International Society of
Minimally Invasive and Virtual Surgery

Annual Report

Content

I. Opening Remarks

II. The Purpose of ISMIVS

III. ISMIVS: Annual Review 2022

IV. ISMIVS: Work Plan 2023

V. The Clinical Development of HIFU

VI. New Developments in Minimally Invasive Laparoscopic and Hysteroscopic Gynecological Surgery

VII. New Vision and Big Shot in Minimally Invasive and Non-invasive Medicine

VIII. Open Projects of Ultrasound Therapy Technology

IX. Appendixes

I. Opening Remarks

1.1 From the President, Prof. David Cranston

Dear members of the ISMIVS Society,

I am honored to serve as President of the ISMIVS Society for 2022. This past year, our society has been through unprecedented challenges, and I want to thank each and every one of you for your dedication and hard work.
In light of the current pandemic, this year we were hosting our first-ever off-site forums: the 2022 APAGE-OGSM-ISMIVS Conference for Minimally Invasive and Noninvasive Surgery in Malaysia and the 3rd International Training Workshop on Focused Ultrasound Therapy for Tumors. We invite all colleagues to join us and learn more about minimally invasive and noninvasive technology such as high intensity focused ultrasound (HIFU).
As we look ahead to the future, we hope to continue to grow and expand our collaborations with other societies. We will continue to keep our members informed of any new developments.
Once again, I thank you all for your dedication and support.

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,

The restriction on COVID-19 was lifted as I wrote this opening message for the 2022 Annual Report on behalf of the International Society of Minimally Invasive and Virtual Surgery (ISMIVS). Our Society has demonstrated fortitude and resilience in the minimally invasive and non-invasive medicine field since the pandemic outbreak, as well as incredible performance delivered under challenging circumstances.
Aligned with our mission and vision of "minimizing harm to patients", ISMIVS is committed to providing scientific education programs for physicians, researchers and all industrial colleagues, thereby serving as an inevitable hub connecting academic platforms around the world to promote a better life and curing patients.

In 2022, the Society hosted one public campaign (IWD-HIFU 2022: Empowering Women to Improve Health), one regional conference (APAGE-OGSM-ISMIVS Conference for Minimally Invasive and Non-invasive Surgery, Malaysia), and six webinars. These academic events focused on minimally invasive and non-invasive therapies for various diseases, gathering experts and scholars worldwide to discuss clinical practice and comprehensive knowledge. IWD-HIFU 2022 had attracted 147 high-intensity focused ultrasound (HIFU) centers to join online and collaboratively implement HIFU treatment and unveiled the world's first cross-provincial remote

HIFU surgery using 5G technology; Malaysia Conference for Minimally Invasive and Non-invasive Surgery was the first offline collaborative joined meeting between ISMIV, Asia-Pacific Association for Gynecologic Endoscopy and Minimally Invasive Therapy (APAGE), and Obstetrical & Gynecological Society of Malaysia (OGSM); The six webinars also attracted more than 12,000 enthusiastic colleagues during the COVID-19 pandemic. In addition, the 3rd International Training Workshop on Focused Ultrasound Therapy for Tumors, sponsored by the Ministry of Science and Technology of the People's Republic of China (PRC), organized by Chongqing Medical University and ISMIVS was successfully launched in Melaka, Malaysia in November, and 25 clinicians from 11 countries were awarded completion certificates by the Ministry of Science and Technology of the PRC.

2023 is a year of challenges and opportunities. As the world is recovering from the pandemic, we believe there will be many exciting opportunities for Society to integrate scientific research, outstanding practice, innovative technology, and academic resources to build a consolidated community. Therefore, I am pleased to announce that the ISMIVS-Yangtze International Summit and Council of the Society will be held in Chongqing, China, on July 8-9, 2023 (tentative). This international event will bring you hybrid symposiums and scientific exchanges in minimally invasive and non-invasive therapies such as laparoscopy, HIFU, and cutting-edge medical technologies.

At the heart of delivering on humanity's promise and quality education, we will continue to thrive and become a global hub rooted for scientific exchange and physician services. In the Chinese zodiac, 2023 is also the year of the rabbit. Let us hope for a successful collaborative future achieved by improving patient treatment and better life.

Best Regards,
Prof. Lian Zhang
Secretariat General
ISMIVS

1.3 From the Chairman of the Board of Trustees of Asia-Pacific Association for Gynecologic Endoscopy and Minimally Invasive Therapy (APAGE)

Dear friends and colleagues,

As the COVID-19 pandemic seems to show a sign of easing, we are gradually going back to normal lives.
In 2022, APAGE has already held 13 academic events, in which we especially focused on HIFU. Promoting this new non-invasive technique is also the major mission we collaborated with ISMIVS.

The treatment would be more individualized if a physician has multiple ways to treat their patients. I hope more and more gynecologists could absorb more knowledge of HIFU, the non-invasive therapy that advocates women's health and improves their quality of life.

Wish you all the best in 2023!
Chyi-Long Lee, M.D., Ph.D.
Chairman of Board of Trustee, APAGE

1.4 From the President of Obstetrical and Gynaecological Society of Malaysia (OGSM)

Dear Colleagues,

It gives me great pleasure that OGSM has organized the APAGE-OGSM-ISMIVS Conference in Melaka Malaysia jointly with APAGE and ISMIVS which focus on HIFU and laparoscopic surgery in Year 2022.

The first time we had a topic on HIFU was during our 29th International Congress of the Obstetrical and Gynecological Society of Malaysia. At the Congress, Dr. Sevellaraja had given an excellent presentation on HIFU and the cases that has been done to-date. There was also a booth during the OGSM Congress about HIFU which had attracted a lot of attention. Having this Conference allowed our colleagues to have an in-depth knowledge regarding this procedure and the benefits to the patient. The objective of this joint Conference is not only to share knowledge update but to also interact with our fellow colleagues. The Conference provided all of us with evidence, new insights, issues and controversies on HIFU and also minimally invasive surgery.
I hope all of you had a fruitful 2022 and best wishes in 2023!

Dato' Dr Balanathan a/l Kathirgamanathan
President
Obstetrical and Gynecological Society of Malaysia

II. The Purpose of ISMIVS

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 2022

Our work in 2022, in numbers:

2 non-profit events, 1 regional meeting;

6 online academic symposiums, with nearly 30000 participants;

The 3rd International Training Workshop on Focused Ultrasound Therapy for Tumors was successfully held in Malaysia, 25 trainees from 11 countries were awarded with completion certificates;

355 active members;

Publication of the 2021 Annual Report, covering more than 4,500 colleagues;

6 bimonthly newsletters for more than 30000 professionals;

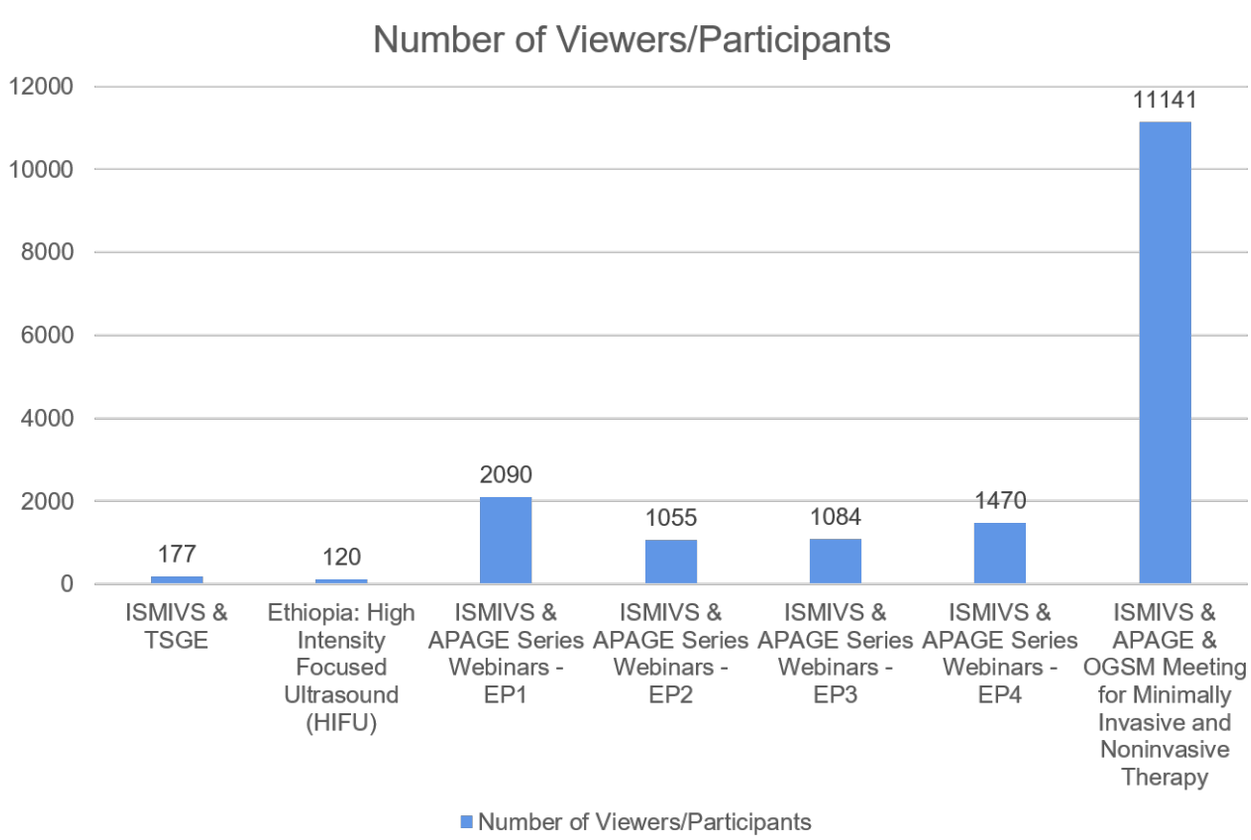
Over 8500 visitors on ISMIVS.com;

86 posts on LinkedIn and Facebook, hitting 26822 reads;

43 academic videos released on Youtube

Academic Meetings	Live Broadcast		Playback	Physical At-tendance	Total
	Zoom	Da Yi Wei Ke*	Youtube		
ISMIVS & TSGE Live Webinar – HIFU: Game Changer of Uter-ine Fibroid Management	60	/	117	/	177
Ethiopia: High Intensity Fo-cused Ultrasound (HIFU)	/	/	/	120	120
Episode 1: APAGE-ISMIVS HIFU Series Webinars 2022	138	1780	172	/	2090
Episode 2: APAGE-ISMIVS HIFU Series Webinars 2022	179	760	116	/	1055
Episode 3: APAGE-ISMIVS HIFU Series Webinars 2022	116	900	68	/	1084
Episode 4: APAGE-ISMIVS HIFU Series Webinars 2022	189	1188	93	/	1470
2022 APAGE-OGSM-ISMIVS Conference for Minimally Invasive and Noninvasive Surgery (Malaysia)	158	10721	206	56	11141

*Da Yi Wei Ke： An online medical education platform in China



3.1 Non-profit events

3.1.1 International Women's Day – HIFU Event 2022 (IWD HIFU 2022)

Themed on Empowering Women Health through Technology, the World's Third Multicenter Telemedicine Womb-preserving Campaign brought to a successful conclusion on March 7, 2022. The Campaign was 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, attracting 147 global HIFU centers to join online and together deliver HIFU treatment, an innovative noninvasive therapy, for women with uterine fibroids and/or adenomyosis. The Campaign also witnessed the world's first trans-provincial HIFU surgery using 5G technology.

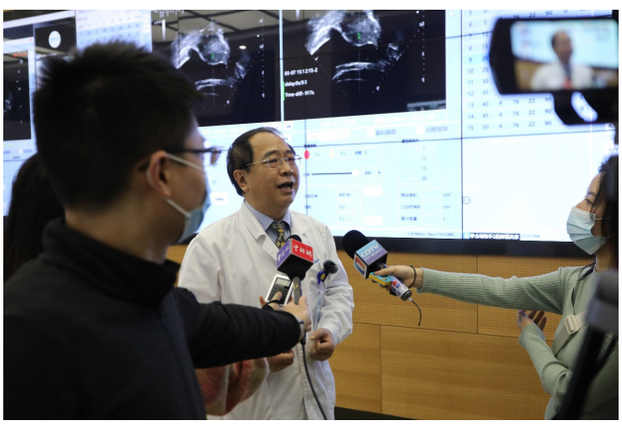
Prof. Lang Jinghe, academician of the Chinese Academy of Engineering and honorary professor of Gynecology and Obstetrics in PUMC Hospital, addressed that the minimally invasive technology represented by high intensity focused ultrasound (HIFU) has promoted the humanization and minimization of clinical surgery, unfolding a new prospect for modern medicine. For today's surgical treatment, apart from the mission of removing the lesion, the awareness of "protecting patient's body function" should be engraved in every doctor's mind. As the leader of domestic market, the focused ultrasound tumor therapeutic system made by Chongqing Haifu Medical Technology Co. Ltd. has also made a global presence, acquired market access in 41 countries and regions with over 210, 000 cases in total been treated worldwide. Focused ultrasound is a highlight of Chinese technology, Chinese-made and Chinese standard, making great contributions in strengthen global cooperation and mutual improvement for the benefit of mankind.

Prof. David Cranston, the Associate Professor of Surgery in the Nuffield Department of Surgical Sciences in the University of Oxford and President of ISMIVS, said that women who lose their uterus are not only deprived of the opportunity to become a mother, but also seriously harmed in both physical and mental ways. Compared to traditional surgical options, HIFU enjoys the same effectiveness, but with less damage to the uterus and is more conducive to post-operative pregnancy. HIFU is one of the most typical representative technologies and pioneers in the field of minimally invasive and noninvasive medicine.

Prof. Zhu Lan, Director and Doctoral Supervisor of Gynecology and Obstetrics in PUMC Hospital, gave a speech to discussed the safety of focused ultrasound treatment from the perspective of academic research, and shared the research project “A prospective, multicenter, non-randomized concurrent control trial of high intensity focused ultrasound (HIFU) in the treatment of uterine fibroids” concluded in 2017 with Prof. Lang Jinghe taking the role of Research Chair. The research results, jointly released by Chinese Medical Doctor Association (CMDA), Chongqing Medical University and Chinese Obstetricians and Gynecologists Association (COGA), proved that HIFU is no less effective than traditional surgery in treating uterine fibroids, but has better safety, less invasiveness, shortened hospital stays, less medical costs, and significant improvement in symptom relief and life quality, which is a promising technology for the treatment of uterine fibroids.

Prof. Wang Zhibiao, Director of SKLUME and NERCUM, said that focused ultrasound has been incorporated in the Development Plan for the Medical Equipment Sector During the 14th Five-Year Plan Period (2021-2025), and the 13th Five-Year Plan (2016-2022) released by the government. The CE marked HAIFU Focused Ultrasound Tumor Therapeutic System is an international advanced device and Chongqing Haifu Medical Technology Co. Ltd. has become an important global manufacturing base for medical equipment. We will make the Campaign as a sustainable event to make a call for more clinicians to participate in activities of health preserving and disease prevention – saving lives from the other path in addition to perform surgeries. In the future, we shall defend the uterus for more women around the world.

In 2021, NERCUM, Chongqing Haifu Medical Technology Co. Ltd., Chongqing Weihai Software Development Co., Ltd., China Mobile jointly declared a pilot project of 5G+ healthcare application, “A construction project of the remote therapeutic system based on 5G and high intensity focused ultrasound (HIFU)”, co-launched by Ministry of Industry and Information Technology of the PRC and National Health Commission of the PRC. Under the stable 5G network provided by China Mobile, the team led by Prof. Chen Wenzhi, the Chief Medical Expert of SKLUME and Chongqing Haifu Hospital, used the HAIFU® Focused Ultrasound Tumor Therapeutic System that remotely connected through the Global Telemedicine Center for HIFU Therapy, to jointly perform the world’s first trans-provincial HIFU surgery for a patient with the medical team from Beiliu Maternity & Child Healthcare Hospital of Guangxi. The HIFU surgery successfully completed in 20 minutes at a distance of over 1, 000 kilometers.

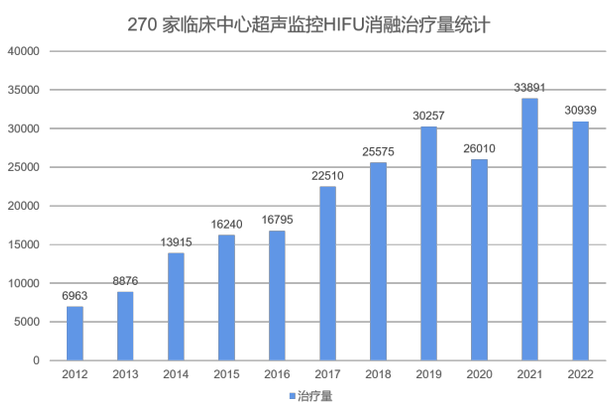


The era of “Internet of Everything” has come along with the gradual implementation of 5G technology, but the issue of unbalanced and insufficient supply of medical service remains unresolved with the development of high-end medical technology. The Outline of the 14th Five-Year Plan (2021-2025) for National Economic and Social Development and Vision 2035 of the PRC provided a guidance on encouraging ground-breaking scientific and technological innovation, developing digital industries, as well as improving fundamental medical infrastructures and public healthcare services.

Prof. Chen Wenzhi said: “HIFU treatment originally invented by China is a noninvasive procedure with no scar and bleeding and can be performed with a computer mouse. This procedure can be done successfully with low latency of 5G network and the cooperation of local medical team”. The team led by Prof. Chen Wenzhi has pursued the national policy with actions and promoted the further development of the integration between focused ultrasound and 5G technology, laying a solid foundation for future’s cross-regional and even cross-national HIFU surgery, as well as making great contributions to the market expansion of high-end medical equipment and the promotion of the construction and service level in primary medical care sector.

“The 5G network maintained by China Mobile plays a vital role as a firm bridge for connection in the successful completion of the world’s first trans-provincial HIFU surgery”, said by a technical expert from China Mobile Group Chongqing Co., Ltd.. Utilizing the increased bandwidth, low latency and high speed of 5G, the operation instruction was transmitted from the central control panel in Chongqing Haifu Hospi-

tal to the HAIFU® Focused Ultrasound Tumor Therapeutic System in the Beiliu Maternity & Child Healthcare Hospital of Guangxi in real time to remotely control the procedure, ensuring real-time communication between the two medical teams from different places and finally attaining a safe and successful HIFU surgery.
147 global HIFU Centers joined the Campaign and performed HIFU surgery in different parts of the world at the same time with live stream. Leading experts from the filed of minimally invasive and noninvasive medicine analyzed typical gynecological cases and give treatment recommendations, monitoring the progress of HIFU surgeries in real time through the Global Telemedicine Center for HIFU Therapy.



Prof. Zhanglian, Director of Chongqing Haifu Hospital and Global Telemedicine Center for HIFU Therapy was providing guidance for doctors at the Dominica-China Friendship Hospital which also participated the Campaign and performed the HIFU surgery later that day due to the 12-hour time difference. Prof. Zhanglian said that the establishment of Global Telemedicine Center for HIFU Therapy aimed to realize the virtual real-time connection among all the HIFU clinicians around the world, achieving experience sharing, mutual communication and remote coaching, and to ensure the successful completion of each HIFU surgery.

According to incomplete statistics, by the end of 2021, the Global Telemedicine Center for HIFU Therapy has been connected to more than 200 global HIFU Centers, and has provided technical support for a total of more than 40, 000 cases. In 2021 alone, the Service Center was connected with domestic hospitals and foreign hospitals in Singapore, Malaysia, Nigeria and Mexico, and had provided support for more than 14, 000 cases.

3.1.2 Science for young minds: Prof. Wang Zhibiao, Honorary Board Member of International Society of Minimally Invasive Medicine, delivered a scientific lecture of "Where Do Babies Come From?"

To grow children's interest in science and stimulate their scientific thinking, Prof. Wang Zhibiao, Honorary Board Member of International Society of Minimally Invasive Medicine (ISMIVS) and Director of National Engineering Research Center of Ultrasound Medicine of China (NERCUM), brought a lively and interesting lecture of birth to children in the Third Zhongzhou Primary School, Zhongxian, Chongqing.
In the class, Prof. Wang made the obscure knowledge popularized and visualized, and led the children to understand life with a combination of vivid illustration and video animation, so that the children could understand the greatness of motherhood with their imagination of the universe and respect for life.

During the lecture, he used a line of uplifting words to encourage students: “If the birth of life is an Olympian race, then every one of us here today is a champion among hundreds of millions or billions of sperm swimmers”; “the beginning of life undergoes a thousand difficulties to generate a fertilized egg, and at the same time, nature has endowed us with essence, an ability to persevere, to use in the more than 30,000 days after birth”; “even if we fall 100 times, we must stand up at the 101st time”; “students should be brave enough to become socially useful and responsible for human beings”.

Faced with the topics of “ Where Do Babies Come From?” and “Origin of Life”, the students asked all kinds of questions, which were answered one by one by Prof. Wang, who explained that the exploration of science is step by step, and one day the unknown phenomena can be explained. He hopes that in the future, students will look at everything with curiosity, ask more questions, and if they persist, they will become thinkers and scientists, and eventually become useful talents in inventing and creating the new world.

We hope this lecture can plant a seed of scientific exploration for the students, who will grow up to enter the scientific career to continue to explore science and promote the progress of human beings.

3.2 Academic Conferences

ISMIVS together with other 4 Societies hosted 7 academic conferences. If you are interested, please watch the playback or refer to Appendix 1 for the summaries of the lectures.

3.2.1 ISMIVS & TSGE Live Webinar – HIFU: Game Changer of Uterine Fibroid Management

A virtual conference on high intensity focused ultrasound ablation of uterine fibroids was delivered jointly by ISMIVS and Thai Society of Gynecologic Endoscopists on March 16, 2022 with 2 obstetrician gynecologist.

Watch the playback: https://youtu.be/71Yhki049lo

3.2.2 High Intensity Focused Ultrasound (HIFU) Symposium in Ethiopia

On May 9, ISMIVS organized an academic symposium in Addis Ababa, Ethiopia. 6 leading gynecologists were invited to discuss the clinical application and fertility outcome of HIFU.

Watch the playback: https://youtu.be/ECXuVmsuV40

3.2.3 APAGE-ISMIVS HIFU Series Webinars 2022

APAGE and ISMIVS developed HIFU Series Webinars in 2020 to provide a platform where colleagues and beginners in the field of non-invasive and minimally invasive medicine can meet and exchange ideas. AIH is designed and delivered by renowned international experts with the latest research, clinical practice, and live demonstrations in terms of high intensity focused ultrasound, a sound and innovative technique for gynecologic diseases.

Episode 1: Management of endometriosis, especially patients with fertility desire

Watch the playback: https://youtu.be/5CluzTepqyM

Episode 2: Treatment for placenta accreta and cesarean scar pregnancy

Watch the playback: https://youtu.be/6jsAafjFKXw

Episode 3: Treatment for vulva and cervical diseases-new options

Watch the playback: https://youtu.be/NeGNiDxPx9Q

Episode 4: Adenomyosis and fertility

Watch the playback: https://youtu.be/CCrrpcSLzq0

3.2.4 2022 APAGE-OGSM-ISMIVS Conference for Minimally Invasive and Non-invasive Surgery (Malaysia)

Nowadays, minimally-invasive and non-invasive therapies, exemplified by the ablation of tumours with less harm to patients, are the trend of modern medical development. This year, joining the hands of Asia-Pacific Association for Gynecologic Endoscopy and Minimally Invasive Therapy (APAGE), Obstetrical & Gynecology Society of Malaysia (OGSM), International Society of Minimally Invasive and Virtual Surgery (ISMIVS) convened a regional conference in Melaka, Malaysia on November 13, 2022, addressing the topic of Laparoscopic Surgery and High Intensity Focused Ultrasound (HIFU) therapy.

Watch the playback: https://youtube.com/playlist?list=PLWbjlVbxcLm0by_vMzqc2K-fkFY9G1q6es

*Please see Appendix 4 for academic meetings launched by other societies.

3.3 The 3rd International Training Workshop on Focused Ultrasound Therapy for Tumors

From November 12 to 26, 2022, the 3rd International Training Workshop on Focused Ultrasound Therapy for Tumors, funded by the Department of International Cooperation, Ministry of Science and Technology, the People's Republic of China, and China Science and Technology Exchange Center, and co-organized by Science and Technology Bureau of Chongqing Municipality, Chongqing Medical University, Mahkota Medical Center and ISMIVS, was successfully held in Malaysia.

This year, 25 participants from 11 countries, including Indonesia, Philippines, Egypt, Ethiopia, Singapore, Malaysia, Germany, Thailand, Nepal, Tanzania and Mexico, were enrolled in this 15-days training program.

On the opening ceremony of the training workshop, Mr. Liu Hua, L1 Investigator, Division of Integration and Planning, International Cooperation Department, China Ministry of Science and Technology, said “focused ultrasound ablation therapy is an innovative and open technology, digging a new way from invasiveness to minimal invasiveness, then to noninvasiveness. This Training Workshop has responded the call of China’s development strategy in building an innovation country, exploring a path of assisting foreign countries with science and technology, and transforming from China-made to China-invent”.

Mr. Stanley Lam, the CEO of MMC, said, “MMC is grateful to work closely with our key partners in co-organizing this training workshop, boosting the knowledge of HIFU among a broader health workforce to bolster treatment services and support for women’s health. Addressing the health concerns among local and international communities has always been our top priority. Following this workshop, MMC hopes to encourage many more women with gynecological issues to opt for HIFU treatment.

After 2-week training sessions and hands-on experience using HIFU, the 25 trainees were granted completion certificates issued by the Ministry of Science and Technology of the People's Republic of China on November 25. Dr S. Selva, Obstetrician & Gynaecologist, and Reproductive Medicine Specialist of MMC, also one of the chief lecturers, shared that "As the first hospital to introduce ultrasound-based HIFU technology in the country, we are happy to be able to provide this option to women in Malaysia and globally. Since its availability in July 2021, we have treated over 300 women not only from Malaysia but international patients from Indonesia, the Philippines and Pakistan. I hope this technology and this workshop will propagate this technology globally, enabling more women to preserve their fertility and achieve their dreams of becoming mothers."

The trainee representative, Dr. Anthony Philip from Kenya, said on the closing ceremony "it is hard to put into words what a wonderful event it was, and I am so glad that the HIFU technology brought the participants with different cultural backgrounds together. The advanced technology of minimally invasive and noninvasive medicine, the rich historical and cultural accumulation of each country and the deep friendship that has been slowly interwoven in this 15-day training and burst with incredible power. I am honored to be a part of this workshop and on behalf of all the participants, I would like to express my heartfelt gratitude to the Chongqing team, MMC and Dr. S. Selva for their efforts in doing so. Today is not the end of the story, HIFU will keep our connection alive and I wish you all the best in your HIFU application journey and hope to see you all again at the HIFU Center in Chongqing".

IV. ISMIVS: Work Plan 2023

4.1 IWD-HIFU 2023

Date: March 7, 2023

Event: IWD-HIFU 2023

Co-organized 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)

4.2 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 gynecological diseases will enlighten doctors about the physics and biological effect of HIFU, case screening, clinical protocol, anesthesia plan, nursing care, etc.

In 2023, 5 courses listed below on focused ultrasound therapy will be released on www.ismivs.org.

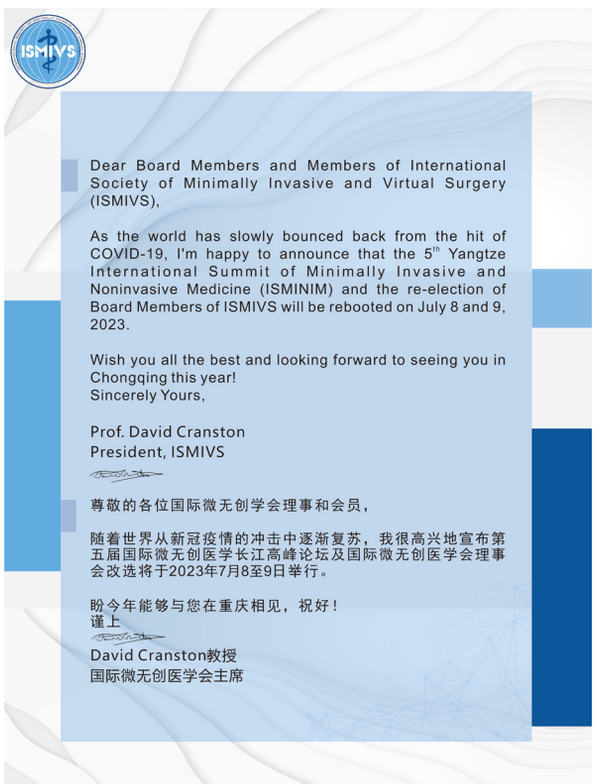
a) Techniques for Understanding MRI and Its Clinical Application in HIFU Ablation (EN)
b) From Treating the Diseases to Treating the Diseased (EN)
c) Case Study: HIFU in the Treatment of Uterine Fibroids (CN & EN)
d) Case Study: HIFU in the Treatment of Uterine Adenomyosis (CN & EN)
e) Case Study: HIFU in the Treatment of Placenta Accreta (CN & EN)

The training courses are accessible only to ISMIVS members. If interested, please contact the Secretariat: hannahxu@isminim.org

*Please refer to Appendix 2 for current training courses.

4.3 The 5th Yangtze International Summit of Minimally-Invasive and Noninvasive Medicine

The 1st Announcement: http://www.isminim.org/index.php?c=article&a=type&tid=48



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

As the world has slowly bounced back from the hit of COVID-19, I'm happy to announce that the 5th Yangtze International Summit of Minimally Invasive and Noninvasive Medicine (ISMINIM) and the re-election of Board Members of ISMIVS will be rebooted on July 8 and 9, 2023.

Wish you all the best and looking forward to seeing you in Chongqing this year!
Sincerely Yours,

Prof. David Cranston
President, ISMIVS

尊敬的各位国际微无创学会理事和会员，

随着世界从新冠疫情的冲击中逐渐复苏，我很高兴地宣布第五届国际微无创医学长江高峰论坛及国际微无创医学会理事会改选将于2023年7月8至9日举行。

盼今年能够与您在重庆相见，祝好！
谨上

David Cranston教授
国际微无创医学会主席

V. The Clinical Development of HIFU

5.1 HIFU Literature Retrieval and Analysis: 2021-2022

In order to know the latest clinical development of high-intensity focused ultrasound ablation therapy, ISMIVS retrieved and analyzed HIFU literature published in 2021 and 2022 for your reference.

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, 2021—December, 2022. 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 indications 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: 2021-2022

5.1.1 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.

5.1.2 HIFU Literature Analysis: 2022

Date of Publication: Between January 1, 2022 and December 31, 2022

Key words: High Intensity Focused Ultrasound
402 articles were retrived using the PubMed database with the key words of High Intensity Focused Ultrasound. 273 articles were excluded. Among the 129 included articles, 45 indications were involved, including 7 indications in the OBGYN field.

5.1.3 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
Adenomyosis	Epilepsy
Abdominal wall endometriosis	Graves' disease
Uterine fibroid	Sacroiliac Joint
C-scar pregnancy	Movement disorder
Cervical pregnancy	Chronic pain
Uterine arteriovenous malformation	Brain tumor
Twin-reversed arterial perfusion sequence	Benign prostatic hyperplasia
Pancreatic cancer	Neuropathic pain
Tremor	Obsessive compulsive disorder
Parkinson's disease	Bone metastasis
Allergic rhinitis	Osteoid osteoma
Kidney tumor	Breast cancer
Bone tumor	Liver tumor

5.1.4 Indications Mentioned in the 2022 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
retroperitoneal lymphatic metastases	Low-flow vascular malformations
Liver tumor	Pain management of osteoarthritis
Liver alveococcosis	Breast cancer

5.1.5 New Indications in 2022 compared to 2021

Psychiatric disorders	**Facet joint osteoarthritis**

Top 10 Indications with the Largest Number of Research Articles: 2021-2022

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

No	Indications	Numbers 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	5	1305
8	Glaucoma	4	102
9	Tremor	3	7
10	Abdominal wall endometriosis	3	98

5.1.7 Top 10 Indications with the Largest Number of Research Articles: 2022

Indication	Numbers of Research articles	Total number of cases
Uterine fibroid	28	3534
Prostate cancer	23	1120
Pancreatic cancer	7	568
Bone tumor	5	104
Liver tumor	5	298
Thyroid nodules	5	689
Adenomyosis	4	1305
Glaucoma	4	102
Tremor	3	7
Abdominal wall endometriosis	3	47

Number of Research Articles on HIFU for OBGYN Diseases: 2021-2022

5.1.8 Number of Research Articles on HIFU for OBGYN Diseases: 2021

Indication	Number Of research articles	Total Number of Cases	The Largest Number of Cases Mentioned	Article Information
Uterine fibroid	25	2713	1012	Multidisciplinary management to optimize outcome of ultrasound-guided high-intensity focused ultrasound (HIFU) in patients with uterine fibroids. 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. Sci Rep. 2021 Nov 23;11(1):22768. doi: 10.1038/s41598-021-02217-y. PMID: 34815488; PMCID: PMC8611035.
Adenomyosis	5	1249	660	
Abdominal wall endometriosis	2	62	33	Dai Y, Luo HJ, Peng Y, Liu BG, Jin P. High intensity focused ultrasound for large abdominal wall endometriosis: a case report. Int J Hyperthermia. 2022;39(1):1276-1282. doi: 10.1080/02656736.2022.2126902. PMID: 36137606.
C-scar pregnancy	2	102	46	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	Huang Y, Zhu X, Wang L, Ye M, Xue M, Deng X, Sun X. Clinical analysis of high-intensity focused ultrasound (HIFU) combined with hysteroscopy-guided suction curettage (HGSC) in patients with cervical pregnancy. Int J Hyperthermia. 2022;39(1):1233-1237. doi: 10.1080/02656736.2022.2123565. PMID: 36120736.
Uterine arteriovenous malformation	1	3	3	Chen H, Tan X, Xiong W, Wang X. High-intensity-focused ultrasound for uterine arteriovenous malformation associated with retained products of conception: A case report. Asian J Surg. 2023 Jan;46(1):653-654. doi: 10.1016/j.asjsur.2022.07.026. Epub 2022 Jul 22. PMID: 35871967.
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.

5.1.9 Number of Research Articles on HIFU for OBGYN Diseases: 2022

Indication	Number of Research Articles	Total Number of Cases	The Largest Number of Cases Mentioned	Article Information
Uterine fibroid	25	2713	1012	Multidisciplinary management to optimize outcome of ultrasound-guided high-intensity focused ultrasound (HIFU) in patients with uterine fibroids. 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. Sci Rep. 2021 Nov 23;11(1):22768. doi: 10.1038/s41598-021-02217-y. PMID: 34815488; PMCID: PMC8611035.
Adenomyosis	5	1807	889	
Abdominal wall endometriosis	2	62	33	Dai Y, Luo HJ, Peng Y, Liu BG, Jin P. High intensity focused ultrasound for large abdominal wall endometriosis: a case report. Int J Hyperthermia. 2022;39(1):1276-1282. doi: 10.1080/02656736.2022.2126902. PMID: 36137606.
C-scar pregnancy	2	102	46	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	Huang Y, Zhu X, Wang L, Ye M, Xue M, Deng X, Sun X. Clinical analysis of high-intensity focused ultrasound (HIFU) combined with hysteroscopy-guided suction curettage (HGSC) in patients with cervical pregnancy. Int J Hyperthermia. 2022;39(1):1233-1237. doi: 10.1080/02656736.2022.2123565. PMID: 36120736.
Uterine arteriovenous malformation	1	3	3	Chen H, Tan X, Xiong W, Wang X. High-intensity-focused ultrasound for uterine arteriovenous malformation associated with retained products of conception: A case report. Asian J Surg. 2023 Jan;46(1):653-654. doi: 10.1016/j.asjsur.2022.07.026. Epub 2022 Jul 22. PMID: 35871967.
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 3 for excerpts from selected articles

5.2 Clinical Application of HIFU in 2022

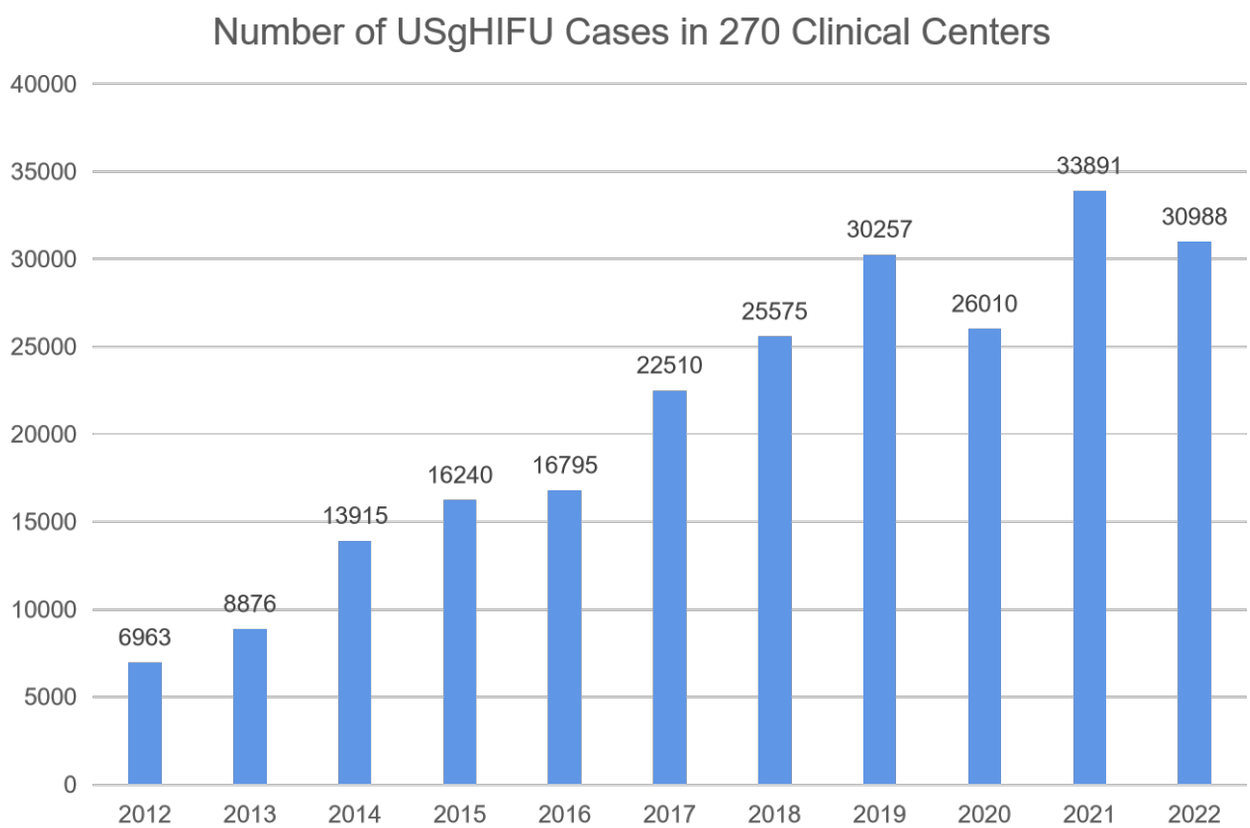
Therapeutic ultrasound, which is undergoing a boom in basic research, clinical studies and clinical implementations, marks the start of the era of noninvasive medicine. High-intensity focused ultrasound (HIFU) ablation, in particular, has been increasingly applied in the treatment of a variety of tumors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

In 2022, 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 counted the number of cases treated with ultrasound-guided HIFU in **270** clinical centers across 29 countries and regions. By December 31st, 2022, the total number of treated cases between 2010 and 2022 has amounted to **245,129** among which 70-80% are fibroids and in which **30,988** cases were performed in the year of 2022.



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

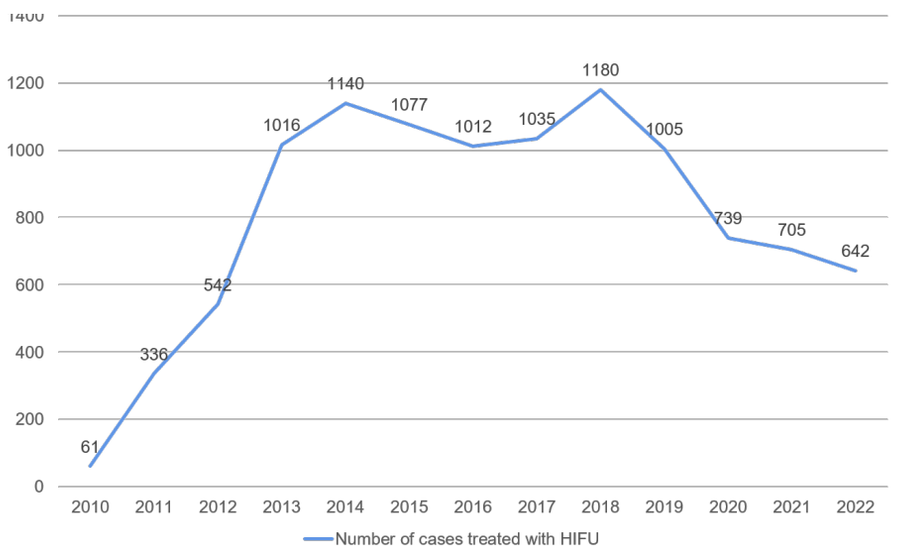
5.2.2 Top Five Clinical Centers with Largest Number of Cases Treated with HIFU in 2022

The top three clinical centers with the largest number of cases treated with HIFU in 2022 were the Chongqing Haifu Hospital (925 cases), Third Xiangya Hospital of Central South University (794 cases), and Suining Central Hospital (642 cases).

Number of Cases Treated with HIFU in 2021

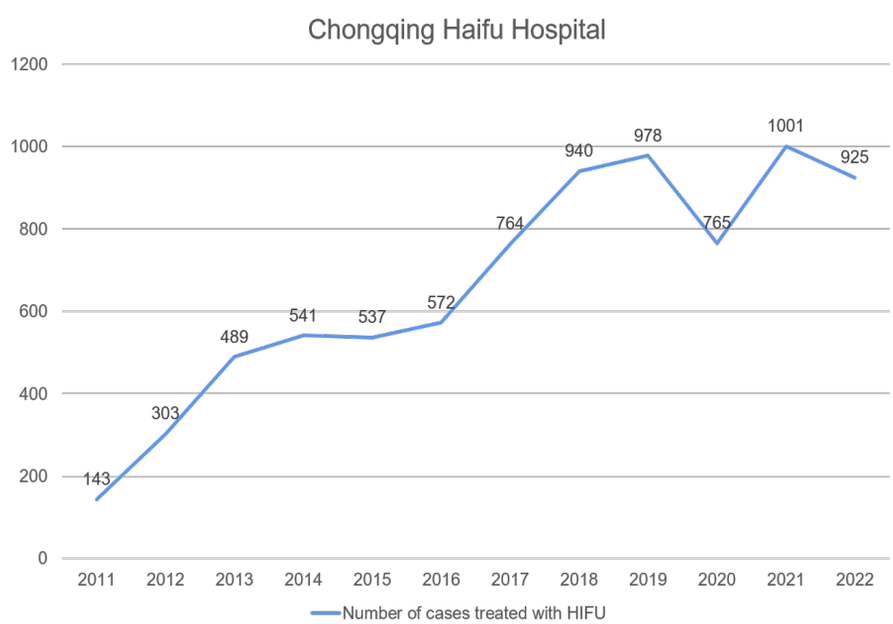
HIFU Center	Number of Cases Treated with HIFU in 2021
Chongqing Haifu Hospital	925
The Third Xiangya Hospital of Central South University	794
Suining Central Hospital	642
The Second Affiliated Hospital of Chongqing Medical University	620
Affiliated Hospital of Zunyi Medical University	534

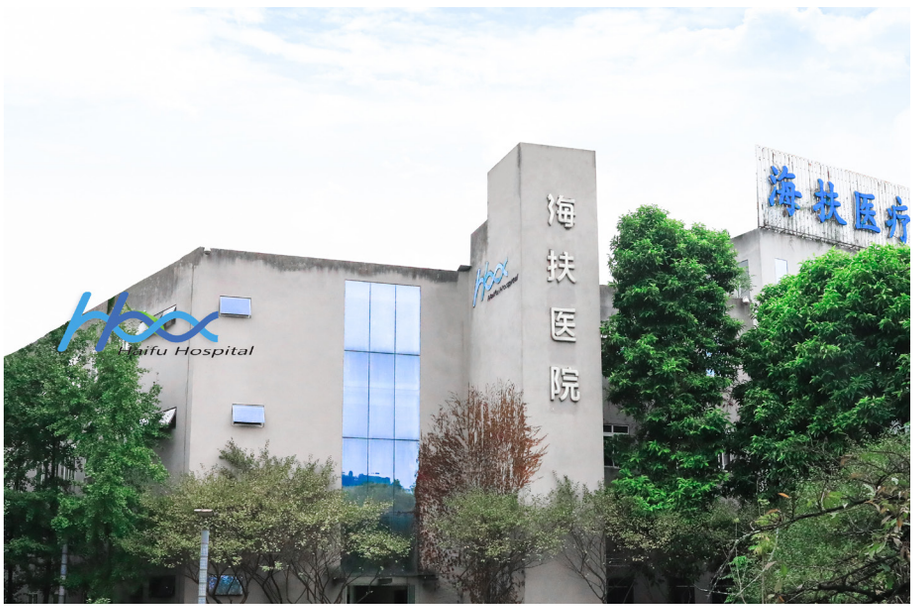
Suining Central Hospital has started HIFU treatment service since 2010. By December 31st, 2022, it has performed 10,495 HIFU ablation procedures, ranking the first in the world in terms of the cumulative total number of HIFU cases. 11 indications are in different stages of clinical research or being 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.



Chongqing Haifu Hospital has started HIFU treatment service since 2011. By December 31st, 2022, it has performed 7,978 HIFU ablation procedures (9,25 cases in 2022), 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 2022. Now over 13 indications are in different stages of clinical research or being provided as paid medical treatments.

Ranking the first clinical center with the largest number of cases treated with HIFU in 2022, Choqing Haifu Hospital is committed to applying the philosophy and technology to the clinical practice of benign and malignant tumors, with the mission of treating diseases and eliminating pain, focusing on the integrity and balance of life structure. Chongqing Haifu Hospital advocates that caring your organs to respect life, implements the concept of “minimizing the harm for patients”, follows the healthcare model of “from treating the disease to treating the patient”, and helps patients achieve the goal of “my wellness, my rule”.

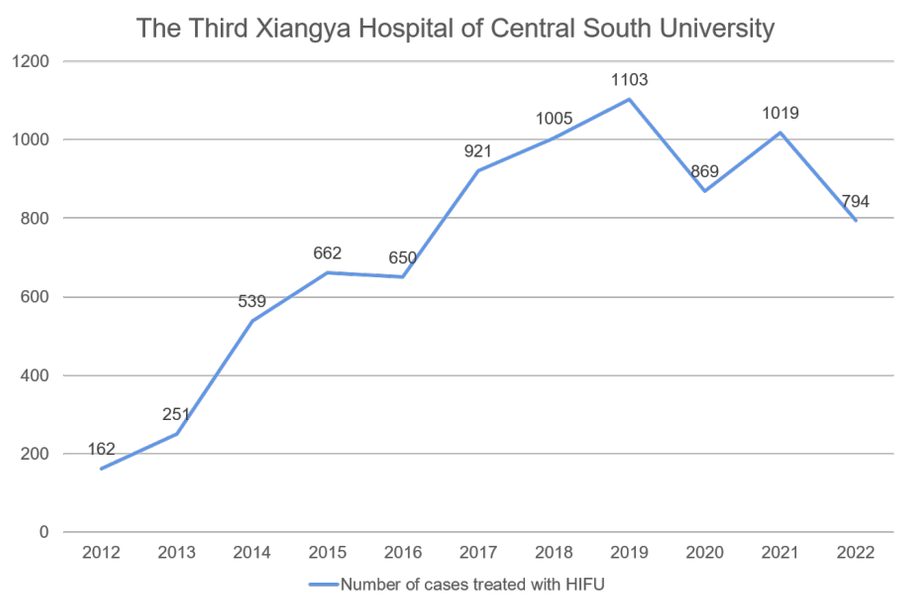




Clinical Indications of HIFU Treatment and research at Chongqing Haifu Hospital: uterine fibroids, adenomyosis, soft tissue tumor, abdominal wall endometriosis, placenta accreta, liver cancer, osteosarcoma, desmoid fibroma, breast fibroadenoma, breast cancer, renal cancer.

The Third Xiangya Hospital of Central South University has started HIFU treatment service since April 24th, 2012. By December 31st, 2022, it has performed 7,973 cases with HIFU ablation (793 cases in 2022), ranking the third in the world in terms of the cumulative total number of HIFU cases and the second in the world in terms of the number of HIFU procedures performed in 2022. 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: 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.



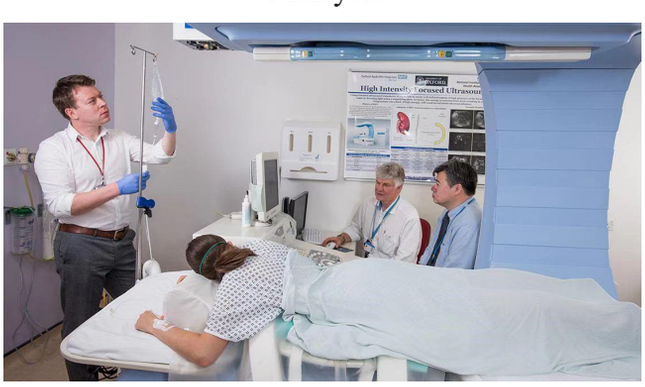
5.2.3 Data from Clinical Centers outside Mainland China

The number of treated cases of 45 clinical centers from Hong Kong, China, Taiwan, China, South Korea, Singapore, Nigeria, Malaysia, Russia, Spain and Britain is 3,439 in 2022. Now the clinical indications for HIFU treatment in the 15 regions are: uterine fibroids, adenomyosis, placenta accreta, abdominal wall endometriosis, liver cancer, pancreas cancer, etc.

Gallery of Some International HIFU Centers:

Malaysia

Mexico



Britain

Dominica

Russia

Nigeria

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, 2,390 medical professionals have received HIFU clinical training and 634 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.

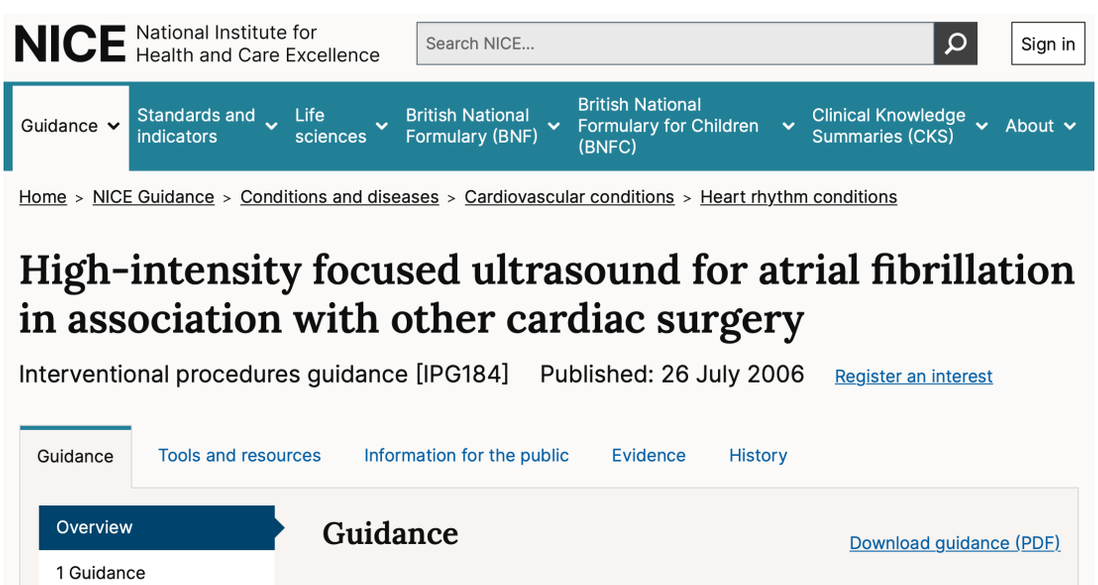
In 2022, the 3rd International Training Workshop on Focused Ultrasound Therapy for Tumors funded by China Ministry of Science and Technology and organized by Chongqing Medical University and ISMIVS has been successfully launched in Melaka, Malaysia in November, and 25 clinicians from 11 countries awarded completion certificates by the Ministry.

5.3 Indications that has been included into clinical guidelines or experts' consensus

5.3.1 2006 NICE guideline on High-intensity focused ultrasound for atrial fibrillation in association with other cardiac surgery

On 26 July, 2006, the National Institute for Health and Care Excellence (NICE),UK, published guidance and evidence-based recommendations on High-intensity focused ultrasound for atrial fibrillation in association with other cardiac surgery.
HIFU for atrial fibrillation is typically carried out in patients undergoing concomitant open heart surgery (often for mitral-valve replacement or repair). Efficacy is based on the results of one case series of 103 patients, in which 85% (80/94) of patients were free from atrial fibrillation at 6 months' follow-up, including 80% of patients who had permanent atrial fibrillation and 100% of patients who had intermittent (paroxysmal or persistent) atrial fibrillation.
It was noted that technique and HIFU settings used for this procedure varied. It was also noted that it may be difficult to determine when fullthickness ablation has been achieved.

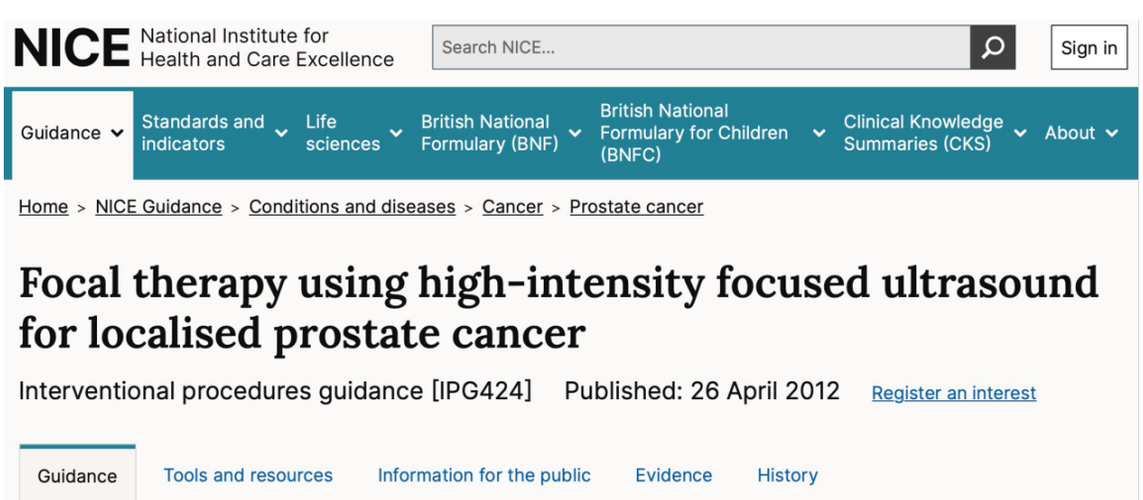
Read More: https://www.nice.org.uk/guidance/ipg184



5.3.2 2012 NICE guidance on the focal therapy using high-intensity focused ultrasound for localised prostate cancer

In the guideline, it mentioned that 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. Several case series of patients were enrolled to demonstrate the efficacy and safety of HIFU for localised prostate cancer. And the Specialist Advisers listed key efficacy outcomes for this procedure as biochemical disease-free survival, absence of viable cancer on repeat biopsy, and MRI evidence of cancer ablation. Also, the Specialist Advisers listed adverse events reported in the literature as bladder neck stenosis, acute retention and erectile dysfunction in those who are preoperatively potent.

Read More: https://www.nice.org.uk/guidance/ipg424



5.3.3 4th Radiological-Gynecological Expert meeting 2019 published MRgFUS treatment in fibroid treatment guideline

This practice guideline covers criteria to measure success, contraindications, side effects and complications of MRgFUS treatment. The role of MRgFUS in the setting of family planning is part of this publication.

Here are some key points:

· MRgFUS therapy should be based on a clear understanding of the aim of treatment and the wish of the patient.

· Success of MRgFUS/HIFU treatment should be judged by the degree of improvement (alleviation) or disappearance of fibroid-related symptoms.

· The indication for treatment by means of MRgFUS/HIFU is based on a gynecological examination incl. ultrasound performed by a specialist. Necessary prerequisite for MRgFUS/HIFU treatment is a contrast-enhanced MRI of the pelvis.

· A number of more than 5 fibroids (leiomyomata) limits the success of MRgFUS/HIFU therapy; the indication to treat fibroids exceeding 10 cm in diameter should be reviewed critically.

· A recommendation for the treatment of fibroids by MRgFUS to patients who seek to conceive cannot be given based on the current state of knowledge.

Read More: https://www.thieme-connect.com/products/ejournals/html/10.1055/a-0884-3143?articleLanguage=en


Guideline

MR-Guided Focused Ultrasound[*] in Fibroid Treatment – Results of the 4th Radiological-Gynecological Expert Meeting

Article in several languages: English | deutsch

Thomas Kröncke **, Matthias David **

› Author Affiliations

› Further Information

› Also available at eRef

Abstract | Full Text

5.3.4 3rd Radiological-Gynecological Expert meeting 2017 published MRgFUS treatment in fibroid treatment guideline

In the consensus, the 12 participants of the radiological-gynecological experts recognized that MRgFUS should only be performed at hospitals with the necessary expertise and experience. This also includes the conservative and surgical management of side effects and complications. Moreover, there should be options for introducing postinterventional pain therapy.
MRgFUS treatment provides a treatment method for patients with fibroid-related symptoms and allows further treatment individualization for uterine fibroids in Germany, Austria, and Switzerland.

The group of experts agreed in consensus upon the following recommendations.

- the Examinations required prior to MRgFUS treatment,
- Indications for MRgFUS treatment
- Success criteria for MRgFUS treatment
- Contraindications for MRgFUS treatment
- MRgFUS treatment in patients with a desire to have children
- Side effects/complications of MRgFUS treatment
- Follow-up after MRgFUS treatment

Read More: https://www.thieme-connect.com/products/ejournals/abstract/10.1055/s-0043-108994


Consensus

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MR-Guided Focused Ultrasound[*] in Fibroid Treatment – Results of the 3rd Radiological-Gynecological Expert Meeting

Article in several languages: English | deutsch

Matthias David , Matthias Matzko

› Author Affiliations

› Further Information

› Also available at eRef

Abstract Full Text

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5.3.5 2017 Consensus meetings regarding uterine artery embolization and focused ultrasound in fibroid treatment: an analysis

On January 14, 2017, the 3rd consensus meeting "MRgFUS for fibroid treatment" and 6th consensus meeting "UAE for fibroid treatment" was held among gynecology and radiology specialists.

For the 3rd consensus meeting "MRgFUS for fibroid treatment", a particular attention was given to the topic "treatment of an undetected leiomyosarcoma". The consensus participants agreed on the following formulation: "...in the informed consent discussion prior to MRgFUS, the patient should be made aware of the lack of preinterventional histological confirmation which all other organ-preserving fibroid treatment methods have in common...". In the case of suspicion of a malignancy of the uterus, MRgFUS treatment is absolutely contraindicated.

The 6th consensus meeting "UAE for fibroid treatment" was also preceded by a selective search of the literature.The topic "embolization of an undetected uterine sarcoma" was given special attention. The consensus participants agreed on the following new recommendation: "The total risk of an undetected uterine malignancy (including uterine sarcoma) in patients undergoing surgery for a fibroid is specified between 0.09% and 0.18% in the current literature. Clinical presentation and imaging do not allow exclusion of a uterine sarcoma in particular. The decision for an organ-preserving, medication-based, surgical, or interventional-radiological treatment option therefore should include explanation of the risks of delayed diagnosis of a sarcoma. The spreading of tumor cells after UAE has not been observed. In the case of a lack of response to treatment or a lack of a reduction in size of the leiomyoma(s), an insufficient embolization result and the presence of a uterine sarcoma must be considered as differential diagnoses...."

Read More: https://www.thieme-connect.com/products/ejournals/abstract/10.1055/s-0043-108824


Editorial

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Consensus meetings regarding uterine artery embolization and focused ultrasound in fibroid treatment: an analysis

Article in several languages: English | deutsch

Thomas Kröncke , Matthias David , Matthias Fritz Matzko

› Author Affiliations

› Further Information

› Also available at eRef

Abstract | Full Text | References

5.3.6 2017 EAU-ESTRO-SIOG Guidelines on Prostate Cancer

In April, 2017, the European Association of Urology (EAU) – European Society for Radiotherapy & Oncology (ESTRO) – International Society of Geriatric Oncology (SIOG) published the guidelines on the treatment of relapsing, metastatic, and castration-resistant prostate cancer (CRPC).
It mentioned therapy for prostate-specific antigen (PSA) relapse after radical prostatectomy (RP) includes salvage radiation therapy (RT) at PSA levels <0.5 ng/ml and salvage RP, high-intensity focused ultrasound, cryosurgical ablation or salvage brachytherapy of the prostate in radiation failures.

Read More:
https://www.sciencedirect.com/science/article/abs/pii/S0302283816304699?via%-3Dihub

5.3.7 2nd Radiological-Gynecological Expert meeting 2015 published MRgFUS treatment in fibroid treatment guideline

There is a consensus between the disciplines of gynecology and radiology that determination of required treatment of uterine fibroids should be based on an examination and advice by a gynecologist.
Comprehensive advice regarding treatment options for symptomatic uterine fibroids encompasses not only medication-based and surgical options, but also non-surgical therapy options including uterine artery embolization (UAE) and MRgFUS. The decision for or against an alternative therapy should be made taking into account the patient's desire for, and knowledge of, therapeutic alternatives, their chances of success and limitations, as well as typical side effects and possible complications (informed decision).

Read More:
https://www.thieme-connect.com/products/ejournals/html/10.1055/s-0034-1399342

Consensus

Magnetic Resonance Guided Focused Ultrasound[#] for Fibroid Treatment – Results of the Second Radiological Gynecological Expert Meeting

Magnetresonanzgeführter fokussierter Ultraschall zur Myombehandlung – Ergebnisse des 2. radiologisch-gynäkologischen Expertentreffens

T. Kröncke , M. David *

› Author Affiliations

5.3.8 HIFU included into the 2012 living guidelines for prostate cancer

In 2012, experts from Germany formulated and resolved the living guidelines on prostate cancer key questions on 13 updating and 5 primary points in question. Examples of updating are imaging, active surveillance and high-intensity focused ultrasound (HIFU) and for primary points, the benefits of new markers and the results of proton therapy.

Read More： https://pubmed.ncbi.nlm.nih.gov/21979905/#affiliation-1

Springer Link

Originalien | Published: 08 October 2011

Welche Inhalte sollte eine „living guideline“ besetzen?

Which components should living guidelines contain?

L. Weißbach

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

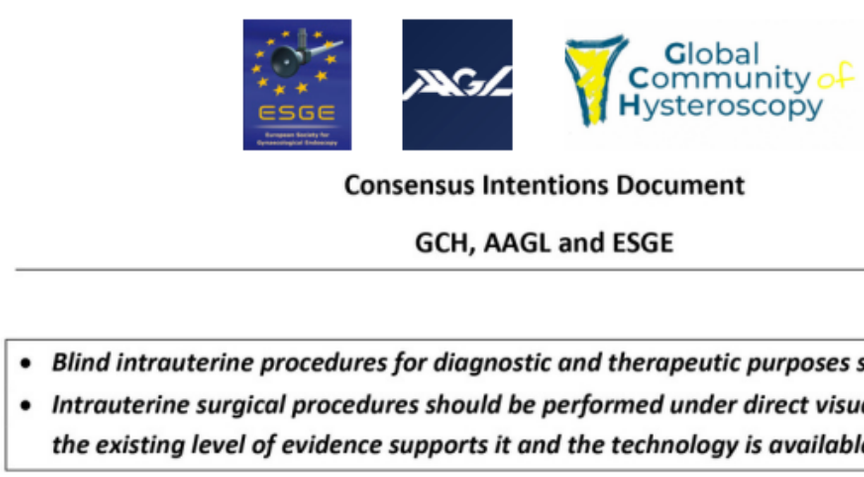
6.1 Major professional societies have released new guidelines/consensus for gynecological laparoscopic and hysteroscopic surgery during in 2022

6.1.1 Consensus Intentions Document by GCH, AAGL and ESGE

The Consensus Intentions Document was agreed and signed by ESGE, GCH and AAGL during the HTRS event in Malaga 27th May 2022.

The three parties agreed that blind intrauterine procedures for diagnostic and therapeutic purposes should be avoided; intrauterine surgical procedures should be performed under direct visualization when the existing level of evidence supports it and the technology is available; and the most recent innovation in the field of Intrauterine Surgery was the introduction of the Hysteroscopic Tissue Removal Systems (HTRS). This technology is designed to extract tissue from the uterine cavity under direct visualization in an efficient and reliable manner.

Source: https://esge.org/esge-gch-aagl-consensus-intensions-document/

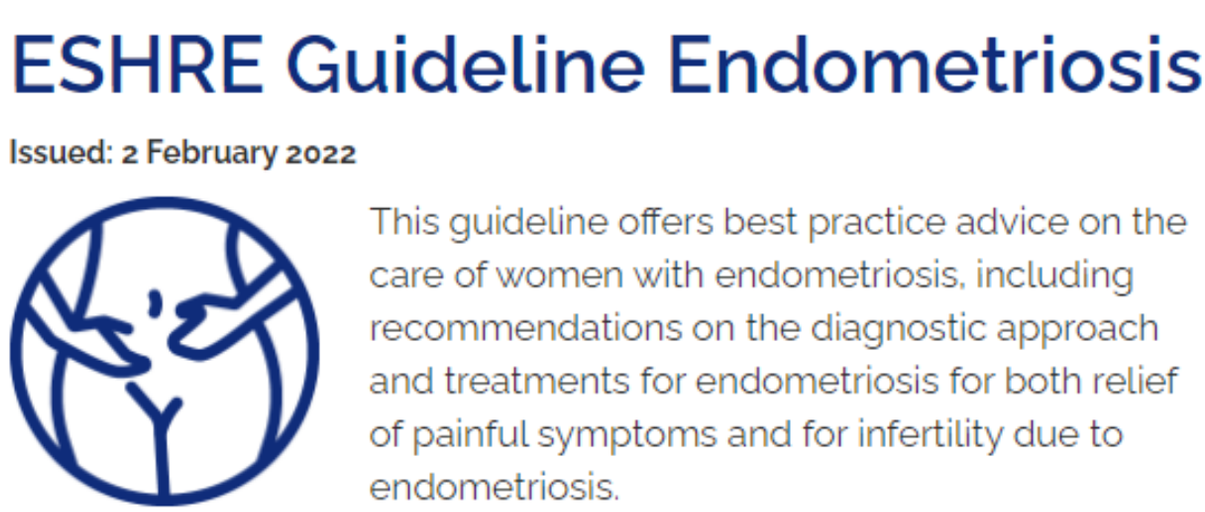


6.1.2 ESHRE Guideline for the Management of Endometriosis

This guideline offers best practice advice on the care of women with endometriosis, including recommendations on the diagnostic approach and treatments for endometriosis for both relief of painful symptoms and for infertility due to endometriosis.
The guideline provides more than 100 recommendations on best practice on caring for women with endometriosis. The guideline is a full revision of – and hence replaces - the ESHRE guideline on Endometriosis (2014), with major changes in recommendations regarding the relevance of diagnostic laparoscopy and post-operative hormone therapy.

In addition, a new section on endometriosis in adolescence provides information on diagnosis appropriate treatments for symptom management in female adolescents and young adults. The topics of menopause, pregnancy and fertility preservation in relation with endometriosis have been addressed in more detail.

Source :
https://www.eshre.eu/Guidelines-and-Legal/Guidelines/Endometriosis-guideline



6.2 New Endometriosis ICD codes for 2023 (effective Oct 1, 2022)

Previously, the codes for endometriosis were limited. The codes did not specify side, depth of invasion or associated symptoms. As you might imagine, our understanding and classification of this disease has changed and thus our coding of the disease needed changing as well. The inadequate current coding for endometriosis is in the N80 set as follows:

N80 Endometriosis
N80.0 Endometriosis of uterus
N80.1 Endometriosis of ovary
N80.2 Endometriosis of fallopian tube
N80.3 Endometriosis of pelvic peritoneum
N80.4 Endometriosis of rectovaginal septum and vagina
N80.5 Endometriosis of intestine
N80.6 Endometriosis in cutaneous scar
N80.8 Other endometriosis
N80.9 Endometriosis, unspecified

AAGL and Endometriosis leaders petitioned for new ICD-10 CM codes to represent our increased understanding. These codes were approved by the American Medical Association, Centers for Medicare & Medicaid Services, and the World Health Organization and will go into effect October 1, 2022. The codes further define laterality and depth of invasion as well as more specifically identify the location. Thus, the above 10 codes have expanded to 168 codes.

In general, the codes start with identifying the side of the lesions (right, left, bilateral), the depth of the lesion (unspecified depth, superficial, deep) and then sorted by location (ovary, tube, cul-de-sac, sidewall, brim, uterosacral ligament, rectovaginal septum, intestine, scar, bladder, ureter, diaphragm, thoracic cavity, abdominal wall {not in a scar} and finally, specific affected nerves).

Source：https://aagl.org/new-endometriosis-icd-codes-for-2023/

6.3 Studies/recommendation related to gynecological laparoscopy released by professional societies in 2022

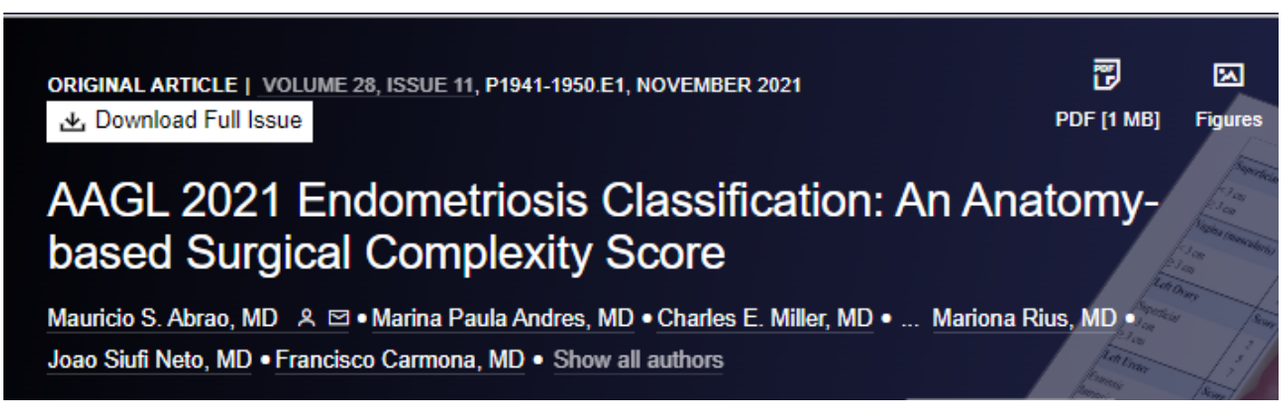
6.3.1 AAGL Endometriosis Classification: An Anatomy-based Surgical Complexity Score

The primary objective of this study was to develop an anatomy-based and user-friendly scoring system that correlates with surgical complexity. The secondary objective was to determine its correlation with preoperative pain symptoms and infertility. In addition, we aimed to compare the performance of the new classification with the 1996 revised ASRM classification system.

The current study created a scoring system on the basis of expert surgeon-derived complexity ratings and translated these scores into a 4-stage endometriosis scale. The high concordance between the AAGL Endometriosis Classification System scale and the surgical complexity scale validates the use of the system in scoring surgical complexity. This system is easy to calculate at the time of laparoscopy and is solely derived from intraoperative anatomic findings. We envision the greatest potential application to be in aiding surgeons who are seeking to objectively quantify procedure difficulty. The AAGL Endometriosis Classification score has the potential to improve clarity in communication within medical records and in clinical research.

The AAGL Endometriosis Classification allows for identifying objective intraoperative findings that reliably discriminate surgical complexity levels better than the ASRM staging system. The AAGL severity stage correlates comparably with pain and infertility symptoms with the ASRM stage.

Source：
https://www.jmig.org/article/S1553-4650(21)01173-0/fulltext#seccesectitle0022



6.3.2. Impact of the COVID-19 pandemic on surgery for severe endometriosis in the UK: a national database study

The COVID-19 pandemic has had a significant effect on healthcare services, particularly affecting patients who suffer from chronic conditions. However, the pandemic's effect on endometriosis surgery is not yet known. To determine the impact of the COVID-19 pandemic on surgery for severe endometriosis in the UK at a national, regional and centre-level, BSGE collects data nationally on all operations for severe endometriosis which involve dissection of the pararectal space.

Most endometriosis surgery is performed laparoscopically, and the magnified decline in procedures for complex endometriosis may have been in part due to concerns raised early in the pandemic about aerosol generation during laparoscopy. However, in this study, we did not observe a decline in the laparoscopic approach for the treatment of severe endometriosis during the pandemic. The increased use of pre-operative testing of patients and measures to improve the COVID-safety of laparoscopy have allowed the careful re-introduction of endometriosis surgery at some centres through 2020 and 2021, mitigating some of the disruption (Odejinmi et al., 2020; Saridogan and Grimbizis, 2020). This study shows that the number of operations performed annually in the UK for severe endometriosis fell dramatically during the COVID-19 pandemic and is yet to normalise. It reveals the dramatic effect that the COVID-19 pandemic has had on UK services for endometriosis surgery, which may continue to affect patients and clinicians for a considerable time to come.

Source:
https://fvvo.eu/archive/volume-14/number-4/original-articles/impact-of-the-covid-19-pandemic-on-surgery-for-severe-endometriosis-in-the-uk-a-national-database-st/

Facts Views Vis Obgyn, 2022, 14 (4): 309-315

Original article

Impact of the COVID-19 pandemic on surgery for severe endometriosis in the UK: a national database study

J. Lewin[1], E. Saridogan[1], D. Byrne[2], T.J. Clark[3], A. Vashisht[1]

[1]University College London Hospital, Women's Health Division, London United Kingdom; [2]Department of Gynaecology, Royal Cornwall Hospital, Truro, United Kingdom; [3]Birmingham Women's and Children's Hospital, Birmingham, United Kingdom.

Correspondence at: Dr Jonathan Lewin, Flat F, 14 John Spencer Square, London N1 2LZ. E-mail: Jonathan.lewin1@nhs.net.

6.3.3 The future of (non-)surgical ablative therapy in uterine adenomyosis

Uterine adenomyosis (UA) has a significant negative impact on the individual's quality of life due to pain, abnormal uterine bleeding, and subfertility. The impact on women's health and sexuality has never been underestimated by physicians, but treatment modalities have been shown to be problematic.

Due to the high importance of the UA, a new Working Group of the European Society for Gynaecological Endoscopy (ESGE) - European Society of Human Reproduction and Embryology (ESHRE) – World Endometriosis Society (WES) has been inaugurated, to give expert recommendations on diagnostics and therapies for UA based on available evidence and experience, described in separate parts. This working group of experts will diligently scrutinise the available evidence before summarising their recommendations. Imaging by MRI and possibilities of transvaginal and transabdominal ultrasound and medical therapies will be evaluated. There will be a special scope on open and laparoscopic surgery, as only a few expert centres are performing adenomyosis surgery on a regular scale. Distinction will be made between solitary or localised disease, and the diffuse form. The non-surgical ablative therapies such as HIFU and uterine artery embolization will also be analysed, highlighting the upcoming importance. It is anticipated that the resulting documents will be published during the year 2023.

Source:
https://fvvo.eu/archive/volume-14/number-4/editorial/the-future-of-non-surgical-ablative-therapy-in-uterine-adenomyosis/


FACTS, VIEWS & VISION
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Issues / Volume 14 / Number 4 / Editorial
/ The future of (non-)surgical ablative therapy in uterine adenomyosis

The future of (non-)surgical ablative therapy in uterine adenomyosis

R.L. De Wilde[1], R. Devassy[1], H.C. Verhoeven[1], L.A. Torres-de la Roche[1]

VII. New Vision and Big Shot in Minimally Invasive and Noninvasive Medicine

7.1 New vision: novel technologies in 2022

7.1.1 The Mini-Recsectoscope: A Real Innovation or Just Another Trend?

For a hysteroscopist, the mini-resectoscope is the device that best exemplifies the successful advancement of minimally invasive gynecologic surgery. The original Gubbini mini-resectoscope was created by Giampietro Gubbini, initially equipped with a 16Fr diameter that later evolved into an oval 14.9Fr device. A few years later, Karl Storz brought to market a 15Fr bipolar mini-resectoscope. Both are versatile tools with different kind of tips including a monopolar/bipolar loop, ball, and needle, and the “cold loop” technique used for enucleation of submucosal fibroids.

The question many ask is how is this new device useful when compared with our “old” conventional resectoscope? First and foremost, there is a significant difference in safety. Due to the smaller 5mm diameter of the mini-resectoscope, there is no need for cervical dilation in most cases. Blind dilation is a step in which false passages and uterine perforations can happen; by negating the need for blind dilation, you benefit by avoiding these common complications. Additionally, the mini-resectoscope can solve almost all intrauterine pathologies except for fibroids greater than 2-3cm in size. This size limitation is based on the dimension of the mini-resectoscope tool and the resulting increase in operative time for myomectomies of larger fibroids.

Source： https://newsscope.aagl.org/volume-36-issue-8/spotlight-on-hysteroscopy/

7.1.2 Fibroid SIG Technology Update: Radiofrequency Fibroid Ablation

Although the main focus of surgical techniques for fibroid treatment historically involved excisional procedures such as hysterectomy and myomectomy as the gold standard, radiofrequency fibroid ablation (RFA) has emerged as another non-invasive fibroid treatment option.

The current review of the literature suggests that RFA offers a safe and effective alternative treatment option for patients with symptomatic fibroids who seek uterine preservation. Although RFA is not yet approved by the FDA as a fertility-enabling treatment, subsequent successful pregnancy outcomes have been reported in the literature. More robust fertility data is required to confirm its safety for those who actively desire future pregnancy. RFA is another promising, conservative fibroid treatment and is looking to be an essential component of the minimally invasive gynecologist's armamentarium.

Source：
https://newsscope.aagl.org/volume-36-issue-1/difficult-case-review-tap-block-2/

Fibroid SIG Technology Update: Radiofrequency Fibroid Ablation

Although the main focus of surgical techniques for fibroid treatment historically involved excisional procedures such as hysterectomy and myomectomy as the gold standard, radiofrequency fibroid ablation (RFA) has emerged as another non-invasive fibroid treatment option.

7.1.3 A new fertility-preserving treatment modality for life-threatening bleeding caused by acquired uterine arteriovenous malformation (AVM): Combination laparoscopic ligation of uterine arteries and AVM suture

In this article, the author shared a new fertility-preserving treatment modality for life-threatening bleeding caused by an acquired uterine arteriovenous malformation (AVM): A combination of laparoscopic ligation of uterine arteries and AVM suture.
A 39-year-old female was successfully treated using laparoscopy bilateral uterine arteries ligation followed by application of uterine AVM suture with an absorbable barbed wound closure device. Complete regression of the AVM lesion on sonography was noted 8 months after laparoscopic surgery. Besides, this patient had normal menstruation after the operation.
This case report describes for the first time a successful combination of bilateral uterine artery ligation and AVM sutures to treat a patient with uterine arteriovenous malformation. They demonstrated the efficacy and safety of this fertility preserving method. And the disadvantages of this procedure were the risk associated with general anaesthesia and the skills needed to perform laparoscopic surgery.

Source： https://www.sciencedirect.com/science/article/pii/S1028455922001607

Contents lists available at ScienceDirect

Taiwanese Journal of Obstetrics & Gynecology

journal homepage: www.tjog-online.com

Case Report

A new fertility-preserving treatment modality for life-threatening bleeding caused by acquired uterine arteriovenous malformation (AVM): Combination laparoscopic ligation of uterine arteries and AVM suture

Ting-Fang Lu [a], Yu-Hsiang Shih [a], Chien-Hsing Lu [a, b, c], Lou Sun [a, *]

[a] Department of Obstetrics and Gynecology and Women's Health, Taichung Veterans General Hospital, Taichung, Taiwan, ROC
[b] School of Medicine, National Yang-Ming University, Taipei, Taiwan, ROC
[c] Institute of Biomedical Sciences, Program in Translational Medicine, and Rong Hsing Research Center for Translational Medicine, National Chung Hsing University, Taichung 40227, Taiwan, ROC

7.2 Recipients of FUS Foundation Awards in 2022

7.2.1 Clinical Adoption Award – Zhibiao Wang, MD

This award was established in 2022 and recognizes an individual dedicated to advancing the field of focused ultrasound and whose efforts have led to a significant number of patient treatments. Prof. Wang Zhi Biao is the Honorary Board Member of International Society of Minimally Invasive Medicine (ISMIVS) and Director of State Key Laboratory of Ultrasound in Medicine and Engineering (SKLUME). His career in therapeutic ultrasound has spanned 34 years. He has made pioneering contributions to the field of ultrasound therapy, including breakthroughs in basic research, large medical equipment development, clinical applications, and industry standards. He is also the founder and Chairman of Chongqing Haifu Medical Technology Co. Ltd, who developed China's – first high-intensity focused ultrasound therapeutic system, which has been exported to 28 countries and regions and has collectively treated more than 200,000 patients worldwide.

7.2.2 Commercialization Pathfinder Award – Kobi Vortman, PhD

The Commercialization Pathfinder Award recognizes an individual who has served as a galvanizing force in facilitating the rapid acceleration of focused ultrasound, speeding the transition from laboratory research to widespread adoption and utilization of the technology. The recipient is always working to achieve the ultimate goal – providing significant contributions to the use of focused ultrasound technology to decrease death, disability, and suffering for patients with serious medical disorders around the world. Mr. Kobi Vortman is the Founder and Vice Chairman of the Board at Insightec.

7.2.3 Lifetime Achievement Award – Yoav Medan, PhD

The Lifetime Achievement Award was established in 2022 and recognizes an individual who has devoted a major portion of his or her distinguished career to advancing focused ultrasound therapy by establishing the field and improving the lives of patients. Mr. Yoav Medan is Vice President at Insightec and in advisory roles.

7.2.4 Visionary Award – Gail ter Haar, DSc

The Visionary Award is given every two years at our Symposium to recognize an individual who has created a larger vision for what the future of focused ultrasound may hold and whose effort, passion, and persistence have been crucial to advancing the field. Professor Gail ter Haar, a renowned expert in the intersection of focused ultrasound and physics, has been selected for the Focused Ultrasound Foundation's 2022 Visionary Award.

VIII. Open Projects of Ultrasound Therapy Technology

As an exemplified technology of minimally invasive and non-invasive therapies, ultrasound therapy is deemed one of the frontiers in science and technology across the globe, and the exploration in minimally invasive or non-invasive therapies has become an inevitable trend of medical development in the 21st century. Universities and R&D institutions around the world have invested a lot of resources in the research and development of this technology. To facilitate the development of ultrasound therapy technology in the world and bring the mutual benefits to global research institutions, the State Key Laboratory of Ultrasound in Medicine and Engineering (SKLUME) in China opens some of their projects to seek global collaborations.

8.1 About State Key Laboratory of Ultrasound in Medicine and Engineering (SKLUME)

The State Key Laboratory of Ultrasound in Medicine and Engineering (SKLUME) was funded and set up in 2020 under the approval of the Ministry of Science and Technology of China and Chongqing Municipal Government. At present, it occupies 4,500 m2 of space, houses facilities of 60 million RMB and has more than 60 in-house staff members. Steered to the research in 1) macrosonics and the biological effect of high-energy acoustics, 2) multimodality image monitoring and AI-aided precise therapy, and 3) clinical ultrasound therapy and big data, SKLUME has been studying high-energy acoustics and focused ultrasound surgery. On the yearly basis, SKLUME will open a certain number of projects for collaboration with domestic and overseas outstanding scholars. The open projects are included in the Chongqing Scientific Research Program and the support from the applicant institution with a matching fund (5 times of the fund provided by SKLUME) is required. In 2020, for example, SKLUME received 31 bids from 18 institutions, and 21 projects were finally approved, with a total of 6.042 million RMB provided by SKLUME.

8.2 The list of open projects of the SKLUME in 2023

Research Direction	Project Title
Macrosonics and Acoustic Effect	Research on the mechanism and application of strong acoustic cavitation on material processing under high hydrostatic pressure
	Theoretical study of strong acoustic cavitation and its dynamics under high hydrostatic pressure and high power drive
	Theoretical and experimental studies on the propagation and effects of high-intensity focused ultrasound in multi-layered non-uniform tissues
Multimodal Image Monitoring and Intelligent Precision Therapy	Study on pathology related to minimally invasive and non-invasive uterine imaging
	Research on digital anatomy and 3D reconstructive methods based on images
	Research on focused ultrasound therapy monitoring based on a novel ultrasound imaging strategy
Clinical Research of Ultrasound Therapy and Big Data	Study on minimally invasive and non-invasive treatment of total cervical histopathy in situ and its impact on fertility
	Focused ultrasound therapy for adenomyosis with precise and comprehensive treatment plan and fertility protection research
	Basic and clinical research of focused ultrasound therapy in the combination with radiotherapy, chemotherapy and immunotherapy for the treatment of malignant solid tumors
	Clinical research on the treatment of benign breast tumors by focused ultrasound ablation surgery

Amount of Funding: 50,000-100,000RMB per project
Application Period: May 2023 to April 2025
Application Enquiry: Fang Yuan 18883939267
Project Management: Nie Yuxian 023-63303353

Source: https://skl-ume.cqmu.edu.cn/info/1027/1413.htm

IX. Appendixes

Appendix 1: Summary of 2022 Online Lectures by ISMIVS

1.1 2022 APAGE-ISMIVS HIFU Series Webinars

Episode 1: Management of endometriosis, especially for patients with fertility desire

Lecture 1
Speaker: Prof. Chyi-Long Lee
Topic: How does deep endometriosis impact reproductive outcomes
Prof. Chyi-Long Lee, the Chairman of the Board of Trustees of APAGE, discussed the therapy for endometriosis in reproductive women. He first indicated that endometriosis was found in 10% of women in reproductive age and about 176 million women suffer from the disease worldwide, then he explained the mechanisms of mild or minimal endometriosis and infertility based on the paper and how deep endometriosis impacts fertility, based on which he introduced several surgical techniques including "A to Z" of DIE treatment. At the end of his lecture, he emphasized that laparoscopy should remain the gold standard whenever DE surgery is indicated and continuous training would always be the last puzzle for reproductive surgery.

Lecture 2
Speaker: Prof. Zhang Lian
Topic: Comparison of ultrasound-guided high intensity focused ultrasound ablation and surgery for abdominal wall endometriosis
Prof. Lian Zhang, Secretary-General of ISMIVS, Director of Chongqing Haifu Hospital, compared ultrasound-guided HIFU (Usg-HIFU) and other surgical options for abdominal wall endometriosis (AWE). He first introduced the principle and indications of HIFU, showing some contrast enhanced MRIs of a patient with AWE before and after HIFU treatment. In addition, he indicated that there was no skin burn encountered, the pain did not recur during a mean follow-up of 18.7 months, and all treated nodules gradually shrank over time, then concluded that HIFU treatment was promising and could be used to treat AWE safely and the effectiveness of HIFU treatment for AWE was comparable with open surgery, with less adverse effects and short hospital stay.

Lecture 3

Speaker: Dr. He Min

Topic: The learning curve of HIFU and our training experience in China

Dr. Min He, the Senior Training Lecturer, shared the learning curve of HIFU and her training experience in China, she indicated that basic requirements for clinicians to learn HIFU included specific medicine majors (ob-gyn, oncology, surgery, breast surgery, orthopaedics, medical imaging), image recognition ability (US/MRI), and understanding of HIFU. She also mentioned that factors affecting the learning curve of HIFU include ultrasonic image recognition ability, clinical experience, HIFU treatment related knowledge, number of cases and operation frequency. Since 2005, 2150 professionals have been trained in China's HIFU training center.

1.2 2022 APAGE-ISMIVS HIFU Series Webinars

Episode 2: Treatment for Placenta Accreta and Cesarean Scar Pregnancy

Lecture 1

Speaker: Prof. Aizura Adlan

Topic: Diagnosis of placenta accrete and caesarean scar pregnancy - clinical protocol and outcomes

Prof. Aizura Adlan, Associate Professor of Department Obstetrics and Gynecology, University of Malaya, discussed the pathogenesis, diagnosis and management of placenta accreta and cesarean scar pregnancy (CSP). She believed that conservative management should be considered only for carefully selected cases of placenta accrete spectrum, cases that be considered investigational and after detailed counselling about the risks, uncertain benefits and efficacy. After demonstrating 4 cases of CSP, she provided several treatment modalities including laparoscopic caesarean scar resection, TAS-guided hysteroscopic curettage, and repeated HIFU combined with hysteroscopic S&C.

Lecture 2

Speaker: Dr. Lee Jae Seong

Topic: Clinical experience of ultrasound-guided HIFU treatment for gynecologic disorders at single center in South Korea

Dr. Lee Jae Seong shared 13 years of clinical experience in the HIFU treatment for gynecological disorders at a single center in South Korea. From February 2010 to October 2017, his center managed 1807 cases (918 cases of uterine fibroids and 889 cases of adenomyosis), among which the uterine fibroid volume (mean ± SD) before HIFU is 176.46 ± 149.87, and 3 months and 12 months after HIFU is 79.87 ± 74.81 (55%) and 46.23 ± 54.7 (74%). He also provided clinical evidence for the safety and efficacy of HIFU therapy with several research papers, then end up summarizing that HIFU clinicians should be careful with patients who want future pregnancies and inform some possibilities of being in trouble of pregnancy and enough experience is needed to make satisfactory treatment outcomes.

Lecture 3

Speaker: Dr. Zhang Cai

Topic: HIFU followed by dilation and curettage to treat caesarean scar pregnancy – clinical protocol and outcomes

Dr. Zhang Cai, the Senior HIFU doctor, discussed clinical protocol and outcomes of HIFU followed by dilation and curettage to treat CSP. She first introduced the types of CSP based on the 2016 Chinese Expert Opinion and indicated that the aim of the management of CSP was to preserve fertility, and prevent life-threatening complications such as massive haemorrhage and uterine rupture. She further shared different sonication strategies of HIFU treatment for CSP and compared the adverse events, efficacy and fertility outcomes of HIFU and UAE, and concluded that HIFU therapy featured non-invasive and real-time monitoring qualities which could reduce the risk of vaginal massive bleeding, minimize damage to the uterine, and keep the fertility.

1.3 2022 APAGE-ISMIVS HIFU Series Webinars

Episode 3: Treatment for vulva and cervical diseases: new options

Lecture 1
Speaker: Prof. Li Chengzhi
Topic: The efficacy of HIFU treatment for cervical ectopy and HPV infection
Prof. Li Chengzhi from Chongqing Medical University discussed focused ultrasound surgery (FUS) as a new way to treat high-risk HPV infection and CIN. At first, she introduced the principles and characteristics of FUS and stressed its advantages in real-time monitoring and dose adjustment, and then made a detailed presentation on the application of focused ultrasound in HR-HPV infection and CIN, including the indications and contraindications, preparation before the treatment and how to carry out the therapy. She also shared some clinical observations of FU therapy for cervical diseases and compared FUS with laser, drug and other therapies. At last, she showed some cases and the pathological changes in the cervix before and after FUS, reaching the conclusion that focused ultrasound can safely and effectively treat HR-HPV infection and cervical lesions.

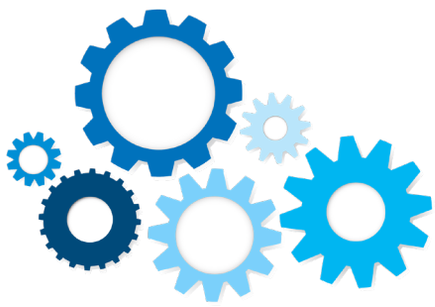
Lecture 2
Speaker: Prof. Apolikhina Anatolievna
Topic: HIFU treatment for non-neoplastic epithelial disorders of the vulva
Prof. Apolikhina Inna Anatolievna and Dr. Teterina Tatiana, from National Medical Research Center for Obstetrics, Gynecology and Perinatology named after V.I. Kulakov, shared their experience with HIFU treatment for non-neoplastic epithelial disorders of the vulva. Prof. Inna mentioned that lichen sclerosis was observed at a higher incidence rate in younger women in recent years. She compared HIFU treatment with fractional laser and emphasized the advantages of HIFU in the alleviation of symptoms and improvement of sexual function. She also shared an observational study including 103 patients with non-neoplastic epithelial disorders of the vulva who received HIFU treatment and showed some clinical cases.

Lecture 3
Speaker: Prof. Kuan-Gen Huang
Topic: HPV vaccine beyond cervical cancer
Prof. Kuan-Gen Huang, president of the Taiwan Association for Minimal Invasive Gynecology discussed the HPV vaccine beyond cervical cancer. Prof. Huang raised that vaccine was the most minimally invasive treatment for cancer. After giving an introduction to human papillomavirus (HPV), he focused on the prevention of cervical cancer and mentioned that HPV vaccination is the primary prevention of cancer, as the cause of cervical cancer is the persistent infection of HPV, which finally leads to pathological changes. He also mentioned that there were many other HPV-associated cancers, including vulvar cancer, vaginal cancer, oropharyngeal cancer, anal cancer and penile cancer.

1.4 2022 APAGE-ISMIVS HIFU Series Webinars

Episode 4: Adenomyosis and Fertility & Consensus on HIFU Treatment

Lecture 1
Speaker: Dr. Sevellaraja Supermaniam)
Topic: Infertility with adenomyosis – how can HIFU help?
Dr. Sevellaraja Supermaniam (S. Selva), Head of the IVF Centre and HIFU Centre at a private hospital in Melaka, Malaysia, shared treatment options for infertility patients with adenomyosis based on his rich clinical experience, and case studies of 3 types of adenomyosis that keen on pregnancy requiring HIFU therapy, including patients who have frozen embryo, keen on spontaneous pregnancy, and still single. He concluded that for women with adenomyosis who have difficulty in conceiving especially after failed IVF, HIFU is a good option to shrink the adenomyosis before frozen embryo transfer.



Lecture 2

Speaker: Prof. Rudy Leon De Wilde

Topic: Should HIFU be considered as an alternative non-surgical treatment of adenomyosis in non-Aisatic countries?

Prof. Rudy Leon De Wilde, Head of the University Clinic for Gynecology of the Faculty of Medicine and Health Science, Carl von Ossietzky University, Oldenburg, Germany, first introduced the evolution of surgery from open surgery based on anatomy to minimally invasive surgery based on laparoscopic technique, then to extracorporeal noninvasive procedure based on imaging anatomy. He elaborated on clinical and social advantages of HIFU including no incisions, shorter hospital stay, uterine function preserved, life quality improvement, no scars, etc. He also indicated adverse events that might occur in the near-field region after HIFU, and concluded that in future, adenomyosis treatment by HIFU would be qualified to give patients a chance to protect their uterus.

Lecture 3

Speaker: Dr. Hsin-Hong Kuo

Topic: Tips and tricks in laparoscopic adenomyomectomy

Dr. Hsin-Hong Kuo, Deputy Secretary General, APAGE, first introduced the pathological mechanism and classification of adenomyosis, as well as applicable treatment options, then shared the surgery video of adenomyomectomy under laparoscopy to detailed the skills and tricks during the surgery.

1.5 2022 APAGE-OGSM-ISMIVS Conference for Minimally Invasive and Non-invasive Surgery (Malaysia)

Lecture 1

Speaker: Prof. Jordi Rodriguez

Topic: Pregnancy outcome after HIFU - A single center result from Spain

Professor Jordi Rodriguez and Dr S. Selva focused on the topic of HIFU and fertility. Prof. Jordi Rodriguez shared their studies on the pregnancy outcome after HIFU, which was a single-centre result from Spain. He mentioned at the end of the speech that USgHIFU therapy was an effective and safe treatment for uterine fibroids and it seemed to be the first therapeutic option in women with uterine fibroids and gestational desire. Dr. S. Selva also gave a detailed presentation on how could HIFU help with infertility with adenomyosis.

Lecture 2

Speaker: Prof. Feng Wu

Topic: HIFU ablation and antitumor immune response

Prof. Feng Wu from Oxford University addressed the topic of HIFU ablation and antitumor immune response. The best scenario in cancer therapy is killing all tumor cells including primary and metastatic sites without causing any harm to healthy cells in the body. As non-selective radiotherapy and chemotherapy have strong side effects, professor Wu raised the possibility of manipulating an immune response against tumor cells but not normal cells, and list studies on the immune response after HIFU treatment. In conclusion, he noted that HIFU Therapy not only induces the death of all localized tumor cells without damage to healthy cells but also activates systemic antitumor immunity.

Lecture 3

Speaker: Dr. Sevellaraja Supermaniam

Topic: Infertility with adenomyosis - How can HIFU help?

Professor Jordi Rodriguez and Dr S. Selva focused on the topic of HIFU and fertility. Prof. Jordi Rodriguez shared their studies on the pregnancy outcome after HIFU, which was a single-centre result from Spain. He mentioned at the end of the speech that USgHIFU therapy was an effective and safe treatment for uterine fibroids and it seemed to be the first therapeutic option in women with uterine fibroids and gestational desire. Dr. S. Selva also gave a detailed presentation on how could HIFU help with infertility with adenomyosis.

Lecture 4

Speaker: Prof. David Cranston

Topic: HIFU - Ten year's experience in Oxford

The president of the International Society of Minimally Invasive and Virtual Surgery (ISMIVS), Prof. David Cranston from Oxford University Hospitals shared their experience on the clinical treatments and trials of HIFU therapy. He noted the results showed that there was an increasing number of studies showing the effects of HIFU treatment as good as other localized treatments and the side effects were less.

Lecture 5

Speaker: Dr. Kim Tae Hee

Topic: How to enhance HIFU sonication

Dr. Kim Tae Hee introduced his experience on how to enhance HIFU sonication. He shared some measures to improve the safety of the treatment. By reducing sonication power, exposure time and air bubble, the complication rate could be lowered. He also listed other methods such as protecting nerve by making a distance from the sacral area.

Lecture 6

Speaker: Prof. Mohamed Hamed

Topic: Management of liver tumor & HIFU application in other extended indications

Focusing on the application of HIFU technology, Prof Mohamed Hamed (from Cairo University) gave a lecture on the Management of liver tumor & HIFU applications in other extended indications. Professor Hamed listed the advantages of HIFU technology, which is non-invasive and re-treatable with high safety profile and no ionizing radiation, and shared related cases and studies.

Lecture 7

Speaker: Prof. He Min

Topic: Overview of HIFU clinical application and our training experience

Dr He Min from the Chongqing Haifu Hospital also introduced the application of HIFU technology and focused on the training experience in China. On the same day launched the opening ceremony of the 2022 International Training Workshop on Focused Ultrasound Therapy for Tumors, which gathers momentum for the development of HIFU technology.

Appendix 2: 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
11. From Osler to Noninvasive
12. Clinical Application of HIFU for Liver and Pancreatic Cancer
13. HIFU in the treatment of Breast Cancer and Breast Benign Tumor
14. Nursing Care of HIFU Treatment of Malignant Tumors

*Note: Course 11-14 were newly updated on www.ismivs.org in 2022

Appendix 3: Excerpts from some selected articles

1. High-intensity focused ultrasound treatment for symptomatic uterine fibroids: a systematic review and meta-analysis.

This study was aimed at comparing the outcomes of high-intensity focused ultrasound (HIFU) with those of uterine artery embolization (UAE) and traditional surgeries for treating symptomatic uterine fibroids.

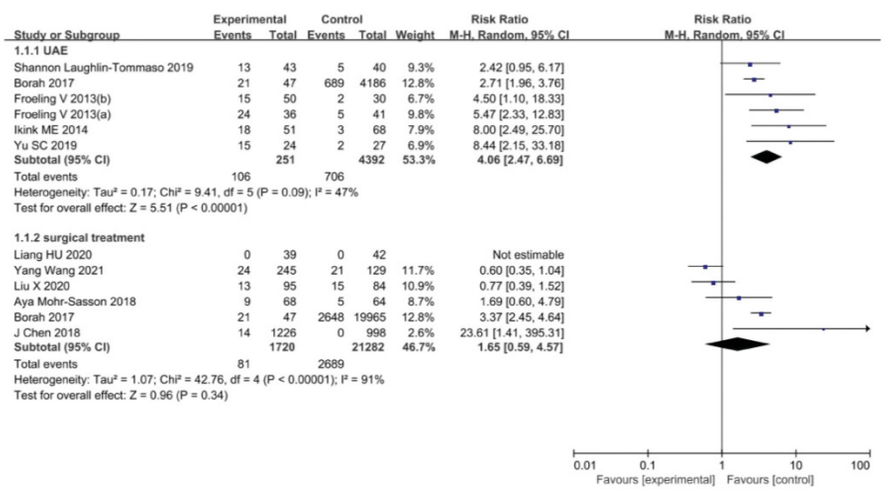


Figure 3. A forest plot for overall results and heterogeneity of the re-intervention rate.

Overall, 21 studies were included in this meta-analysis. The results revealed that HIFU had a higher re-intervention rate than UAE (relative risk [RR] = 4.06, 95% confidence interval [CI]: 2.47-6.69) and offered no significant advantages in reducing the symptom severity score (SSS) (mean difference [MD] = 17.01, 95% CI: 10.25-23.77) and improving the health-related quality of life (HRQoL) score (MD= -18.32, 95% CI: -24.87 to -11.78) in the treatment of symptomatic uterine fibroids. However, compared with UAE, HIFU may be associated with a higher pregnancy rate (RR = 17.44, 95% CI: 2.40-126.50) and may have a significant advantage in shortening pregnancy interval and preserving ovarian function. Moreover, upon comparing HIFU with traditional surgical treatments, the HIFU group showed significantly improved HRQoL score (MD = 2.25, 95% CI: 1.15-3.35), but the re-intervention rate (RR = 1.65, 95% CI: 0.59-4.57), pregnancy rate (RR = 1.01, 95% CI: 0.90-1.13), SSS and ovarian function did not significantly differ between the two groups.

Conclusions: Although HIFU has relatively high re-intervention rate, it may offer a higher pregnancy rate and shorter pregnancy interval with little influence on ovarian function, thus making it an attractive option for treating symptomatic fibroids in young women who wish to plan a pregnancy in the future.

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2. Effectiveness and safety of ultrasound-guided high-intensity focused ultrasound ablation for the treatment of colorectal cancer liver metastases

To investigate the effectiveness and safety of high-intensity focused ultrasound (HIFU) ablation for patients with colorectal liver metastases (CRLMs) who were unsuitable for hepatectomy.

This is a multicenter retrospective study. 238 CRLM patients underwent ultrasound-guided HIFU (USgHIFU) ablation in three medical centers from October 2014 to December 2020. Patients who had complete colorectal cancer resection, but exhibited extra-hepatic metastasis were excluded from this study. HIFU ablation procedure was performed, and contrast-enhanced MR imaging and/or contrast enhanced CT examinations were conducted and mRECIST was used for the assessment of tumor ablation effectiveness before and after treatment, and every 3 months thereafter. Adverse events and complications were recorded.

Table 1 (continued)

Author	Year	Patients (*n*)	Study design	Median survival (months)	Pain relief (%)	Adverse events
Ning et al. [54]	2016	436	Unresectable PDAC for HIFU and non-HIFU	7.1 (HIFU) vs 5 (non-HIFU)	N/A	Increase of serum or urinary amylase levels, incomplete intestinal obstruction, mild fever
Ji et al. [57]	2018	87	Unresectable locally advanced PDAC	12.2	64	Fatigue, abdominal pain, fever, nausea, rash
Marinova et al. [58]	2019	50	Unresectable advanced PDAC	16.2	84	None
Ning et al. [60]	2019	347	Unresectable advanced PDAC for HIFU + GEM and GEM	7.4 (HIFU + GEM) vs 6.0 (GEM)	None	Skin burn, vertebral injury, GI breeding, elevated amylase, abdominal pain, fever, obstructive jaundice
Zhu et al. [61]	2019	86	Advanced PDAC	9.9	97.6	Fever, abdominal pain, skin burn, amylase elevation
Tao et al. [62]	2019	38	Advanced PDAC (HIFU + Gemox)	12.5	90	Upper abdominal discomfort, tolerable liver area pain or low back pain, fever, obstructive jaundice
Sofuni et al. [68]	2021	176	Unresectable advanced PDAC	21.3 (HIFU + chemotherapy) vs 9.5 (chemotherapy alone)	63.8	Skin burn, mild pancreatitis, pseudo pancreatic cyst, gastric ulcer

*PDAC: pancreatic ductal adenocarcinoma, **VAS: visual analog scale

43 CRML patients (27 male, 16 female, aged 29–82 years) were enrolled and underwent a USgHIFU ablation procedure. CR (complete response) was achieved in 21 patients, while PR (partial response) was observed in 21 patients and SD (stable disease) was achieved in one patient, respectively. The objective response rate was 97.7%. Median OS (overall survival) was estimated to be31 months, and1-year and 18-month overall survival was 90.7% (39/43) and 72.1% (31/43), respectively. For CR and PR patients, the median OS was 35 months and 23 months, respectively (p¼0.00). The majority of adverse events were pain in 22 cases (51.2%) and local skin edema in 33 cases (76.7%). Nosevere adverse events or complications were reported and recorded. USgHIFU ablation is a safe and effective treatment option for CRLM patients, especially for patients who are unsuitable for hepatectomy.

Full article: https://www.tandfonline.com/doi/full/10.1080/02656736.2022.2086712

Appendix 4: Other academic meetings

1. Linyi Traditional Chinese Medical Hospital: Gynecology Forum of Minimally Invasive and Noninvasive Surgery

Date: January 8, 2022
Venue: Academic Exchange Center of Linyi Traditional Chinese Medical Hospital
More Info: https://mp.weixin.qq.com/s/3a0d7yV35ii2htrW4tQBbw

2. Webinar of Liaoning Province: Minimally Invasive and Noninvasive Therapy for Gynecologic Disorders

Date: April 29
Venue: Online
More Info: https://mp.weixin.qq.com/s/dbE-gPgvfB36TwsxZUh9Mw

3. Taihe Hospital: Wudang Forum of Minimally Invasive and Noninvasive Gynecology Surgery

Date: May 8, 2022
Venue: Online
More Info: https://mp.weixin.qq.com/s/dbE-gPgvfB36TwsxZUh9Mw

4. Northeast Chongqing Region: Clinical Application of Minimally Invasive and Noninvasive Technology Workshop

Date: July 8, 2022
Venue: People’s Hospital of Wuxi
More Info: https://mp.weixin.qq.com/s/SxGC5wbZPSX5NpXqFGt2vA

5. Ethiopia Symposium: High Intensity Focused Ultrasound

Date: May 9, 2022
Venue: Addis Ababa, Ethiopia
Playback: https://youtu.be/ECXuVmsuV40

6. Indonesian Association for Obstetrics and Gynaecology: How Can HIFU Treat Adenomyosis?

Date: January 31, 2022
Venue: Online
Playback: https://youtu.be/x6nMYvSW2H4