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Medical Innovator

Pankaj Garg: A Community Doctor to a Master Innovator to a Global Icon

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ABSTRACT

Pankaj Garg's story is an interesting one and is a source of inspiration for all physicians and budding innovators. He started his career as a community doctor about two decades back in the year 2001, then changed gears in between to become an avid researcher and innovator. He progressed to become a leading international figure in his field. Garg has exemplified three important points. First, with proper temperament, it is possible to achieve academic excellence and conduct research even in a primary care setting. Second, every specialist should fulfill the role of a family physician as well. While pursuing any specialty, the role of a "general physician" should never be ignored. Third, innovation is a state of mind, and big institutions and well-equipped laboratories with costly gadgets are not a prerequisite to it. This is clearly exemplified by Pankaj Garg's story that it is possible to excel in research, academics, and clinical work at the global level without any research budget, big institute tag, or the help of government or non-government organizations. Garg has more than 175 publications in high-impact journals. He has 30 innovations to his name, in and outside his field of expertise, all of which have been published in international journals. The innovations include new operative procedures, successful non-operative management, the discovery of new anatomical spaces, new concepts in disease understanding and management, and finding non-operative treatment for diseases for which surgery is routinely performed. It is impressive that seven of his innovations are popularly known by his name - Garg classification, Garg space, Garg protocol, Garg cardinal principles, Garg scoring system, Garg phenomenon, and Garg incontinence scores. Due to 30 innovations done single-handedly, Garg has been certified as a "doctor with maximum innovations" by several record books. Due to his ability to think "out-of-the-box" and his immense contribution to advancements in the field of proctology, he is recognized as a global icon in his field. Garg is a master teacher. He has taught surgical skills and the art of scientific paper writing to hundreds of surgeons and doctors. In spite of limited resources at his disposal, Garg goes out of his way to help poor people. He performs about 30–40% of operations free of cost. He has successfully treated patients from 41 countries and several patients from royal families of the Gulf who offered him lucrative money to move to the Middle East. However, Garg flatly refused all offers because his priority was to serve his country and countrymen first. Hence, a simple doctor working in a small city was never discouraged by the lack of resources, and the fear of working alone in a small set-up and without any help from the government has carved out a tale that can motivate professionals in any corner of the world. Dr. Garg's story provides immense inspiration to every practicing physician in the country to innovate whether he/she is practicing in a primary healthcare center or a rural area.

Keywords: Medical research, Exemplary, Pankaj Garg, Community doctor

ACADEMIC AND RESEARCH IN PRIMARY CARE SETTINGS

Doctors working at the community level seldom publish or become national leaders in their field but does this mean that community doctors cannot excel in their field, professionally and academically? The answer is "No" because there are many doctors who are practicing in the community and have excelled academically as well as in research. Pankaj Garg is one such doctor [Figure 1].

Garg did undergraduate and post-graduate education in Surgery from 1990 to 1999 at AIIMS, N. Delhi, which is the top-ranking medical institute in India. Upon completion, he started community practice as a general surgeon in Panchkula, Haryana, India. Professionally, what made him stand out was that he always fulfilled his role as a family physician along with his surgical practice.

A community practice devoid of academics and research made Garg was uncomfortable because he was keen on doing research. Unfortunately, he had no experience in doing research or writing scientific papers. In 2007, he specially went to the University of California, Irvine, USA, to learn about research. As there were no slots available in the surgery department, he got an opportunity in the Cardiology department. However, this did not deter Garg. Being a colorectal surgeon, he learned the basics of research in Cardiology. After a month of training, he wrote a review article that got published in Nature Cardiovascular Reviews![1] In this article,strategies were discussed to identify and localize "vulnerable plaques" (atherosclerotic plaques vulnerable to rupture and cause sudden heart attack). The plaques that are vulnerable to rupture demonstrate distinct histological characteristics, which include large plaque and necrotic core volumes (necrotic core >25% of plaque area), extensive positive remodeling of the vessel at the lesion site (positive remodeling is defined as a 5% increase in the luminal cross-section of the artery at the lesion site compared with the unaffected proximal segment of the vessel), and attenuated fibrous caps (cap thicknesses of <65 μm).

Figure 1: Dr. Pankaj Garg.

When he returned to India, Garg started implementing what he had learned in the USA. It was an uphill task to use his newly acquired experience; he had none of the sophisticated facilities the faculty of academic institutes or medical colleges have namely, patient availability, access to published papers, availability of infrastructure (in terms of manpower [junior doctors, residents, etc.] and logistics), big institution tag, grants or funding for research and article sharing with colleagues. However, this did not discourage him. He worked hard and relentlessly. He set up an eponymous institute, Garg Fistula Research Institute (GFRI). Even though the institute was small, the vision was big. His initial five papers were the most difficult to publish. However, once the initial barrier was broken, there was no looking back. It took him only 10 years (2008–2018) to have more than one hundred publications to his name! Summarizing the whole experience, he wrote in his book, DECISIONS, that "*The biggest barricades in my road to success were my own thoughts. My biggest enemy was my own mind. Once you determine that you have to excel, then nobody has the power to stop you*!" (https://www.amazon.in/Decisions-How-Master-Art-Decision-Making-ebook/dp/B083QKBXZY)

HEALTH-CARE PROVIDER

Family physicians form the backbone of the healthcare system of any country. In India, the value of family physicians is undermined by the lure of the trend to become a specialist., Therefore, it is paramount for every specialist to fulfill the role of a family physician in the community. Garg is a perfect example of this commitment. Even though he is a colorectal surgeon, he always takes his role as a family physician seriously. Several innovations of Garg (listed below) exemplify this. He often says, "*Specialties are made by humans, God made only one body, and everything is interlinked. To treat a patient completely, you always have to look at the complete picture.*" Several concepts on physician's behavior and doctor–patient interaction published by Garg have become guiding lighthouses for the budding doctors.[2]

INNOVATIONS

Some of the innovations done by Garg in his role as a family physician (outside his domain of expertise) [Table 1] are briefly discussed below:

Traction exercise for the neck in domiciliary setting (TRENDS)

Neck pain is increasing, especially in the younger generation, due to the over usage of electronic gadgets. A simple domiciliary exercise, TRENDS, gives controlled traction to the neck and has

Table 1: Some of the innovations of Dr. Garg across different specialties in prominent international journals.

Name of innovation	Type	Brief description
TROPIS.[11]	New surgical procedure	To treat complex anal fistula
Garg classification[13]	New classification	For anal fistulas that was much more useful than the existing classifications
Garg protocol[14]	A new management protocol	To manage anal fistulas in which the internal opening is not locatable
Garg cardinal principles[20]	Management principles	To manage complex anal fistulas
Garg space[12] (outer-sphincteric space)	New discovery	A new anatomical space where anal fistula spreads
Garg scoring system[15]	A new scoring system	Applied at 3 months after fistula surgery accurately predicts long-term fistula outcome
Garg incontinence score[16]	A new scoring system	A scoring system to clinically assess fecal incontinence
TRENDS[3]	New treatment concept	To treat neck pain due to over usage of mobile phones and computers
ECLIPS[4]	New epidemiological concept	New concept to detect breast cancer early
MUSTARD	New epidemiological concept	To detect persons with uncontrolled diabetes and to control Mucormycosis during COVID pandemic
FEED[5]	New treatment concept	To treat chronic constipation without medicines
LOCULA	New surgical procedure	To treat complex pilonidal sinus and pilonidal abscess
IRIP	New treatment concept	To treat urinary retention without catheterization after pelvic surgery
TONE[6]	New treatment concept	To treat hemorrhoids without surgery
RIFIL	New discovery	A new type of complex anal fistula

TROPIS: Transanal opening of intersphincteric space, TRENDS: traction exercise for neck in domiciliary setting, ECLIPS: Early cancer lump is painless, MUSTARD: Mass urine sugar testing to assess and regulate diabetes, LOCULA: Laying open and curettage under local anesthesia, IRIP: Inability to raise intra-abdominal pressure

shown to be highly effective in treating and preventing cervical pain. In this exercise, the person lies on the edge of the bed in a supine position for 1–2 min. The head lies at the edge of the bed and the feet toward the center of the bed. The head and the upper torso are then lowered from the edge of the bed so as to hang the head free from the bed. This traction exercise is simple, easy to learn, and reproducible. It can be done at home without involving any extra cost or gadgets.[3]

Early cancer lump is painless (ECLIPS)

Many women with breast cancer lumps presented quite late in outpatient care because they did not take it seriously as it was painless. As can be expected, most lay people associate pain with danger and vice-versa. In a large epidemiological study, Garg highlighted that even in an urban and educated city like Chandigarh, 82% of women did not know that an early breast cancer lump is painless. The recommendation by Garg to raise awareness about ECLIPS has saved thousands of lives was published in a high-ranking U.S. journal.[4]

FEED (To treat chronic constipation physiologically)

Chronic constipation affects 15–20% of the population. Most of these patients must take laxatives on a long-term basis and this has its own side effects. Garg advocated a physiologic method (FEED):

F - Fiber supplement intake (20 g of Psyllium husk to be taken with 500 mL of water per day),
E - Elevation of feet in the toilet seat during defecation by keeping a small bench (of 12–16 inches in height) below the feet to increase hip flexion,
E - Exercises of the abdominal muscles while sitting on the toilet commode,
D - Drinking 500–600 mL of water, empty stomach in the morning.

The FEED regimen combines the benefit of many physiologic methods and is highly effective in treating chronic constipation without medicines or laxatives.[5]

TONE (To treat even advanced degree hemorrhoids without surgery)

Hemorrhoids affect 20–30% of the world's population. Many of these patients, especially those with advanced hemorrhoids, are operated on. Garg innovated the TONE concept, which removed the root cause of the disease and was shown to be effective in preventing surgery in >90% of patients with even advanced hemorrhoids. The TONE concept is

T - Three minutes at defecation (spending 3–5 min in the toilet)
O - Once a day (frequency of defecation to be once a day)
N - No straining (no compulsive defecation or excessive straining while defecating, not to take a newspaper or mobile phone in the toilet)
E - Enough fiber (4–5 tablespoons of psyllium husk with 500 mL of water)[6]

Water jet in toilet seat as a cause of anal fissure

Garg discovered that the water jet in toilet seats commonly used in India is one of the leading causes of anterior anal fissures. This discovery was published in a leading UK journal.[7]

Physiological treatment of irritable bowel syndrome (IBS)

A lot of treatment regimens are being tried for IBS, but none of them has been shown to be effective. Garg demonstrated that intake of psyllium husk by proper method (20 g of psyllium husk taken with 500 mL of water per day) along with the FEED regimen (Point 4 above) is effective in treating IBS physiologically, that is, without any medicines.[8]

Post-defecation cleansing method: Tissue paper or water?

Half of the world uses water as a post-defecation cleansing method while the other half uses tissue paper. No research has been done to find a better method between the two. Garg did the first detailed research on this topic which was published in the topmost colorectal journal.[9]

GLOBAL INNOVATIONS

Some of the remarkable path-breaking innovations by Garg in his specialty (colorectal surgery), which earned him recognition as the top-most expert at the global level, are listed below [Table 2]. All these were done in a modest center in a small district place (GFRI, Panchkula, India) with a zero research budget [Table 1].

Transanal opening of intersphincteric space

A new procedure innovated by Garg for highly complex anal fistulas has been highlighted by a large meta-analysis as the most effective sphincter-sparing procedure among all procedures invented to treat anal fistulas in the past 100 years.[10,11]

Garg space

Garg has discovered a new anatomical space, outer sphincteric space (Garg space), where the fistula usually spreads. This discovery was published in the top-most abdominal radiology journal in the world. This further led to the discovery of a new type of complex fistula, fistula at roof of ischiorectal fossa inside levator-ani muscle (RIFIL) [Figure 2].[12]

Garg classification

Garg published a new classification for anal fistulas that is much more useful than the existing classifications because it is more accurate and is the first classification that guides and helps in the management of these fistulas. Garg's classification is extensively used across the world and has been published widely in international medical journals and textbooks [Figure 3].[13]

Garg protocol

Garg innovated a new protocol to manage anal fistulas in which the internal opening is not locatable. This protocol has been shown to be highly effective in achieving high cure rate and preventing the recurrence of the disease.[14]

Garg scoring system

Anal fistulas are notorious for recurrence even years after the surgery. This causes a lot of uncertainty in the minds of patients as well as doctors. Garg innovated a new scoring system which, when applied at 3 months after fistula surgery, accurately predicts the long-term fistula outcome (positive predictive value >98%).[15]

Garg incontinence score

Fecal incontinence is a common problem and the existing scoring systems to clinically evaluate this problem had several lacunae. Garg devised a new improved scoring system which is statistically sound and more scientific [Figure 4].[16,17]

Local and oral antibiotics and avoidance of constipation (LOABAC) treatment to treat anal fissures without surgery

Garg innovated a new treatment for anal fissures, which is effective in treating >90% anal fissures with medicines only and without surgery.

Lay open and curettage under local anesthesia (LOCULA) procedure for a pilonidal sinus

Routine surgery for pilonidal sinus results in an extensive wound, a hospital stay of 2–4 days, and a bed rest of 15–20 days. LOCULA can be performed under local anesthesia, requires no hospital admission, and the patient can resume his/her normal activities after 1–2 hrs. This is a major advancement and reduces patient suffering significantly.[18]

Table 2: Path-breaking and pioneering research work in the field of anal fistula by Dr. Garg.

1. Largest series of anal fistula in the medical literature (1250 patients)
2. Largest series of exclusive complex high fistulas with long-term follow-up (408 patients)
3. Largest series of supralevator fistulas with long-term follow-up (129 patients)
4. Largest series of preoperative and postoperative MRI in anal fistulas (2404 MRI)
5. Largest series of anorectal tuberculosis (776 patients, 1336 samples)
6. Largest series of fistulotomy to treat anal fistulas (611 patients)
7. New useful classification of anal fistula (Garg classification)[13]
8. New cardinal principles to treat complex anal fistula (Garg cardinal principles)[20]
9. New protocol to treat anal fistula with no obvious internal opening (Garg protocol)[14]
10. First guidelines to interpret MRI in the postoperative period after fistula surgery
11. New anatomical space where fistula spreads (outer sphincteric or Garg space)[12]
12. New type of highly complex fistula (RIFIL fistulas)
13. New parameter-HOPE- As a parameter in MRI reporting of anal fistulas
14. Innovation of TROPIS procedure- Highly effective to treat high complex and supralevator fistulas (healing rate>90% over long-term)[10]
15. Innovation of tube in tract and PERFACT procedures for anal fistula
16. The first paper on the management of circumrectal fistulas (completely encircling the anorectum)
17. The first paper on the management of additional supralevator rectal opening in supralevator fistulas
18. First proportional meta-analysis on VAAFT and anal fistula plug
19. A new phenomenon- IRIP phenomenon as a cause of urinary retention after fistula surgery
20. The first series of anal fistula and pilonidal sinus disease coexist simultaneously
21. The first paper to objectively demonstrate the role of MRI to confirm long-term healing in complex high cryptoglandular anal fistulas (151 cases)
22. The first guidelines on postoperative MRI in patients operated for cryptoglandular anal fistula (2404 MRI)
23. A new scoring system to accurately predict long-term healing in cryptoglandular fistulas[15]
24. A new scoring system to clinically assess fecal incontinence[16]

TROPIS: Transanal opening of intersphincteric space, IRIP: Inability to raise intraabdominal pressure, MRI: Magnetic resonance imaging

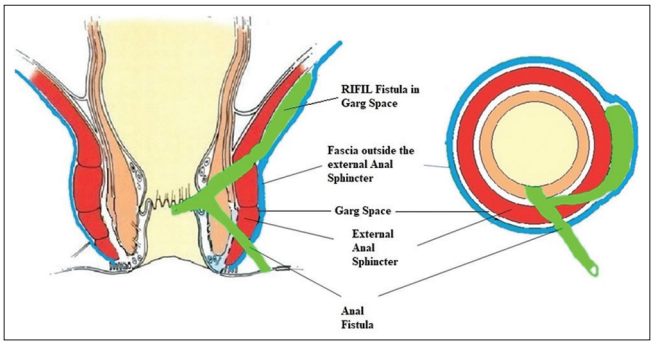

Figure 2: Garg space and RIFIL fistula.

Type of Fistula	Grade	Description of Fistula
Simple	I	• LOW fistula with a single linear tract (intersphincteric or transsphincteric)
	II	• LOW fistula with multiple tracts or abscess or horseshoe tract (intersphincteric or transsphincteric)
Complex	III	• HIGH Transsphincteric fistula with a single linear tract • Fistula with associated comorbidities*
	IV	• HIGH Transsphincteric fistula with multiple tracts or abscess or horseshoe tract
	V	• Supralevator extension • Suprasphincteric fistula • Extrasphincteric fistula

LOW Fistula- ≤ 1/3 of external sphincter involvement,
HIGH Fistula->1/3 sphincter involvement
*Comorbidities- Associated Crohn's, HIV or AIDS, sphincter injury, post radiation exposure or anterior fistula

Figure 3: Garg classification for anal fistulas.

Incontinence type	Weight	Frequency			Maximum score
		Never (points)	Occasional (points) (≤1 episode/ week)	Common (points) (>1 episode/ week)	
Solid	8	0	1	2	16
Liquid	8	0	1	2	16
Urge	7	0	1	2	14
Flatus	6	0	1	2	12
Mucus	6	0	1	2	12
Stress	5	0	1	2	10
TOTAL					80

Score in a cell = Weight for that incontinence type × frequency points.
For example, a person with occasional liquid incontinence would have an 8 × 1 = 8 score.
Maximum possible score = 80 (total incontinence), **Minimum score possible** = 0 (no incontinence)

Figure 4: Garg incontinence scores: A scoring system to clinically assess fecal incontinence.

STATEMENT OF STATURE

It is rightly said that when you pursue excellence, everything else follows suit. After entering the medical field in 1990, Garg could not publish any research paper till 2008. But with determination, between 2008 and 2022, he published more than 175 articles in high-impact international journals.[21] This includes a full spectrum of articles from case series, prospective controlled studies, randomized controlled trials, systematic reviews, meta-analyses, and even guidelines. Overall, Garg's research has been cited more than 2600 times, and the H-index and i10-index are 26 and

55, respectively. Apart from receiving top international and national awards (https://fistulacure.com/about-us/), Garg has been ranked number one in Asia in the field of rectal fistulas, pilonidal sinus, and fissure-in-ano by a leading USA medical monitoring site, expertscape.com. (https://expertscape.com/ex/fissure+in+ano/c/asi). His name has been included among the top 10 innovators and contributors in the field of anal fistula in the past 500 years.[19] Several record books including the Limca Book of Records, Asia Book of Records, India Book of Records, etc. have certified Garg as "Doctor with maximum innovations in the world." The innovations include seven eponymous innovations - Garg classification, Garg space, Garg protocol, Garg cardinal principles, Garg scoring system, Garg phenomenon, and Garg incontinence scores.[12-15,20]

He has been invited more than 200 times to present his research by surgical societies across the globe. The largest society of laparoscopic and colorectal surgeons in the World Society of American Gastro Endoscopic Surgeons (SAGES) and the American Society of Colon and Rectum Surgeons (ASCRS), respectively, has bestowed Garg with top awards (SAGES International Young Investigator Award and ASCRS Traveling Fellowship Award). He has also presented research papers in ASCRS and SAGES for the past 15 years. Garg has also been awarded a fellowship of ASCRS and an honorary fellowship of the Russian Society of Colorectal Surgeons and the International Society of Colo-Proctologists. He has been conferred with numerous national awards, which include the top-most research award of the state of Haryana (Haryana Vigyan Ratan award), Punjab (Fellowship of Punjab Academy of Sciences), and Association of Surgeons of India-the largest Association of Surgeons in India - Betadine Young Surgeon Award, Hari Om Ashram Prerit Dr. S. Rangachary Research Endowment Award, and the Best National Research Paper Award.

Thus, Dr. Garg's life story is full of enduring lessons that highlight how every human being has the potential to break the glass ceiling imposed by the norms of society and, more importantly, by one's own mind. What is needed is hard work and passion to achieve one's goals. Garg often says in his lectures, "*Anything done with passion becomes an art*". Who has exemplified this maxim better than Garg himself?

Declaration of patient consent

Patient's consent is not required as there are no patients in this study.

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Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of Artificial Intelligence (AI)-Assisted Technology for assisting in the writing or editing of the manuscript and no images were manipulated using the AI.

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