Zhang Lian concluded that HIFU treatment was an effective way to help patients who suffered from infertility due to uterine fibroids or adenomyosis, and required more researches to theoretically prove its effectiveness on pregnancy.

Lecture 3

Speaker: Prof. Felix Wong

Topic: Introduction of Hong Kong HIFU Center & Surgery Video

Prof. Felix Wong, the Adjunt Professor of the University of New South Wales and Chairman of CA-AMIGO, shared his experience in setting up Hong Kong HIFU Center and some surgery videos of HIFU treatment. With advanced equipment and customized services, Hong Kong HIFU Center has treated 240+ cases in total since September 2019. Prof. Felix Wong also looked back on the development of gynecological surgery from opening surgery to advanced laparoscopic surgery and robotic surgery, and then to focused ultrasound surgery.

1.4.2 Episode 2

Lecture 1

Speaker: Prof. Chii-Ruey Tzeng

Topic:
Addressing Challenges of Myoma Uterine & Adenomyosis in Fertility Management

Prof. Chii-Ruey Tzeng, Founder of Taipei Fertility Center (TFC) and President of Taiwan Endometriosis Society, shared current challenges and treatment options of uterine myoma and adenomyosis in fertility management. Prof. Tzeng first analyzed the mechanisms linking different types of uterine fibroids and infertility, and provided corresponding management strategies. And he explained why patients with adenomyosis were not easy to be cured due to CISD2 (a longevity gene), then further compared IVF outcome of 10 adenomyosis cases after GnRHa treatment. Prof. Tzeng concluded that segmental IVF approach and adenomyomectomy should be considered for patients who were poor responders to long-term GnRHa long-term regulation with a treatment diagram of ART in adenomyosis.

Lecture 2

Speaker: Dr. Jordi Rodriguez

Topic: HIFU and Fertility

Dr. Jordi Rodriguez from Mutua Terrassa University Hospital, Spain, gave a speech themed on HIFU and Fertility. He introduced the working principle of ultrasound ablation and two goals of HIFU treatment for fertile women with uterine fibroids, including the inactivation of fibroid tissues and shrinkage of fibroids with gradual restoration of uterine structure and function. After that, he compared the pregnancy rate of patients with uterine fibroids underwent laparotomy, laparoscopic surgery and USgHIFU therapy. Based on his clinical experience of treating uterine fibroids and adenomyosis, Dr. Jordi Rodriguez concluded that USgHIFU therapy was an effective and safe technology, and that it seemed to be the first-line therapeutic option for women due to its noninvasive nature.

Lecture 3

Speaker: Dr. Wei-Chun Chen

Topic:
Surgery Video – HIFU Treatment for Adenomyosis and Myoma Uterine

Dr. Wei-Chun Chen shared his clinical experience using HIFU technology to treat uterine fibroids and adenomyosis in Chang Gung Memorial Hospital of Linkou, and elaborated on the whole process of HIFU treatment with HIFU treatment videos. He ended his lecture with some tips of HIFU treatment for uterine fibroids and adenomyosis, such as using concentrated high-dose energy strategy for myoma treatment and considering average low-dose energy strategy for adenomyosis treatment.

1.4.3 Episode 3

Lecture 1

Speaker: Dr. Hsin-Hong Kuo

Topic: MRI Change in Uterine Myoma before and after HIFU

Dr. Hsin-Hong Kuo from Chang Gung Memorial Hospital at Linkou, Taiwan, mainly shared how to diagnose sarcoma through MRI before HIFU. He first introduced the classification and position of mesenchymal tumor in uterus, and said that it was hard to prognose leiomyosarcoma due to the similar symptoms with benign uterine myoma of bleeding, pelvic mass and pain. Then, he indicated that T2-weighted image of leiomyosarcoma was featured with irregular heterogenous and central hyper intense (necrosis/high cellularity), while T1 contrast image showing central necrosis with the evidence of invasion, with suspicious symptoms of rapid tumor growth (double size within 3-6 months), growing even with GnRHa and tumor growth after menopause.

Lecture 2

Speaker: Dr. Yen-Ju Sung

Topic: Case Presentation

Dr. Yen-Ju Sung also Chang Gung Memorial Hospital presented 3 cases of adenomyosis with infertility. One of the cases was a 37-year-old female who has suffered from infertility for 5 years due to adenomyosis, she received GnRHa for a month in June 2020, yet still got persistent symptoms. In August 2020, she underwent HIFU treatment and conception with advice for about 6 month, after that, she became pregnant via IVF in April 2021 and is expected to deliver this December.

Lecture 3

Speaker: Prof. Chyi-Long Lee

Topic:
The Management of Adenomyosis in Sub-fertile Patients before ART

Prof. Chyi-Long Lee, the chairman of APAGE, discussed the management of adenomyosis in infertile patient. He first explained the pathogenesis of adenomyosis and indicated that ultrasonic evaluation of the type and the extend of adenomyosis in the myometrium are important to confirm the severity of symptoms and infertility. Then, he mentioned that there were 5 treatment options including medical treatments, surgical options, radiologic, HIFU and combined therapy depend on the presence of specific symptoms, such as pain, abnormal uterine bleeding and/or infertility. He also indicated the cause of infertility and two major goals of treatment: improving the chance of pregnancy and ART outcome post adenomyomectomy or HIFU ablation. After elaborating several surgery videos of different therapy, Prof. Chyi-Long Lee concluded that segmented ART for adenomyosis patients seems to be the best option, and HIFU showed a safe and effective profile as a therapeutic management option for sub-fertile patients with adenomyosis.

Lecture 4

Speaker: Dr. Sevellaraja Supermaniam

Topic: Surgery Video

Dr. Selva, a Consultant Obstetrician and Gynecologist at Mahkota Medical Center, Melaka, Malaysia, shared a clip of surgery videos in managing uterine fibroids and adenomyosis with HIFU, and outlined the standard procedures and useful skills of operation. During the Q&A part, for the question of how to position the focal zone, Dr. Selva and Prof. Chyi-Long Lee emphasized the importance of controlling the ultrasonic power and precisely positioning center zone and explained the usage of the water balloon.

1.4.4 Episode 4

Lecture 1

Speaker: Dr. Lee Keen Whye

Topic: The Learning Curve of HIFU

Dr. Lee Keen Whye, the Leading Consultant Obstetrician and Gynaecologist at the Gleneagles Medical Centre, Singapore, opened the seminar by emphasizing the importance of treating benign tumors such as fibroid and adenomyosis and introducing the development of gynaecological surgery from laparotomy to HIFU. Then, he brought a lecture themed on The Learning Curve of HIFU, during which he first compared the main differences between MRI-guided HIFU and Ultrasound-guided HIFU which was indicated to be more flexible and efficient with shorter treatment time. Over the last 3 years, he had managed 118 patients with HIFU therapy, among which 83 cases with fibroids, 26 with adenomyosis and 9 mix symptoms with 123 min of average treatment time. Based on such clinical experience, he shared a three-stage method to learn HIFU. He also shared 4 cases of uterine fibroid and 2 cases of adenomyosis that were treated with HIFUand concluded that HIFU was revolutionary and disruptive to the world of gynaecological surgery which he believed more women would choose HIFU in the future.

Lecture 2

Speaker: Prof. Fong Yoke Fai

Topic: Case Study – HIFU Treatment in Singapore

Prof. Fong Yoke Fai from the Department of Obstetrics and Gynaecology, National University of Singapore, shared his clinical experience using HIFU to treat uterine fibroids and adenomyosis. He introduced the principal of HIFU and indicated that HIFU was an advanced non-invasive and non-surgical technology with little downtime and allowing patient to resume daily activities after treatment. Till December 2021, Farrer Park Hospital Day Surgery Centre had done 173 cases of HIFU in total, for follow-ups of these cases after HIFU treatment, there were no skin burns, 1 case of L4 nerve root radiculopathy (complete recovery after 3 months), 6 cases of pregnancies (3 fibroids, 3 adenomyosis).

Lecture 3

Speaker: Dr. P.M. Gopinath

Topic: Pre-treatment of uterine fibroids and adenomyosis for ART

Dr. P.M. Gopinath, the Director of Obstetrics and Gynecology, SIMS Hospital, India, mainly introduced the pre-treatment of fibroids and adenomyosis in ART. He first explained the mechanism of impaired fertility in case of intramural-submucosal myoma and discussed the impact of myoma on fertility. He also presented the pregnancy rate and miscarriage rate of intramural leiomyoma after IVF and then provided 5 treatment options for fibroids including medical therapy, open surgery, laparoscopy, robotic surgery and HIFU. After comparing the old and new techniques of reduction surgery for adenomyosis, he concluded that HIFU was well tolerated by patients, and the mean uterine volume decreased by 12.7%, the symptom severity score improved significantly and no serious complications were observed.

Lecture 4

Speaker: Dr. He Min

Topic: Discussion on Difficult Cases

Dr. He Min from Chongqing Haifu Hospital further shared treatment strategies for difficult cases of HIFU. She indicated that to achieve safety, effectiveness and efficiency of HIFU treatment, 6 factors including BMI, the position of the uterus, number and position of the fibroids, blood supply and T2WI should be considered. Then she shared difficult cases of the posterior uterus, multiple fibroids and adenomyosis with hysteromyoma/chocolate cyst, as well as potential responding strategies. As the director of the Training Department, Engineering Research Center of Ultrasound Medicine, China, Dr He Min was also involved in the Q&A part to address the problems and concerns participants had in terms of device operation and treatment planning.

1.5 HIFU treatment for liver and pancreatic cancer – new option, new hope

1.5.1 Episode 1

Lecture 1

Speaker: Prof. Zhang Lian

Topic:
Clinical experience of HIFU treatment for liver and pancreas cancer in China

Prof. Zhang Lian, Secretary-General of ISMIVS and Director of Chongqing Haifu Hospital, first introduced the fundamental principle of HIFU. Then, based on the inclusion criteria of HIFU treatment for small hepatocellular carcinoma (HCC) in his institution including patients who were deemed not candidates for surgery, not suitable for local treatment such as radiofrequency ablation (RFA), or with a solitary tumor ≤ 5cm/tumor number ≤ 3 with each tumor ≤ 3 cm in diameter, he shared the characteristics, survival rates and recurrence rates of the 35 patients with small HCC treated with HIFU. Prof. Zhang Lian also compared the survival rates of transcatheter arterial embolization (TAE) and TAE followed by ultrasound-guided HIFU (USgHIFU) for advanced HCC. After the elaboration of several case reports, he concluded that USgHIFU ablation could be considered a safe and effective approach for liver tumors.

Lecture 2

Speaker: Prof. Holger Strunk

Topic:
The safety and efficacy of HIFU treatment for pancreatic cancer

Prof. Holger Strunk from the University Hospital Bonn, Germany, discussed the safety and efficacy of HIFU treatment for pancreatic cancer. One of the cases he shared was a 56-year-old male patient with an inoperable pancreatic tumor who received HIFU treatment. Significant pain relief was achieved 2 days after HIFU and tumor remission was observed 12 months after HIFU. Based on the clinical data his institution collected, he summarized that HIFU therapy can bring effective and lasting reduction of cancer-related pain burden in 85% of patients, significant tumor volume reduction persisting over time in 80% of patients and possible tumor regression after the second HIFU procedure. HIFU also seems to provide a possible survival benefit for advanced pancreatic cancer.

Lecture 3

Speaker: Prof. David Cranston

Topic:
The role of HIFU beyond liver and pancreatic tumor – the clinical experience trial in Oxford

Prof. David Cranston, the President of ISMIVS, shared a fascinating story about how HIFU was introduced to his research team in Surgery at Oxford University and the clinical trials of HIFU therapy conducted in Oxford. He particularly indicated the drug delivery procedure and result for liver cancer by using focused ultrasound to release doxorubicin from circulating thermosensitive liposomes: out of 9 patients with complete radiological assessment, 4 demonstrated PR on CHOI and/or PERCIST. He also talked about HIFU ablation for pancreatic cancer and targeted drug delivery. Among 8 patients with unresectable pancreatic cancer treated with HIFU, total pain relief was observed and the median survival time was 11 months. In his view of the development of HIFU application, advanced machines, faster treatment and more accurate imaging would emerge in the nearer future.

Lecture 4

Speaker: Prof. Xu Yonghua

Topic:
MRI evaluation for HIFU treatment of hepatic and pancreatic tumors

Prof. Xu Yonghua from Xuhui Hospital of Fudan University mainly discussed the MRI evaluation for focused ultrasound ablation in the treatment of hepatic and pancreatic cancer. He compared MRI images before and after HIFU therapy of 19 cases with liver cancer. As one of the examples, a 60-year-old male patient with hepatic metastasis after sigmoid colon cancer surgery received HIFU treatment due to the bleeding risks and thrombus for RF ablation, and the lesion was almost completely ablated with intact vessels. He also shared 6 cases of pancreatic cancer and indicated that HIFU was a feasible and safe therapy for liver and pancreatic tumor with less complication, and he believed that with the development 5G technology, the remote surgery of HIFU can be performed to benefit more patients around the world.

Lecture 5

Speaker: Prof. Zhou Kun

Topic: Surgery video – HIFU treatment for pancreatic cancer

Prof. Zhou Kun from the Second Affiliated Hospital of Chongqing Medical University further shared a surgery video of a patient with pancreatic cancer who were receiving HIFU treatment and elaborated the procedure and precautions, including the patient' s surgical position, sedation administration and imaging analysis. He also shared two case reports of his hospital and concluded that HIFU therapy was a safe minimally invasive treatment which can benefit cancer-related pain release and was a potential option as a pre-surgery for borderline resectable tumor.

1.5.2 Episode 2

Lecture 1

Speaker: Dr. Simon Tsang

Topic: HIFU treatment for liver tumor in difficult location

Dr. Simon Tsang from the department of surgery at the University of Hong Kong gave a speech themed on "High-intensity Focused Ultrasound Treatment of Liver Tumors in Difficult Locations". He first mentioned 6 treatment options for HCC, in which HIFU was included as an emerging and valuable one for small and advanced cirrhosis, and then introduced the eligibility and contraindications for HIFU. Subsequently, Dr. Tsang elaborated on the feasibility of HIFU for ablating liver cancer lesions of the difficult locations, with several cases of lesions in the liver dome as well as the ones close to vascular structures and portal pedicles. In his case demonstration, pre-operative and peri-operative preparations in terms of equipment setting, positioning, sonication and general anesthesia were presented wit hgreat details, along with other tips and tricks. Dr. Tsang concluded that it was safe to ablate the tumors in some particular positions, and the treatment efficacy and the prognosis of patients with liver tumors following HIFU were quite pleasing.

Lecture 2

Speaker: Prof. Joan Vidal-Jove

Topic:
HIFU treatment for liver and pancreatic tumor – the Spanish experience and case study

Prof. Joan Vidal-Jove, the surgical and interventional oncologist of the Comprehensive Tumor Center Barcelona and the Institution Khuab for Interventional Oncology, has performed over 250 oncological cases with HIFU in the last 12 years. He shared his experiences in tackling liver and pancreatic tumors in Spain and clarified some of the most difficult questions in this specific field. Then, he compared the clinical outcomes and survival curves before and after HIFU treatment in patients with liver and pancreatic tumors based on cohort studies. The results revealed that HIFU treatment or HIFU plus chemotherapy was indeed safe and effective, which indicated that it was the right path in such cases. Prof. Joan Vidal-Jove further shared his recommendations in the degree of ablation, reinforce strategies, combined therapies and ideal candidates for HIFU therapy. Prof. Vidal-Jove hoped that there could be a breakthrough both in the equipment and the treatment in the future.

Lecture 3

Speaker: Prof. Meng Zhiqiang

Topic: The experience of HIFU treatment for pancreatic cancer

Prof. Meng Zhiqiang from the Minimally Invasive Treatment Center of Fudan University Shanghai Cancer Center (FUSCC) shared the exploration in his institution of HIFU treatment for pancreatic cancer. He indicated that only 10% pancreatic tumors were resectable and the 5-year survival rate was very poor even after the surgery, which was the main reason HIFU emerged as a new option for pancreatic cancer. After introducing the developing course of HIFU application for locally advanced pancreatic cancer (LAPC) in FUSCC from 2008 to 2019, including the initial success of pain relief in patients with high rate of survival and minimal complications, further exploration of treatment for tumor with metastasis, safety evaluation by several HIFU cases, as well as the comparison with other local therapies such as RFA and irreversible electroporation (IRE), he concluded that HIFU appears to be the most attractive option to treat pancreatic cancer, especially pancreatic metastasis in the future, because it' s a repeatable technique with low risk and cost.

Lecture 4

Speaker: Prof. Mohamed Hamed

Topic: Management of liver tumor – intervention therapy of HIFU?

Prof. Mohamed Hamed from Cairo University, Egypt, discussed the local management of HCC. He mentioned that due to the difficulties regarding to the staging system, size and number limitation, as well as the vascular invasion, HIFU was recommended for the treatment of unresectable liver tumors. Through several case analyses, he showed that HIFU was not only able to ablate the lesion in difficult locations, but also benefited the drug delivery process and the immune response. He further compared HIFU with liver cancer-intervention therapy for HCC and concluded that HIFU would bring a better result to the treatment of HCC with a lower distance, smaller size and less vascularity.

Lecture 5

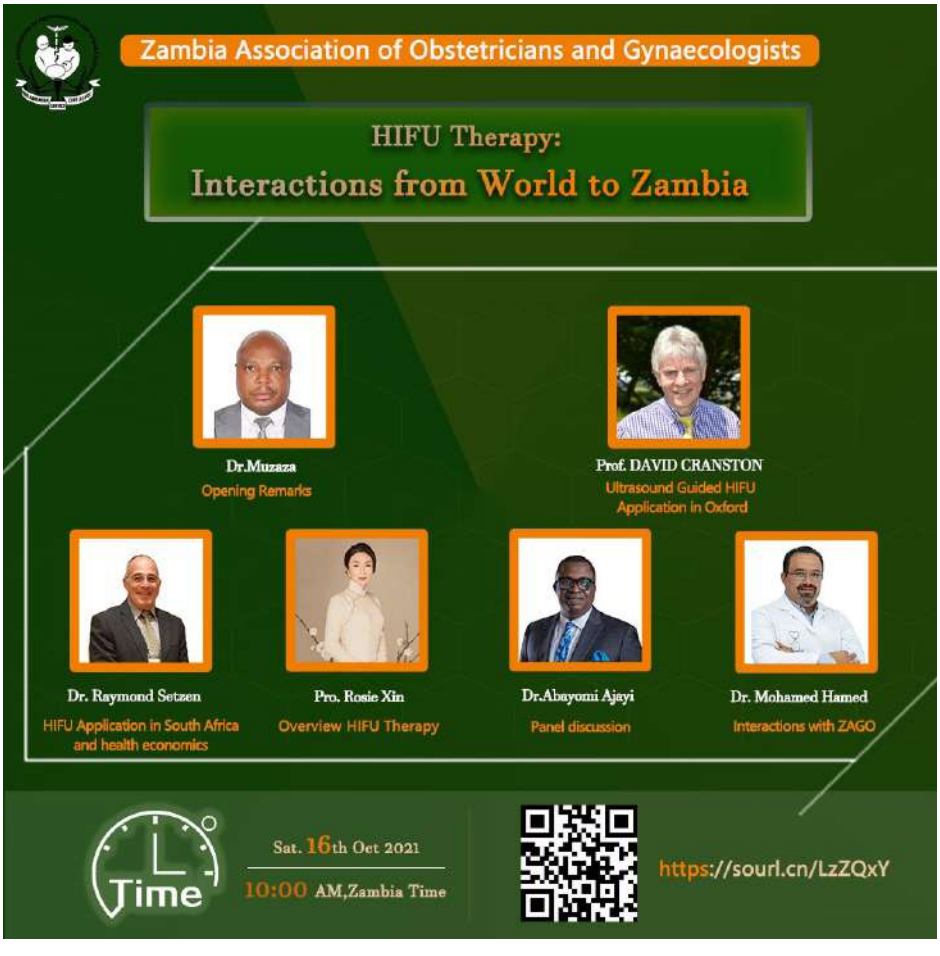
Speaker: Prof. Yang Wuwei

Topic: Application of HIFU for the treatment of progressive stages of pancreatic cancer – a single center experience

Prof. Yang Wuwei from the General Hospital of the People' s Liberation Army shared the application of HIFU for the treatment of progressive stage of pancreatic cancer. He discussed the 4 local ablation techniques for pancreatic cancer such as RFA, IRE, cryoablation (CA) and HIFU, which resulted in the significant tumor progression control, prolonged survival time, symptom alleviation and improving the quality of life. After elaborating the diversity of HIFU effects, he showed a case of a 48-year-old female with significant cancer pain whose pain score decreased from 7 to 2 after HIFU treatment with a survival time of 18 months after combined chemotherapy. He believed that HIFU is valuable in the treatment of advanced pancreatic cancer and the comprehensive treatment strategy is worth exploring if it can be combined with systemic therapy such as immunotherapy.

Appendix 2: Summary of 2021 Online Lectures by Other Societies Engaged in Minimally Invasive and Noninvasive Medicine

2.1 Zambia Association of Obstetricians and Gynaecologists



Watch here:
https://www.youtube.com/watch?v=H-7Oue7nsM8&feature=youtu.be

2.2 Indonesian Gynaecological Endoscopy Society

Watch here:
https://www.facebook.com/haifumedical/videos/871485997065581

2.3 Asociación Colombiana de los Centros de Reproducción Humana

Watch here: https://youtu.be/g4E1wZy-k8U

2.4 The Asia-Pacific Association for Gynecologic Endoscopy and Minimally Invasive Therapy

Watch here: https://youtu.be/hS2dA3YTLmk

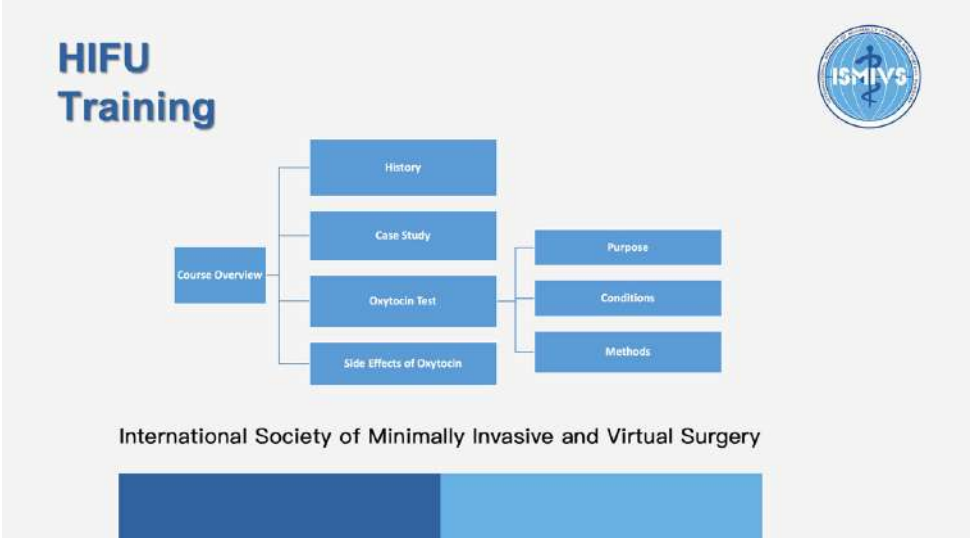
2.5 Society of Gynaecology and Obstetrics of Nigeria (SOGON) & European Endometriosis League (EEL) & Endometriosis Support Group, Nigeria (ESGN)

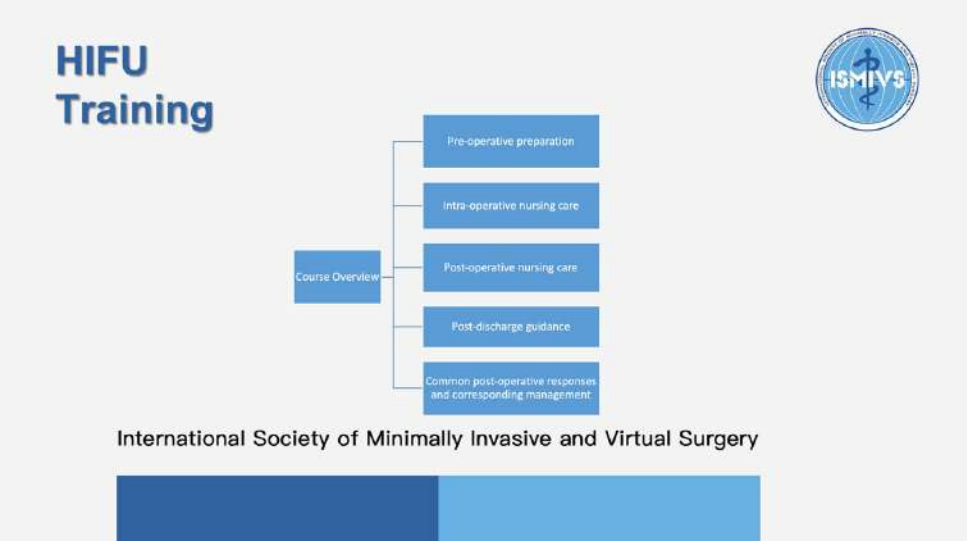
Watch here: https://youtu.be/Sbm1pYmJyW8

Appendix 3: HIFU Training Courses by ISMIVS

Available Training Course:
1. Introduction to Haifu Focused Ultrasound Tumor Therapeutic System
2. The Physics and Biological Effect of HIFU Ablation
3. In Vitro Animal Experiment: The Correlation between HIFU dosage and HIFU Ablation Effect
4. MRI Features of Pelvic Diseases
5. Techniques for Understanding MR Images and Its Clinical Application in HIFU Ablation
6. HIFU Treatment of Uterine Fibroids: Clinical Protocol
7. Case Study on HIFU Ablation of Uterine Fibroids
8. Sedation and Analgesia Planning for HIFU Ablation
9. Application of Oxytocin in HIFU Treatment of Uterine Fibroids
10. Nursing for HIFU Treatment of Uterine Fibroids/Adenomyosis
*Note: Course 9 & 10 were newly updated on www.ismivs.org in 2021

Please see the following overview of Course 9 & 10 as reference:
Application of Oxytocin in HIFU Treatment of Uterine Fibroids





Appendix 4: Excerpts from some selected articles

Efficacy of High-Intensity Focused Ultrasound Combined With GnRH-a for Adenomyosis: A Systematic Review and Meta-Analysis

High-intensity focused ultrasound (HIFU) is an innovative non-invasive technology used for adenomyosis. Gonadotropin-releasing hormone agonist (GnRH-a) is a hormone commonly used for adenomyosis. Li-Li Pang et al. investigated and assessed the efficacy of HIFU combined with GnRH-a for adenomyosis.

Three hundred and ninety potentially relevant articles were screened. Nine studies with data for 766 patients were finally included. Compared with the HIFU alone group, the HIFU combined with GnRH-a group had a higher rate of uterine volume reduction (MD 7.51, 95% CI 5.84–9.17, p < 0.00001), smaller adenomyotic lesion volume (MD 4.11, 95% CI 2.93–5.30, p < 0.00001), lower VAS score for dysmenorrhea (MD 1.27, 95% CI 0.54–2.01, p = 0.0007) and menstrual volume score (MD 0.88, 95% CI 0.73–1.04, p < 0.00001), and lower CA125 level (SMD 0.31, 95% CI 0.05–0.56, p =0.02) after the procedure. The recurrence rate in the HIFU combined with GnRH-a group was lower than that in the HIFU alone group (RR 0.28, 95% CI 0.10–0.82, p = 0.02).

They concluded that compared with HIFU treatment alone, HIFU combined with GnRH-a for the treatment of adenomyosis has greater efficacy in decreasing the volumes of the uterine and adenomyotic lesions and alleviating symptoms.
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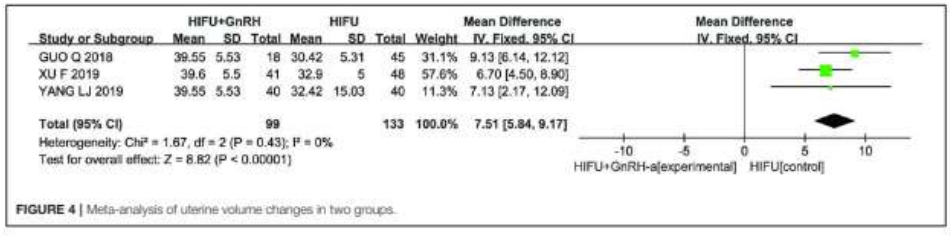

FIGURE 4 | Meta-analysis of uterine volume changes in two groups.

Comparing the toxicity and disease control rate of radiotherapy for prostate cancer between salvage settings after high-intensity focused ultrasound therapy and initial settings

The purpose of this retrospective study was to compare the toxicity and disease control rate of radiotherapy for prostate cancer in salvage settings after high-intensity focused ultrasound (HIFU) therapy (HIFU cohort) with those in radical settings (non-HIFU cohort). From 2012 to

2020, 215 patients were identified for this study and 17 were treated in the salvage settings after HIFU. The median follow-up time was 34.5 months (range: 7–102 months, interquartile range [IQR]: 16–64 months). Genitourinary (GU) and gastrointestinal (GI) adverse events were evaluated in acute and late periods with Common Terminology Criteria for Adverse Events version 5, and the rates of biochemicalclinical failure free survival (BCFS) and overall survival (OS) were estimated. The cumulative incidence of late GU Grade 2 or greater toxicity after five years was significantly different between the non-HIFU and HIFU cohorts with rates of 7.3% and 26.2%, respectively (P = 0.03). Regarding GI Grade 2 or greater toxicity, there was no significant difference between the two cohorts. The 5y-BCFS was 84.2% in the non-HIFU cohort and 69.5% in the HIFU cohort with no significant difference (P = 0.10) and the 5y-OS was 95.9% and 92.3%, respectively (P = 0.47). We concluded that the possibility of increased late GU Grade 2 or greater should be considered when applying salvage radiotherapy for local recurrence after HIFU.
Source: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9303605/

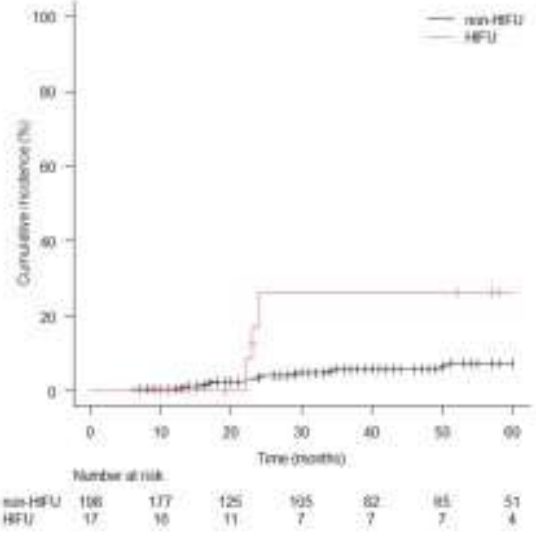

Fig. 1. Kaplan–Meier curves for cumulative incidence of late GU Grade 2 or greater toxicity in HIFU and non-HIFU cohorts. HIFU: high-intensity focused ultrasound.

High-intensity focused ultrasound therapy for pancreatic cancer

Pancreatic cancer (PC) has one of the poorest prognoses among solid cancers, and its incidence has increased recently.

Satisfactory outcomes are not achieved with current therapies; thus, novel treatments are urgently needed. High-intensity focused ultrasound (HIFU) is a novel therapy for ablating tissue from the outside of the body by focusing ultrasonic waves from multiple sources on the tumor. In this therapy, only the focal area is heated to 80–100 °C, which causes coagulative necrosis of the tissue, with hardly any impact on the tissue outside the focal area. Although HIFU is a minimally invasive treatment and is expected to be useful, it is not yet generally known. Here, we discuss the usefulness of HIFU treatment for un-resectable advanced PC using the results of previous research, meta-analyses, and systematic reviews on its efficacy and safety. HIFU therapy for un-resectable PC is useful for its anti-tumor effect and pain relief, and is expected to prolong survival time and improve quality of life. Although HIFU for PC has several limitations and further study is needed, this technique can be safely performed on un-resectable advanced PC. In future, HIFU could be utilized as a minimally invasive treatment strategy for PC patients with a poor prognosis

Source: https://link.springer.com/article/10.1007/s10396-022-01208-4

Table 1 HIFU therapeutic outcomes

Author	Year	Patients (*n*)	Study design	Median survival (months)	Pain relief (%)	Adverse events
Wang et al. [16]	2002	15	HIFU monotherapy in late stage PDAC*	N/A	100	Mild abdominal pain
Xie et al. [17]	2003	41	HIFU alone vs HIFU + gemcitabine in locally advanced PDAC	N/A	66.7(HIFU), 76.6(HIFU + GEM)	None
Xu et al. [18]	2003	37	HIFU monotherapy in advanced PDAC	N/A	80	None
Yuan et al. [19]	2003	40	HIFU monotherapy in PDAC	N/A	80	None
Wu et al. [20]	2005	8	HIFU in advanced PDAC	11.25	100	None
Xiong et al. [21]	2009	89	HIFU in unresectable PDAC	26.0 (stage II), 11.2 (stage III), 5.4 (stage IV)	N/A	Skin burn, subcutaneous fat sclerosis, asymptomatic pseudocyst
Zhao et al. [22]	2010	37	Phase II study of gemcitabine + HIFU in locally advanced PDAC	12.6 (95%CI: 10.2–15.0)	78.6	Neutropenia, thrombocytopenia, nausea vomiting
Orsi et al. [24]	2010	6	HIFU in unresectable PDAC	N/A	100	Portal vein thrombosis
Song et al. [28]	2011	46	Stage III or IV PDAC	12.4 (Overall survival at 12 mo was 30.4%)	N/A	Minor: abdominal pain, fever, nausea, major: pancreaticoduodenal fistula, gastric ulcer, skin burns
Wang et al. [29]	2011	40	Advanced PDAC	10 (stage III), 6 (stage IV)	87.5	None
Lee et al. [30]	2011	12	HIFU monotherapy in unresectable PDAC (3/12 received chemotherapy)	10.3 (HIFU alone. 9/12 pts)	N/A	Pancreatitis
Li et al. [32]	2012	25	Unresectable PDAC	10 (42% survived more than 1 year)	92(PS and pain)	Skin burn
Wang et al. [35]	2013	234	Advanced PDAC	N/A	N/A	Elevated amylase, gastrointestinal dysfunction, obstructive jaundice, vertebral injury
Gao et al. [37]	2013	39	Locally advanced PDAC	11 (30.8% survived more than one year)	79.5	None
Solluni et al. [39]	2014	30	Unresectable advanced PDAC	N/A	66.7	Skin burn, mild pancreatitis, pseudo pancreatic cyst
Vidal-Jove et al. [45]	2015	43	Stage III and stage IV PDAC with systemic chemotherapy	13	N/A	Severe pancreatitis with GI bleeding, skin burning
Marinova et al. [50]	2016	13	Locally advanced PDAC	N/A (tumour reduction was 34.2% at 6 weeks and 63.9% at 3 months)	77	None
Li et al. [51]	2016	16	Combined application of HIFU and radiotherapy for locally advanced PDAC	14	VAS** declined (5.1 → 3.3)	None
Li et al. [52]	2016	61	HIFU in combination with S-1 and S-1 alone for metastatic PDAC	10.3 (HIFU + S-1) vs 6.6 (S-1)	57 (HIFU + S-1) vs 20 (S-1)	None
Strunk et al. [53]	2016	15	Unresectable locally advanced PDAC	N/A (average volume reduction of 63.8% after 3 months)	80	None

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