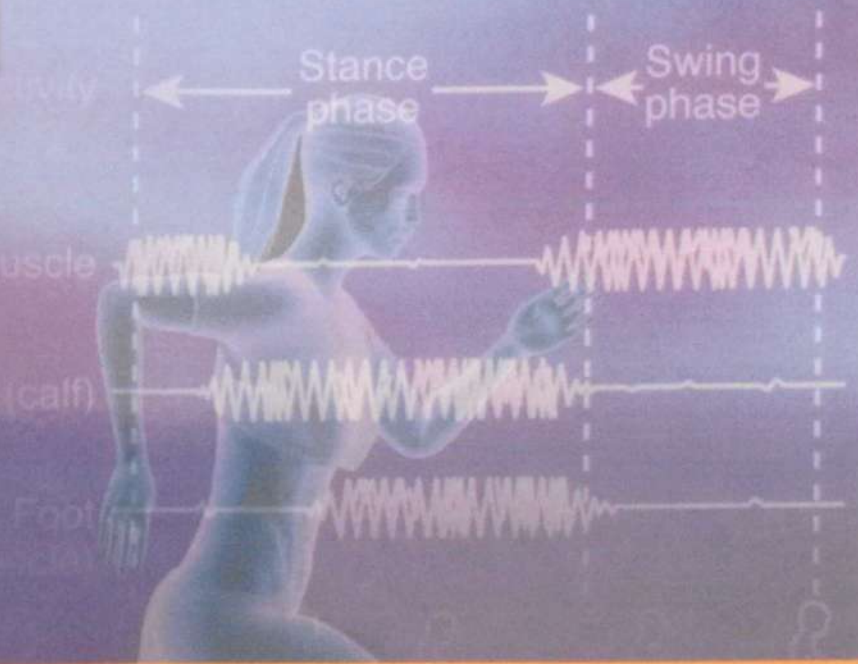
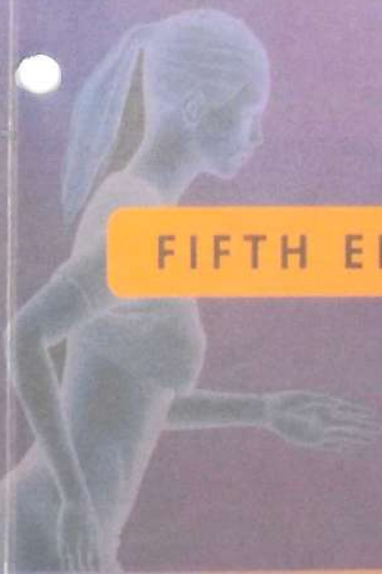



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FIFTH EDITION



Margareta Nordin
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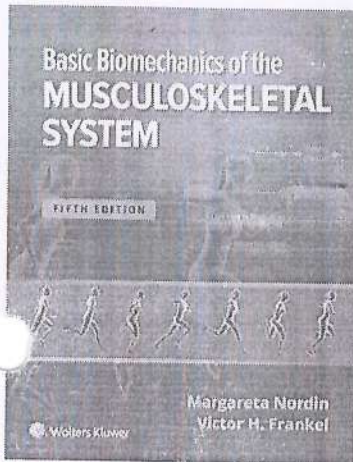
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Clinically focused, clearly written and vibrantly illustrated, this introductory text equips students with a working knowledge of the force-motion relationship within the musculoskeletal system and the use of biomechanical principles in the evaluation and treatment of musculoskeletal dysfunction in clinical settings. Content progresses logically, introducing the basic terminology and concepts of biomechanics and providing focused perspectives on the biomechanics of tissues and structures, the biomechanics of joints and applied biomechanics — with case studies throughout to integrate biomechanical knowledge into clinical training for patient care. This updated 5th Edition of **Basic Biomechanics of the Musculoskeletal System** highlights the global relevance of musculoskeletal biomechanics and features new full-color images that demonstrate biomechanical movement with vivid detail.

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About The Author(s)

Margareta Nordin

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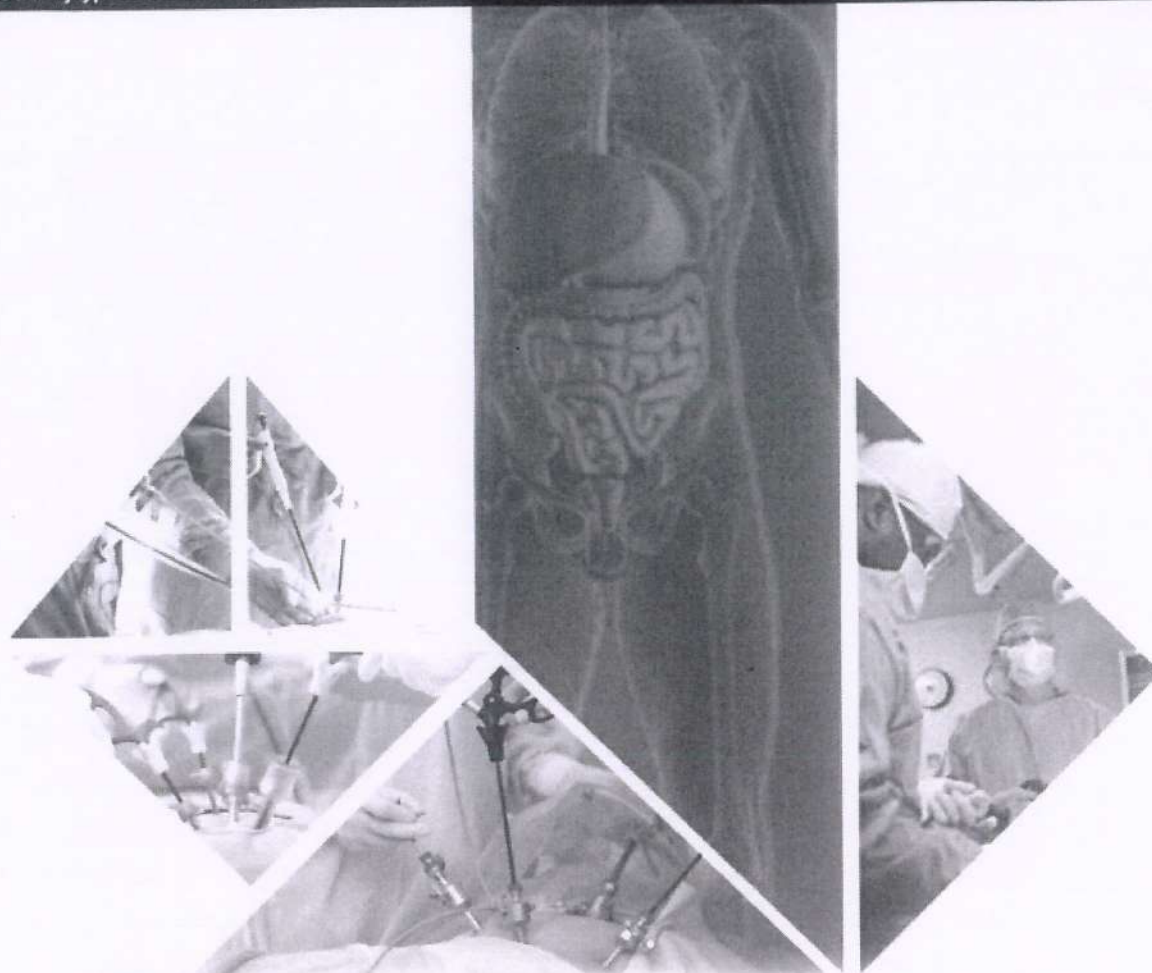
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Safety in **Minimal Access Surgery** EVIDENCE AND RECOMMENDATIONS

Editors

Om Tantia

Tamonas Chaudhuri



**ILS Academics
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Safe Laparoscopic Splenectomy: Evidence and Recommendations

Pravin Rajendra Suryawanshi

INTRODUCTION

Splenectomy is the preferred treatment option for many haematological, myeloproliferative disorders and various other infective conditions. Delaitre et al. in 1992, reported the first laparoscopic splenectomy.¹ The biggest challenge in the initial years of splenectomy was vascular control especially in cases of splenomegaly. To overcome that, hand-assisted laparoscopic splenectomy (HALS) and pre-operative splenic artery embolisation (SAE) was described. Subsequently, the increasing experience of operating surgeons in advanced laparoscopic procedures and availability of sophisticated energy sources such as ultrasonic shear and advanced bipolar has made laparoscopic splenectomy not only a gold standard procedure, but also some challenging and massive spleens can be managed laparoscopically with equal morbidity and mortality compared to open splenectomy.^{2,3}

ANATOMY

Spleen is the largest lymphoid organ in the human body. It is an intra-peritoneal organ located in the left upper quadrant of the abdomen. Harris odd no 1, 3, 5, 7, 9, 11 is useful for remembering the size and position of the spleen. The spleen measures 1 × 3 × 5 inches with a weight of 7 oz (220 g) and is located against 9–11 ribs.

It has two surfaces, parietal, which is convex and related to the diaphragm and visceral surface, which is related to various intra-abdominal organs such as stomach, kidney, tail of pancreas, and colon. Splenic hilum is also present at visceral surface. There are two borders: (1) anterior and (2) posterior. Splenic notch is present at anterior border in 70% of cases.

Splenic Artery

Splenic artery originates from the coeliac trunk and traverses along the superior border of pancreas to the splenic hilum (Fig. 1).

The pancreatic course can be supra-pancreatic (90%), retropancreatic (7%), pre-pancreatic (2%) or intra-pancreatic (1%).⁴

In 80% of the population, splenic artery ends in two terminal branches: (1) Terminalis superior, and (2) Terminalis inferior, in rest 20% it may have a third branch, terminalis media.

Spleen has two types of blood supply: (1) Magistral (30%), and (2) Distributed (70%).⁴

In magistral supply, splenic artery has a long stump and divides into terminal branches within 2–3 cm of the hilum, and it occupies the middle one-third of the splenic surface (Fig. 2).

Distributed type is where splenic artery has a comparatively shorter stump and divides about 2–21 cm proximal to hilum, this means it can even branch right at its origin at the coeliac axis. Superior terminal branches are longer compared to inferior terminals and occupy the middle three-fourths surface of the spleen (Fig. 3). As a rule, those spleens having notch or tubercles will have distributed type of blood supply.⁴

Superior polar artery is present in 65% of cases and in 75% of cases, it originates just proximal to the primary division of splenic artery.⁴

Splenic Vein

Blood from the splenic parenchyma is collected by the trabecular veins, which join to form the segmental veins. These segmental veins drain individual splenic segments. These segmental veins join to form either two (superior and inferior) or three (superior, middle and inferior) lobar veins. These lobar veins join to form splenic vein.

Splenic vein lies posterior-inferior to the splenic artery and anterior to the renal hilum behind the tail of pancreas and joins superior mesenteric vein (SMV) to form portal vein. The course of the splenic vein is non-tortuous.

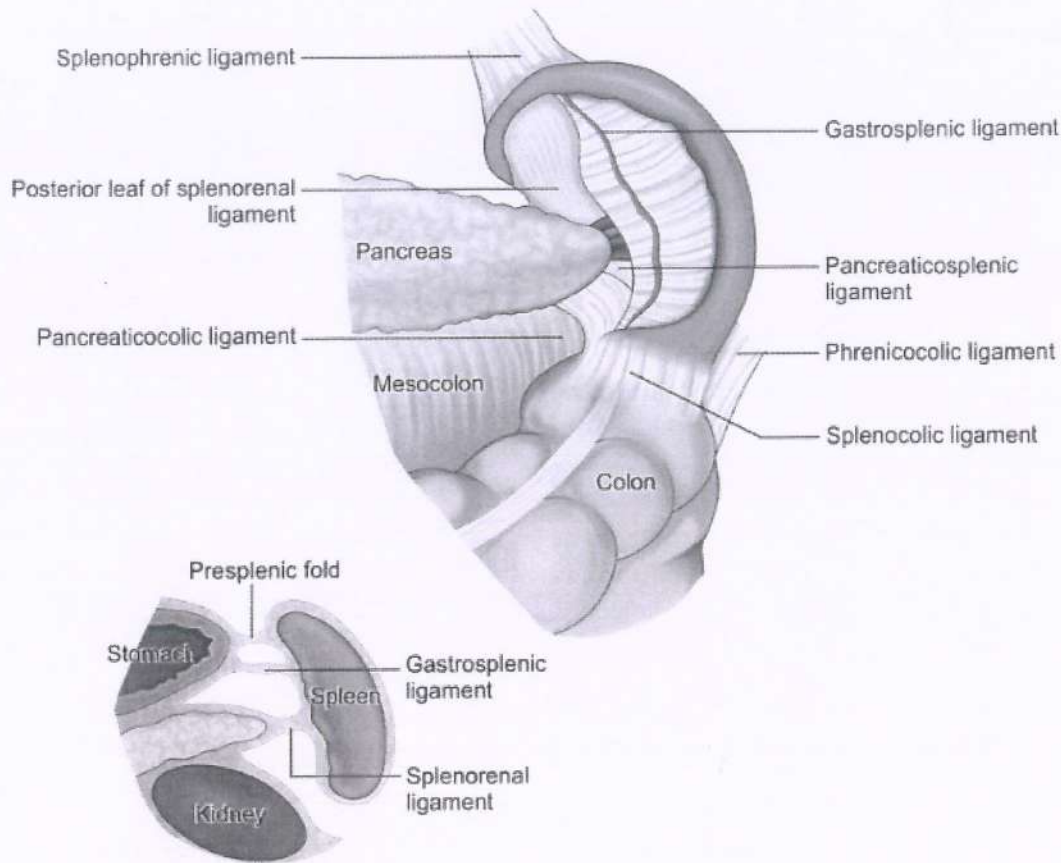


Fig. 4: Eight folds or ligaments around the spleen.

Splenorenal Ligaments

This is the posterior portion of the primitive dorsal mesogastrium. It envelops the splenic vessels and the tail of the pancreas in between its two leaves.

Phrenosplenic Ligaments

This is a reflection of the leaves of the mesentery to both the posterior body wall and the inferior surface of the diaphragm at the area of the upper pole of the spleen on its medial aspect.

Pancreatico-splenic Ligaments

Pancreatico-splenic ligament is present in 75% of the population only when tail of the pancreas is not abutting the splenic hilum and it is avascular.

Other three colic ligaments, i.e., *pancreatico-colic*, *spleno-colic* and *phrenico-colic* are the extension of the transverse mesocolon and they are also avascular.

INDICATIONS

Possible Indication

- Cancer surgery*

- Felty syndrome
- Hereditary spherocytosis
- Immune thrombocytopenia (ITP)
- Pyruvate kinase (PK) deficiency
- Splenic abscess
- Splenic marginal zone lymphoma
- Splenic vein thrombosis with bleeding gastric varices
- Splenomegaly (massive or symptomatic)
- Transfusion-dependent thalassaemia
- Warm autoimmune haemolytic anaemia (AIHA)
- Splenic trauma.

Rarely Indicated

- ABO or human leucocyte antigen (HLA) desensitisation for kidney transplant
- Chronic lymphocytic leukaemia (CLL)
- Hairy cell leukaemia
- Primary myelofibrosis
- Splenic infarction
- Splenic sequestration crisis in sickle cell disease
- Thrombotic thrombocytopenic purpura (TTP).

*Examples include debulking for ovarian cancer; left hemicolectomy for colon cancer; pancreatectomy for pancreatic cancer; or gastric or renal cell cancer surgery when the spleen is adhered to the involved organ.

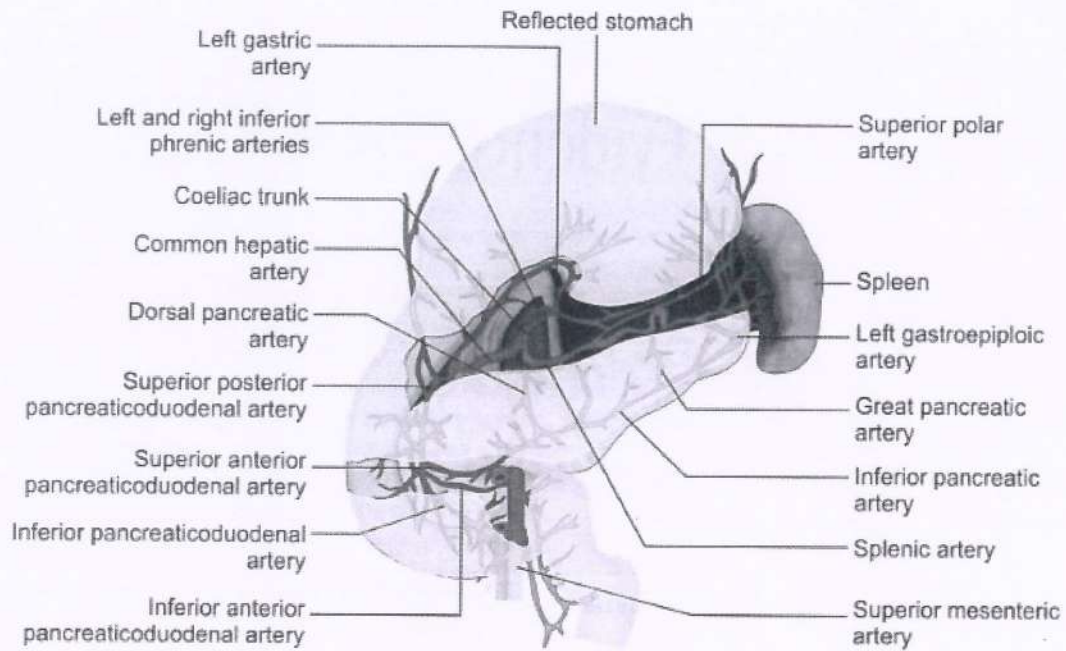


Fig. 1: Surgical anatomy of spleen.

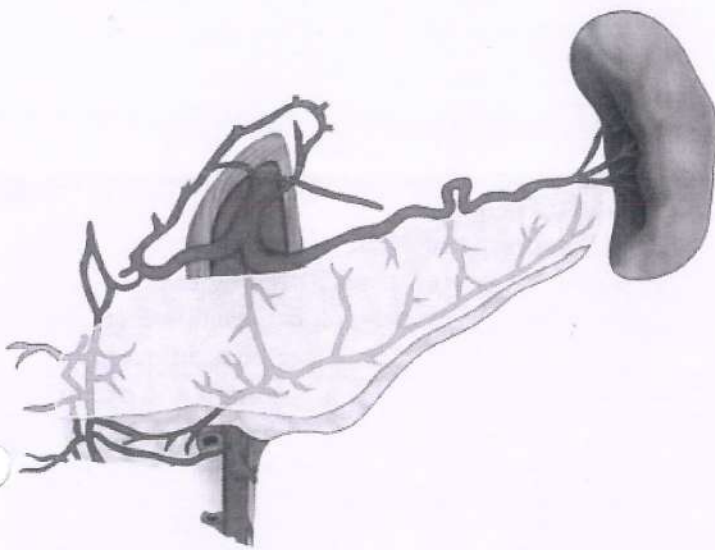


Fig. 2: Magistral type supply—please note short terminal vessels and occupy only middle one-third of the splenic surface.

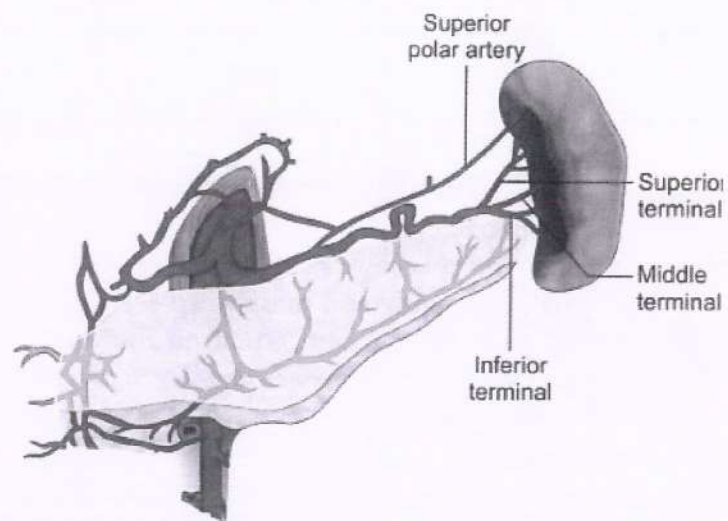


Fig. 3: Distributed type of blood supply. Please note long terminal branches and occupying three-fourths the visceral surface of the spleen.

Splenic Ligament

Understanding various splenic ligaments is a crucial step in splenectomy. The spleen develops between the two layers of the dorsal mesogastrium.

The right and left layers of the mesogastrium separate to enclose the spleen almost completely except at the hilum. These two folds form two important and other six ligaments of the spleen.

There are eight folds or ligaments around the spleen (Fig. 4):

1. Gastrosplenic.
2. Splenorenal.

3. Pre-splenic fold.
4. Phrenosplenic.
5. Pancreatico-splenic.
6. Pancreatico-colic.
7. Splenocolic.
8. Phrenicocolic.

Gastrosplenic Ligaments

The portion of the primitive dorsal mesentery between the stomach and the spleen forms gastrosplenic ligament. The cranial part of the ligament contains the short gastric vessels and the more caudal part contains the left gastro-omental vessels.



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Nanotechnology Applications in Health and Environmental Sciences pp 83–109

Green Synthesis of Iron Oxide Nanoparticles and Its Biomedical Applications

[Mansee Thakur](#), [Smital Poojary](#) & [Niharika Swain](#)

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Abstract

Rapid development of nanotechnology had made availability of nanoparticles in various biomedical applications. Due to the hazardous effects of chemical and physical synthesized nanoparticles, the research has now focussed on “green nanotechnology”. The plant-based nanoparticles have shown many advantages as compared to other chemical, physical and biological mode of nanoparticle synthesis. In this chapter, we made an effort to explore in depth about the various methodology and the biomedical utility of one of green synthesized nanoparticles, i.e. iron oxide nanoparticles (IONPs). In addition, the potential use

of IONPs in diagnostic and therapeutic aspect of various human diseases is also highlighted with specific reference to its impeding application in the treatment of iron deficiency anaemia (IDA), one of the widely spread nutritional disorders affecting mainly women and children.

Keywords

Hematite nanoparticles **Green synthesis**

Iron oxide nanoparticles (IONPs)

Iron deficiency anaemia

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References

Basic Computer and Smartphone—Technology for Practicing Physicians in COVID-19 Era

SV Kulkarni, Priyanka Jadhav, Ajay Kukreja, Sagar Sinha,
Laxman G Jessani, Manasi Kulkarni, Aditya Kulkarni

Abstract

Technology has made a great impact on the health-care outcomes in the recent years. Starting with simple apps or peripherals which can be attached to a smartphone or basic clinical evaluation equipment. The research process has advanced due to faster access to the literature and resech papers. Many new concepts like augmented, virtual, mixed, and immersive reality will be changing the spectrum of health care. Same applies for augmented artificial intelligence, big data, cloud computing, data mining, and retrieval. Telemedicine, Electronic health records, and virtual visits have made a sea change in patient management in the COVID-19 era. Many unexplored vistas of the new modality need to explored and utilized.

Introduction

The influenza pandemic a century ago was in a very different era but caused a catastrophic loss. With the onset of the COVID pandemic, the world has faced its greatest health crisis in the 21st century. There could not be a more opportune time for us to realize the value and implications of technology and there is a golden moment to radically transform health care via the use of basic smartphones and computers.

This working group has been advocating the same since the last 10 years. The basics of technology including hardware/software, world of apps, including challenges and issues not covered as quoted in our earlier publications.¹

Specific approaches to smartphone applications include:²

- *For Doctors:* Developer, Content, Accessibility, Purpose, Cost
- *For Patients:* Integration, Electronic presence, Patient-doctor relationship, Outcome, Cost

Non-communicable diseases like diabetes have always been a focus of most developers and care of these patients has now been adapted and integrated via interventions at community level and social media. Besides blood glucose monitoring, data recording, control and tracking, futuristic parameters like electronic fall detectors and remote vitals monitoring are now in our reach. Exercise and fitness promotion with specific apps targeted for diabetic patients are now being absorbed for good holistic patient management.^{3,4}

Medical calculators, bundled apps like *Medscape* and *UpToDate*, and specialty-specific apps are the essentials to have on a physician's smartphone. As we embrace technology especially for electronic health records, data safety, and privacy too are real concerns but must be addressed thoroughly with a simple approach of audit trails, password protection and data encryption.⁵

Artificial Intelligence (AI) is not science fiction anymore and evidence-based medicine is now taking evolutionary steps with fundamentals rooted in pattern recognition, deep learning, cloud computing, and big data. From the

decade old story of IBM's Watson, now Internet of the Things (IoT) is actually here.⁶

The future of medicine will be founded on 'The Big Five':⁷

- Artificial Intelligence
- Big Data
- Cloud Computing
- Data Mining, Retrieval, and Analysis
- Electronic Medical Records

Technology and the Primary Physician

While emphasizing that the physician's touch and clinical acumen can never be replaced, technology when used aptly can transform one's practice significantly... and, it is here to stay; and evolve, at the same pace as medicine itself!

Teleconsultations/Virtual Visits

The west was rapidly able to evolve quickly due its past adaptation to modern technology but the COVID-19 pandemic has proven and given a boost to Tele-Health in India too.⁸ Inculcating it in our regular practice will become the new normal, with guidelines and regulations made for its practice and use. International response was swift to promote telesolutions.⁹ MoHFW, India, already released guidelines for the practice of Telemedicine on March 25, 2020.¹⁰

Clinic software management companies have quickly adapted to it to include it as one of the *essential features* in their software besides

- Ease of access
- Lesser wastage of time
- Cost-effectiveness

The goal is for the patients despite being far away still get the best out of the physician.¹¹ Additional principles must be adapted to avoid repeated flaws we face.

- Distinguishing between need of virtual and physical visit
- Good documentation
- Observing guidelines (laid down by that country's legislation/rules)
- Well-communicated session

Clinic Management Software

Challenges:

- Difficulty for a traditional physician to shift to technology-assisted practice
- More than 50 software options available online (Table 1)
- Confusion, viz. cost vs. features vs. "the latest one"

Essential features and how to choose"

- Cloud-based system for easy accessibility
- Better data security and storage
- Appointment management, billing, and invoice generation
- Multiple online payment options
- Printed prescription
- Easy EHR (Electronic Health Record) management system

All these also provide smartphone-based app extension for their software which helps manage things "on the go." The physician has to choose according to individual needs. There are also specialty-specific software solutions available, which are further fine-tuned according to the specific specialty requirements (e.g., *Crystal pm*, *Ehnote*, *NETRA clinics* for Ophthalmology).

TABLE 1 Comparison of three common EHR platform providers

Examples	Practo	Docon	Doxper
Strengths	<ul style="list-style-type: none"> • Digital presence • Good appointment management • Patient feedback rating linked 	<ul style="list-style-type: none"> • Easy & fast prescription system • Quick turnover time • Helpful for 'not-so-tech-savvy' physicians 	<ul style="list-style-type: none"> • Good old 'pen & paper technique', digitized EHR of what is written on notes • Good prescriptions, option of additional customized audio/video advice
Challenges	<ul style="list-style-type: none"> • Complicated billing • Weak prescription system • Risk of commercialization? 	<ul style="list-style-type: none"> • Minimal online presence 	<ul style="list-style-type: none"> • Limited presence

cognitive behavioral therapy for perimenopausal hot flashes & many varied symptoms difficult to manage.

- *SyncThink* has VR goggles with eye-tracking abilities to test for optic deficiencies and *Eye-Sync platform* (a breakthrough device designation awarded by FDA) helps test for concussions soon after a person sustains a bad blow to the head. Useful in unrecognized head injuries like hypoglycemia, alcoholism, mass gatherings, or high intensity sports.

AR technology that superimposes a computer-generated image on a user's view component, the real world around him, thus providing a composite-interactive view in medical teaching training.

- *Augmedix (AR-BASED MEDICAL RECORDS)* uses *Google Glass* allows access to a patient's electronic health records. EMR relays information, like previous personal or video visits and current medications. An addition of *Google Glass* also acts as a scribe that records, vital information, eases in to a more natural doctor-patient interaction, saving time, money, and displays no errors on the side of past medical records, procedures, or drug history.

The new powerful, next generation, interactive headsets & AI based software AR-VR will be the new normal of clinical evaluation. Accepted by health-care professionals to provide them with hands-free working environment, greater flexibility with overlaying information, and data processed by the camera. ID Tech Ex, an investment consultant organization predicts this market to be over \$20 billion.

MR is the future of real and virtual worlds to have a unique new environments and visualizations, here physical and digital objects coexist simultaneously interact in real time.

Many educative, training, & operative possibilities exist here. This happens not in either the physical or virtual world, but is a hybrid of reality and virtual reality, encompassing both augmented reality and augmented virtuality via immersive technology. A technology concept that is difficult to imagine right now.

We users experience a virtual three-dimensional representation of real objects embedded into the physical surroundings. *Microsoft HoloLens* and *Google Glass* are examples of MR devices with different technologies that demonstrate the most prominent emerging technologies.¹⁵ India will soon have *Jio Glasses* as their competitors.

Around INR 14,000, *Snap Spectacles 3* was launched in India at a price point of around INR 30,000. *Microsoft HoloLens* retails at a sky-high price of INR 2,63,000.

As the number of consumers grows, the cost will be still more affordable.

All this will make a sea change in medical education systems and learning right from our formative years in anatomy without the smell of formalin in the dissection halls.¹⁶

It has been proved even in training of paramedics and volunteers for life saving procedures hands on training like pediatric cardiopulmonary resuscitation.¹⁷

Utility of the same in psychiatry is recently been evaluated in this meta-analysis with immense practical positive outcomes.¹⁸

In the present dreadful COVID era, it has been very usefully in protection of HCW, in minimizing exposure to nosocomial infection, optimizing the use of PPE, and enhancing aspects of care. Deploying such *holo-lens augmented technologies* at pace requires context-specific information security, infection control, user experience, and workflow integration led by clinical end-users setting up an entirely new field for exploration.¹⁹

Immersive virtual reality (IVR) has endless permutations combinations, which exist for application in health care. We can now immerse their patients in environments to achieve exposure to a specific clinical situation like Hypoglycemia, Bowel movement irregularities as in IBS, whether constipation type, diarrhea type or mixed pattern & patients correlation with feeling of bloating, blocked or urge as his experience. After the evoked targeted physical & emotional responses, in therapy we can inspire, acclimatize, or distract from an experience occurring in reality. Best example being a patient of Agoraphobia or Claustrophobia gives instructions or commands from HMD special goggles-lenses.

IVR is a future in health care, research, practice, education, and profitable components with many studies exploring its feasibility for acute treatment of health conditions; however, evidence of its effectiveness needs further research.²⁰

AI in Health Care—The Rising Horizons

AI makes medicine more *pre-emptive, predictive, & personalized*.

Conclusion

The pandemic has brought the world to its knees but given all of us a chance to rise up to this once-in-generation challenge. The government too has set off a pace of reforms for enhancing the use of technology in medicine with significant resolve in areas of telemedicine and concept of Unique-health-ID with a promise of complete horizontal and vertical cross-integration. The future has arrived for technology in health care.

While understanding its tremendous power and scope for exponential promises in thrust areas of AI and the four realities (AR/MR/VR/IR); the physician needs to start with the simple steps of using telemedicine and basic apps in their practice for a simple reason... The best interest of the patient!

References

1. Kulkarni SV, Sinha S, Kulkarni A, et al. Smartphones in medicine: augmenting bedside medical clinical skills and beyond. In: Wander GS, Pareek KK (Eds). *Medicine Update 2016-2 (Progress in Medicine 2016)*;(26). India: Assoc Physicians India and Indian Colle Physicians; 2016. pp. 1868-73.
2. Kulkarni SV, Sinha S, Kulkarni A, et al. Smartphone applications in clinical medicine. In: Bansode BR, Muruganathan A (Eds). *Med Update 2017-3 (Progress in Medicine 2017) (Volume 27)*. India: Association of Physicians of India; 2017. pp. 1061-3.
3. Kulkarni SV, Sinha S, Jadhav P, et al. Apps for educating patients. In: Saboo B (Ed). *RSSDI Update 2019*. India: Jaypee Brothers; 2020. pp. 404-7.
4. Kulkarni SV, Sinha S, Jadhav P, et al. Apps & Diabetes—Indian Scenario. In: Das AK (Ed). *Perspective in Diabetes—Past, Present and Future*. India: Micro Labs Limited; 2020. pp. 200-6.
5. Kulkarni SV, Sinha S, Jessani LG, et al. Technology and future of medicine. In: Ahulraj S (Ed). *Medicine Update 2020 (Volume 2)*. India: Jaypee Brothers; 2020. pp. 1243-6.
6. Kulkarni SV, Jadhav P, Sinha S, et al. Artificial intelligence and IOT in medicine. In: Ahulraj S (Ed). *Cardio Diabetes Medicine-2018*. India: Indo Global Cardio Diabetes Academy; 2018. pp. 332-9.
7. Kulkarni SV, Sinha S, Kulkarni AS, et al. Basic technology for practicing physician. In: Banerjee AK (Ed). *Progress in Medicine 2020*. India: Jaypee Brothers; 2020. pp. 678-9.
8. 500% rise in healthcare teleconsultation in India, 80% are first-time users: Report. Available from <https://indianexpress.com/article/lifestyle/health/500-increase-in-healthcare-teleconsultation-in-india-80-are-first-time-users-report-6483212/>
9. Webster P. Virtual health care in the era of COVID-19. *Lancet*. 2020;395(10231):1180-1.
10. Indian Medical Council. *Telemedicine Practice Guidelines—Enabling Registered Medical Practitioners to Provide Healthcare Using Telemedicine*. Professional Conduct, Etiquette and Ethics Regulation, 2002. Available from <https://www.mohfw.gov.in/pdf/Telemedicine.pdf>
11. Iyengar K, Jain VK, Vaishya R. Pitfalls in telemedicine consultations in the era of COVID 19 and how to avoid them. *Diabetes Metab Syndr*. 2020;14(5):797-9.
12. Major S, Sawan L, Vogensen J, et al. COVID-19 pandemic prompts the development of a Web-OSCE using Zoom teleconferencing to resume medical students' clinical skills training at Weill Cornell Medicine-Qatar. *BMJ Simulation and Technology Enhanced Learning*. 2020:bmjstel-2020.
13. Wright JH, Caudill R. Remote treatment delivery in response to the COVID-19 pandemic. *Psychother Psychosomat*. 2020;89(3):1.
14. Khan MG, Yezdani U, Chakravorty A, et al. Efforts and Challenges paved by India to confront of Corona Virus (COVID-19). *Bangladesh Journal of Medical Science*. 2020:88-5.
15. John B, Wickramasinghe N. A review of mixed reality in health care. *Delivering Superior Health and Wellness Management with IoT and Analytics*. Springer, Cham. 2020. pp. 375-82.
16. Nørgaard C, O'Neill LD, Chemnitz J, et al. Learning anatomy with augmented reality. *Tidsskriftet Læring og Medier (LOM)*. 2018;12(20).
17. Siebert JN, Ehrler F, Gervais A, et al. Adherence to AHA guidelines when adapted for augmented reality glasses for assisted pediatric cardiopulmonary resuscitation: a randomized controlled trial. *J Med Internet Res*. 2017;19(5):e183.
18. Dellazizzo L, Potvin S, Luigi M, et al. Evidence on virtual reality-based therapies for psychiatric disorders: meta-review of meta-analyses. *J Med Internet Res*. 2020;22(8):e20889.
19. Martin G, Koizia L, Kooner A, et al. Use of the HoloLens2 mixed reality headset for protecting health care workers during the COVID-19 pandemic: prospective, observational evaluation. *J Med Internet Res*. 2020;22(8):e21486.
20. Snoswell AJ, Snoswell CL. Immersive virtual reality in health care: systematic review of technology and disease states. *JMIR Biomed Engineering*. 2019;4(1):e15025.
21. Davenport T, Kalakota R. The potential for artificial intelligence in healthcare. *Future Healthcare J*. 2019;6(2):94.
22. Use of smartphones for productivity grew 120% during lockdown in India: Report. Available from <https://www.livemint.com/news/india/use-of-smartphones-for-productivity-grew-120-during-lockdown-in-india-report-11597222796805.html>

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Chapter-16

Drug Induced Psychiatric Conditions

Shubhangi S. Dere

Increased understanding of bio-psycho-social approaches in various dermatological conditions necessitates liaison among primary care physicians, psychiatrists, and dermatologists. There is a need for psychiatric consultation in general, as psychological factors may be of particular concern in chronic intractable dermatologic conditions, such as eczema, prurigo, and psoriasis etc.

All the more, various treatment agents used in management for chronic dermatological conditions can have psychiatric side effects, which need to be identified and addressed in time. Following text reviews the aspects of drug induced psychiatric conditions.

Isotretinoin (13-*cis*-retinoic acid (RA):

RA is a medication used for the treatment of acne. The dermatology literature has frequently emphasized the potential for positive behavioural effects with isotretinoin because of the effectiveness of this drug in clearing acne. Although acne is associated with a decrease in self-esteem, anxiety and unhappiness about appearance, studies have not been able to demonstrate a correlation between symptoms of clinical depression and objective severity of acne, or an improvement in clinical depression with treatment.

Isotretinoin administration in human subjects was shown to be associated with increased concentrations of homocysteine, as well as decrease in 5-methyl-tetrahydrofolate, providing a potential metabolic mechanism by which isotretinoin may promote depression. The occurrence of headache with isotretinoin usage has been linked to depression suggesting that patients who show a CNS side effect such as headache may also be more susceptible to isotretinoin-induced depression.

Corticosteroids:

Steroids are routinely prescribed for a variety of allergic and immunological illnesses and are most often associated with psychiatric symptoms, which include cognitive impairment, mood disorders, depression, delirium, aggression and psychosis. Several serious psychiatric syndromes can be caused by corticosteroids: substance-induced mood disorders (with depressive, manic and mixed features), substance-induced psychotic disorders and delirium. While certain clinical groups may be at greater risk of corticosteroid-induced adverse psychiatric effects, corticosteroid-induced psychiatric toxicity is remarkably unpredictable. Psychiatric symptoms usually occur within the first two weeks of corticosteroid therapy and seem to be dose related. Treatment with lithium or antipsychotics may be helpful. Physicians should carefully monitor patients for psychiatric and cognitive side effects of corticosteroid use.²

The pathophysiology of the steroid induced psychosis remains unclear. However, effects of steroid on the dopaminergic, cholinergic and serotonergic pathways can play important role in causation of psychiatric symptoms. The psychiatric symptoms typically appear within 1–2 weeks after starting high-dose corticosteroid steroid treatment and the most common serious adverse event reported is hypomania or mania, though various forms of psychotic syndromes, taken together, are even more

benefits occurring at relatively low doses and within a few weeks. If IFN induces a depression in a patient with a bipolar disorder history, antidepressant treatment must include a mood stabilizer. In the case of vulnerable patients (e.g., those who have significant depressive symptoms prior to IFN or who have had an IFN-induced depression in the past) prophylactic antidepressant treatment appears to decrease the likelihood of having an IFN-induced depression.

Although the treatment with interferon-alpha is contraindicated in patients with major depression (National Institutes of Health), but a considerable number of neuropsychiatric side effects is associated with it which includes personality changes, impaired cognitive, mania, and psychosis. In the limited literature, reports of interferon-alpha-induced psychotic disorder exist. Patients being treated with IFN-alpha can be expected to experience such psychiatric side-effects after few weeks of starting the treatment and disappear after discontinuation of the drug. In addition, certain patients are considered to be at greater risk of developing neuropsychiatric side-effects. Individuals meeting the following criteria are particularly vulnerable: over 40 years of age; having central nervous system abnormalities; a previous neurological or psychiatric history; a past familial psychiatric history; use of narcotics or having alcohol or substance use disorders; being HIV-positive; co-administration of other cytokines and receiving high doses of IFN-alpha (> 6 million units).⁴

PUVA therapy:

Phototherapy with PUVA is used for treatment of various skin conditions like vitiligo, psoriasis. Psychiatric side effects including depression secondary to skin discoloration have been reported. There are two cases of suicides reported. PUVA is associated with less frequent side effects which include depression, dizziness, and headaches.⁵

containing amino acids which is resulted by the interference in folate metabolism.⁶

The psychiatric side effects such as depression, anxiety and even suicide ideation, may differ between groups of patients with arthritis according to the drug used (methotrexate, leflunomide and hydroxychloroquine),.

Relevant Drug Interactions:

A few relevant drug-drug interactions need to be kept in mind specifically in relation to dermatology and psychiatry. Anti-fungals like itraconazole and ketoconazole used in the treatment of dermatophytic infections are inhibitors of CYP3A4 and hence decrease the metabolism of several drugs including psychotropics like carbamazepine and pimozide which can precipitate the psychological symptoms.

Management of drug induced psychiatric disorders:

In management of dermatological drug induced psychiatric disorders, a close liaison is essential between the treating dermatologist and psychiatrist. There is a need for awareness of such side effects, prompt screening, timely referral and appropriate treatment like stopping the culprit agent and managing symptoms with psychotropic agents in case the psychiatric symptoms emerge. Detailed history taking for patients to be started on drugs having potent psychiatric side effects is of importance. Liaison is even more important when the dermatologist becomes the primary care provider in patients who will not accept referrals to psychiatric services. In such cases careful monitoring, involving the family members into the management plan becomes an essential step in case of psychiatric decompensation, complications, or poor outcome.

References:

1. Wooltorton E. Accutane (isotretinoin) and psychiatric adverse effects. *Can Med Assoc J.* 2003;168:66.
2. Brown ES, Khan DA, Nejtek VA. The psychiatric side effects of corticosteroids. *Ann Allergy Asthma Immunol.* 1999 Dec;83(6 Pt 1):495-503; quiz 503-4.
3. Sirota P, Stoler M, Meshulam B. Major depression with psychotic features associated with acyclovir therapy. *Drug Intell Clin Pharm.* 1988 Apr;22(4):306-8.
4. D'Innella P, Zaccala G, Terazzi M, Olgiati P, Torre E. Psychotic disorders induced by interferon alfa. *Recenti Prog Med.* 2002 Jun;93(6):367-9.
5. Patient Information for Psoralen Tablets (Methoxypsoralen Tablets) Page 5 of 6 Version 4. July 2008. Available on <http://dudleygroup.nhs.uk/wp-content/uploads/2014/03/PsoralenTablets.pdf>
6. Hariram, J, &Jegan, Y. Contribution of methotrexate in precipitation of manic episode in bipolar affective disorder explored: a case report. *Therapeutic Advances in Psychopharmacology*, 3(4), 251–254.

Immunomodulators:

This category of drugs includes tacrolimus, cyclosporine, methotrexate, and mycophenolate mofetil. These agents are used for the treatment of various auto-inflammatory skin conditions. Neurotoxicity is a concerning complication of immunosuppressive therapy, manifesting as various psychiatric and/or neurological symptoms.

Tacrolimus induces various neurotoxic side effects resulting in psychiatric symptoms like anxiety, mood, and psychotic episodes along with neurological manifestations (e.g., tremors, dysarthria, apraxia, seizures, delirium, and coma). The neuropsychiatric complications may also occur with other immunosuppressants; for example, mycophenolate can induce depression.

Methotrexate is a disease modifying agent, an antimetabolite analog of folate that is used for a variety of conditions including psoriasis, rheumatoid arthritis and other autoimmune diseases. Methotrexate is a medication used in low doses to treat inflammatory skin conditions such as psoriasis and eczema/dermatitis. It is also prescribed for rheumatoid arthritis, psoriatic arthritis, and increasingly, other inflammatory and autoimmune disorders.

Methotrexate is potent neurotoxic, which is reported to cause widespread cortical, subcortical, hippocampal and white matter pathologies. Although psychiatric side effects are rare with methotrexate, cognitive and psychiatric disturbances have been reported. Few reports highlight the manic exacerbation with methotrexate which can be explained with the action of methotrexate by folate antagonism, resulting in deficiency of folate and secondly by interferences in serotonin and dopamine neurotransmitters. Methotrexate interferes with the biopterin pathway of monoamine metabolism and cause interference in glutaminergic neurotransmission (increased release in glutamate and aspartate) by high levels of homocysteine and sulfur-

common. Hypo-albuminemia appears to be a risk factor, along with co-administration of drugs that may slow the metabolism of the corticosteroid, for example, P450 (CYP) 3A4 inhibitors. Although steroid tapering or discontinuation can help to resolve these side effects, psychotropic medications are often required, either because of the inability to discontinue the steroid treatment or the severity of the psychiatric symptoms.

Acyclovir:

It is a commonly used antiviral agent with wide range of drug induced psychiatric symptoms. Psychiatric side-effects associated with acyclovir therapy are very rare in the medical literature. Available research reports common side effects like hallucinations, psychosis, confusion, aggressive behaviour and agitation which may be more marked in older adults and those with renal impairment. Prevalence of acyclovir induced depression and insomnia is not known. The postmarketing reports of acyclovir highlights occurrence of aggressive behaviour. There are case reports available which emphasize the onset of depression due to acyclovir which resolved following discontinuation of acyclovir and treatment with psychotropic agents.³

Interferon alfa:

IFN-alfa are used for treatment of various cancers (leukemia, melanoma, AIDS-related Kaposi sarcoma), and viral infections (e.g., chronic hepatitis B, hepatitis C, condyloma acuminata). Unfortunately, IFN frequently induces depression and has led to compromised tolerability with lowering of the dose of IFN and even discontinuation of treatment. Interferon-induced depression ranges from 0 to 50%. Thus, it is imperative to diagnose IFN-induced depression early, evaluate whether this depression is associated with IFN-induced anemia or thyroid dysfunction, which can be corrected, and if necessary treat with antidepressants. IFN-induced depression is highly responsive to antidepressants with

Further, the drug has been associated with various psychiatric side effects. There have been reports of depression, suicide, suicidal ideations and suicidal attempts, aggressive reaction, emotional lability, irritability, amnesia, abnormal thinking, aggravated depression, and manic reaction.¹

Although, many investigators have not found a causal connection, and most of the published case reports do not meet the established criteria for establishing causality, still, the fact that the development of depression is temporally related to the initiation of treatment with isotretinoin, increased prevalence of depression with higher dosages, remission with discontinuation of treatment and re-occurrence of symptoms after restarting of the drug supports the causal role that isotretinoin plays in the development of depression. Isotretinoin associated depression is observed to develop early after 1-2 months of treatment in some cases or at later stages of treatment, around 2-4 months after drug commencement. This suggests that the biological mechanism of drug induced depression may not be via immediate influence but through a secondary system or possibly alteration of neuroplasticity or metabolic process known to be influenced by RA.

Etiopathogenesis of RA induced depression:

The *all-trans* RA is an endogenous regulator of gene expression acting via specific receptors that function as ligand (in this case RA) activated transcription factors. Brain regions regulated by, and which may be affected by RA, so as to potentially promote depression, include the striatum, hippocampus and frontal cortex.


One particular RA regulated gene in the hypothalamus that may provide a link between RA and depression is corticotrophin-releasing hormone (CRH) which is a key regulatory factor in the HPA axis which may contribute to HPA axis hyperactivity in depression.



Innovations in Global Mental Health pp 707–725

Developing a Curriculum in Global Mental Health

Theories and Models in Medical Education

[Victor Pereira-Sanchez](#) , [Jibril I. M. Handuleh](#), [Justo E. Pinzón-Espinosa](#) & [Darpan Kaur Mohinder Singh](#)

Reference work entry | [First Online: 03 November 2021](#)

Circuit is open

Abstract

Global mental health is a discipline of growing interest in medical education, aimed at equipping students with knowledge and skills they need to contribute to the provision of quality mental healthcare for all peoples, at home and abroad. Medical education in global mental health can be conveyed at various levels: undergraduate medical studies, psychiatry residency, and other postgraduate programs.

There is a worldwide lack of formal education in global mental health. Furthermore, structured training programs are largely nonexistent and unevenly distributed, with most apparently

concentrated in the USA and the UK. This contrasts with the interests of many early career psychiatrists and trainees worldwide, and the potential benefits of global mental health for the communities they serve and the institutions collaborating in its delivery.

This chapter presents theoretical and practical aspects to be considered in developing global mental health curricula in medical education across the world, with the intent of helping to strengthen existing programs and inspire new ones. The first sections discuss the current need for structured training in global mental health across the world, present a framework for curriculum development, and provide the authors' suggestions for core theoretical contents and skills to be taught.

The final section describes current models according to the frame of the training program: undergraduate studies, psychiatry residency, clinical and research fellowships, and masters' and doctoral programs. Their challenges, and suggestions for innovation, are discussed. Given the dearth of structured training programs, a short depiction of current extracurricular opportunities is also presented.

Keywords

Global mental health

Curriculum development

Medical education



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Surrogate Motherhood-An Act of Violation or Protection of Human Rights

P. Mini Mol^{1*} and Shweta D. Gowda²

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ABSTRACT

Introduction: Surrogacy is providing joy of parenthood to the intended couple but the irony is that to protect one woman from being called childless, surrogate takes over the responsibility of carrying her child to be stigmatized by the society. Though many issues of exploitation have received attention some like surrogacy have been overlooked. The global crisis of population and resources limitation is turning the attention of the world of reproduction towards adoption. Deep down everyone who opts for surrogacy wants to have their own DNA but how does genetic linkage tend to be more than humanity.

Objectives: The objective of this commentary is to give an insight into the exploitation of surrogacy market. Another objective is to discuss how adoption is an alternative option to surrogacy.

Keywords: Surrogacy; Assisted Reproductive Technology (ART); adoption; surrogate.

ABBREVIATIONS

IVF: In-Vitro Fertilization; ART: Assisted Reproductive Technology; IP: Intended Parents.

1. INTRODUCTION

Surrogacy involves an agreement between the intended parents and a surrogate woman, that she will carry the child in her womb with the intention of handing the child over to the commissioning couple after delivery [1]. The Department of Health & Social Care stated that surrogacy is carried by women who is termed as surrogate, who willingly want to help IP's to create family [2]. Surrogacy is an important procedure which has a medical, legal, social and ethical components. According to the Health Ethics, Population Health, Global & Public Health, the reasons why intended parents choose to go for surrogacy are recurrent miscarriages, repeated failure of IVF treatment, premature menopause, often as a consequence of cancer treatment, a hysterectomy or an absent or abnormal uterus, a serious risk to health that may result from pregnancy, heterosexual couples wanting to create a family and also there are women born with chromosomal abnormality like turners syndrome in which because of the high risk of serious cardiovascular disease and other complications during pregnancy and so gestational surrogacy is a reasonable alternative to pregnancy in the few countries where surrogacy is legal [3]. Therefore this commentary gives an insight as to how surrogacy market exploits the reproductive rights of the female though at times it seems to be voluntarily and motivated but it is indeed the violation of human dignity of both mother and child and it also discuss on how adoption could be an alternative to surrogacy.

2. WOMEN EMPLOYMENT AND SURROGACY MARKET

Surrogacy is legal in several developing countries. In 2002, in India, surrogacy was legalised in an attempt to encourage medical tourism in which commercial surrogacy practices were largely neglected. The current absence of regulatory oversight and lack of legal protections for commercial

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surrogates is the root cause of exploitation [4]. There is no clarity in the deal for the surrogacy so there are strong risks of legal problems. Surrogacy across boundaries contributes to issues of race, motherhood, and children's rights [5]. Surrogacy in India may contribute to equality for women if their rights to reproduce and to work are respected.

Economic disadvantage can compel poor women to engage in surrogacy as a form of employment, if we glance at the surrogate mother, her issues and conditions are much worse and immoral. In these deals their partner or middlemen also convince the weak, illiterate women of rural background to gain easy money. These women therefore have no ability to make choices about their own bodies and lives however this employment need not be inherently exploitative as in Indian scenario the women already struggle to provide her family and cannot afford not getting paid as they have to secure the future of their own children [6].

3. SOCIETAL PERSPECTIVE OF SURROGACY

Apart from the financial exploitation the surrogates during pregnancy bonds with the child not just through umbilical cord but emotionally which indirectly harms the surrogate psychologically. Psychological evaluation or legal treatment is not given in India, but is compulsory in the USA [6]. Because artificial insemination does not require much contact with the surrogate, but the price of this seems to entail considering the surrogate mother as something in the society. The importance of motherhood is important as in Indian male dominance society the women with failure to reproduce is considered as stigma for being childless. And to protect one woman from being called childless, surrogate mother takes over the responsibility of carrying her child even if the society stigmatizes her. The women though can undergo uterus transplantation as an option available in the cases of absence of uterus or uterus anomaly but again the problems of due immunological rejections or donor-receptivity synchrony might occur, also it is financially not possible for all and so in these cases the women have to decide to either go for surrogacy or adoption.

Most women don't have a choice to choose about their reproductive rights for themselves and hence have to co-dependent on their husbands to sign the form to whether be a surrogate or not. Whereas some husbands of surrogates are construction labours or not working at all so to protect the husband from being called as not a man enough to earn, the women takes over the job of being surrogate. Whereas in India where surrogacy and prostitution are rejected far from being profession Indian surrogates are stigmatized while being compared with the paid sex workers [7].

4. SURROGATES AND ASSISTED REPRODUCTIVE TECHNOLOGY

Surrogacy inherently transforms a women's body into commodity to be used and cared for, while it is useful and to be forgotten once the contract is fulfilled. Women have least knowledge of procedures of IVF while some don't have any idea about what is happening with them what is been inserted during surrogacy. In some cases where a surrogate is dealing with twins or triplets certain abortion pills are released into the body for conduction of abortion without the surrogate mother knowing, which is indirectly violating the reproductive rights of the surrogate. And whether is it necessary that in order to protect the reproductive rights of one female we have to violate the reproductive rights of the other female?

Undergoing infertility treatment for a woman is not that easy she has to bear lot of pain and after failing all the treatments the psychological disturbance about not been able to deliver baby herself and have to rely on surrogate is even more intense. According to reproductive scientist the pain of delivering a baby is equivalent to breaking several bones at the same time. Some women while delivering a baby also lose their lives and this event is sometimes unpredictable in the lives of some surrogates which is also a huge loss to her own family. Another important cultural factor to think about in India and particularly in Mumbai is Bollywood, which inspires the spread of surrogacy. All residents in Mumbai are conscious of and really attached to films and protagonists. Bollywood may be a key player within the evolution of surrogacy in the society.

5. PROCEDURE FOR SURROGACY IN INDIA AND SURROGACY REGULATION BILL

Surrogacy is done by signing a contract which highlights that the child born through surrogacy completely belongs to the biological parents according to law. Search and selection for surrogate mother is done through various sources of advertisement. The surrogate is been asked for all the previous and past medical records so as to confirm she physically fits into the criteria of a surrogate mother, as HiV is the main concern that has to be taken into consideration before selecting the women as a surrogate.

Once the women surpasses the screening criteria, gametes are collected from the biological parents that is oocytes are retrieved from the female and semen sample is collected from the male. The gametes are processed and using assisted reproduction embryos are transferred into the surrogate. After the delivery of the baby, baby is handed over to the genetic couple and the Government of India issues a certificate for the baby born via surrogacy [8].

In country like India where in there was a exploitation of surrogates, Surrogacy Regulation Bill India 2016 lapsed in Lok Sabha due to improper legal requirements in this bill heterosexual couple married for 5 years were been able to avail the surrogacy procedure.

Surrogacy Regulation bill proposed in 2019 was passed successfully by Rajhya Sabha in 2020 as per the bill commercial surrogacy in which surrogates were rewarded beyond the medical expenses was banned however altruistic surrogacy in which only the medical expenses over the period of 9 months is allowed [9].

Banning commercial surrogacy that took place between Indian surrogates and international couples wanting to have baby now will stop the exploitation. However altruistic surrogacy in which only the medical expense upto the period of 9 months is given to the surrogate this will bring financial burden onto the surrogates.

6. RELATIONSHIP BETWEEN IP'S AND SURROGATES

The relationship between an intended parents and surrogates during previous years was completely negative as the surrogates were seen as the child bearing machine. However in a study conducted in UK where in long term relationship of the surrogates with the intended parents formed during surrogacy was a positive relationship as the genetic linkage to child is not the only thing but there are other things apart from this which will results in sucess of the surrogacy process [10].

6.1 Why not Adopt?

The bond between a child and a parent is incredibly special though they may or may not be genetically linked. Being a parent is not just about the genes those are inherited in fact it is about how a child is been raised. It seems unfair that most of the couples are engaged in surrogacy rather than legal adoption procedure as there are about 31 million orphan children in India. Most women undergo surrogacy as they do not want their career or job to be paused as for example the wealthy people tend to have babies *via* surrogacy in order to have their own biological kids in this scenario they can have adoption as an alternative wherein they can secure a life of an orphan rather than undergoing surrogacy. Deep down everyone who opts for surrogacy wants to have their own DNA but how does genetic linkage tend to be more than humanity. If couple undergo adoption not just their desire to have a child will be fulfilled but the child's life also be considered with healthy future along with the love of parents which is so much important from a point of view of child's psychology which many criminals lack.

7. ADOPTION AN ALTERNATIVE TO SURROGACY

Country like India also have a population overload which indirectly have a crisis of limited or shortage of utility of natural resources as well as space consumed. In this scenario awareness and education

about adoption is of utmost importance as giving the birth is not only that makes a woman a mother but also how she nurtures her baby after birth even if she hasn't carried her in her womb. As being a biological parent is a very sensitive and special event in every couple's perspective but people should also believe in humanity and potentiate adoption over surrogacy not as an act of charity but as an available option. As the chances of abortion or twin triplet pregnancies or medical issues in adoption is far less than that of surrogacy. Adoption is nowhere going to affect the assisted reproductive technology as there are few couple who have rigorous infertility and have no cure other than assisted reproductive technology. Due to its high costs, the majority of Indian women are not exposed to ART.

In this context, ART's inaccessibility should be seen as a violation of human rights. It does, however, produce and establish a real market and company vitality that primarily attract international people for its easy access and cost effective in India as they can opt for more than one attempt in affordable cost in comparison with their own country. Therefore, efforts should be made and research should be enhanced in order to bring about opportunities for the weaker economic sections to have an access to ART [11].

Surrogacy somewhere is not a lifelong opportunity to earn as there are certain limitations on the number of gestation pregnancies to carry forward with. What after the time period of her reproductive age? The surrogate has to have an alternative to earn other than being a surrogate so why not do that rather than surrogacy. Surrogacy links two mothers to the baby and male gender in comparison with the female have to deal with just the psychological, financial stress and less of physical pain in this journey of becoming a father.

8. REGULATION OF ADOPTION

Many IVF clinics should spread awareness about adoption as a healthy option to have a baby besides providing knowledge about complications associated with gestational surrogacy. Adoption needs acceptance and can be done legally. Adoption also provides a woman with opportunity to continue her education or job or get married with the goal of providing her child with love and security. Open adoption is a type of adoption in which a child can communicate with his biological mother wherein this option is not availed in surrogacy as she has no rights over the child. The only responsibility of the parents while adoption is to never make a child realise that the child is not genetically linked to them and even if the child comes to know he should be provided more of emotional support rather than discrimination.

9. CONCLUSION

It's high time to bring population under control so why not limit baby showers and promote showering babies by feeding and becoming guardians? While initiatives towards this can go tandem when we run out of time. Fortunately, if used correctly, we have a very powerful tool which can bring about a great change in the mindsets of people. And what the newspapers and media has done, policy government power or money failed to accomplish in the last five years. If compared with the financial burden of surrogacy, adoption proves to be more beneficial without having to worry about not getting a healthy child or medical complications like in surrogacy.

Though many issues of exploitation have received attention some like surrogacy have been overlooked. To safeguard one woman's reproductive rights meanwhile exploiting the surrogate mothers' reproductive rights is not a justice and solution to deal with the problems of reproduction. Adoption and surrogacy share many resemblances though each one has its own different process advantages and issues meanwhile both are enriching process for the prospective parents in starting their family only if surrogacy as well as adoption provides protection rather than violation of human rights.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Brinsden P. Gestational surrogacy. *Human Reproduction Update*. 2003;9:483–491.
2. Health, Ethics, Population health, Global & public health, Cost centre 10800. *The surrogacy pathway: Surrogacy and the legal process for intended parents and Surrogates in England and Wales*; 2019.
3. Ye M, Yeh J, Kosteria I, Li L. Progress in fertility preservation strategies in turner syndrome. *Front Med*. 2020;7:3.
4. Parry B, Ghoshal R. Regulation of surrogacy in India: Whenceforth now? *BMJ Global Health*. 2018;3:e000986.
5. Shetty P. India's unregulated surrogacy industry. *The Lancet*. 2012;380:1633-1634.
6. Saxena P, Mishra A, Malik S. Surrogacy: Ethical and legal issues. *Indian J Community Med*. 2012; 37:211-213.
7. Wadekar N. Wombs for rent: A bioethical analysis of commercial surrogacy in India – Tuftscope: The Journal of Health, Ethics and Policy; 2011.
8. Satyan K. *Adoption v. Surrogacy - An Indian Comparative Legal Analysis*. SSRN; 2015.
9. Reddy J. Comment, Indian Surrogacy: Ending Cheap Labor. *SANTA CLARA Journal of International Law*; 2020.
10. Imrie S, Jadva V. The long-term experiences of surrogates: Relationships and contact with surrogacy families in genetic and gestational surrogacy arrangements. *Reprod Biomed Online*. 2014;29(4):424-35.
11. Kumari R. *Surrogate Motherhood-Ethical or Commercial*; 2020.

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