

Urgent Need for “Green Endoscopy” in Routine Practice in India

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INTRODUCTION

Green endoscopy revolves around the incorporation of environmentally friendly measures throughout the entire endoscopic process. This encompasses all steps from energy-efficient equipment to waste reduction strategies and sustainable material choices. The aim is to minimize the carbon footprint of endoscopy procedures while ensuring the safety and well-being of young patients.¹ This paradigm shift promotes eco-conscious practices within endoscopic procedures.

WHY THIS CONCEPT OF GREEN ENDOSCOPY IS GAINING IMPORTANCE?

In the recent United Nations Climate Change (December 2023), India pledged to transition out of fossil fuel and reduce its carbon footprint. Healthcare accounts for 4.4% of the global carbon footprint. The gastrointestinal (GI) endoscopy is the third-highest waste generator in healthcare facilities due to the production of large-volume nonrenewable waste and reprocessing or decontamination processes. So that at each and every step, we have a high carbon footprint in our activities. A recent study revealed that each endoscopy generates 2.1 kg of disposable waste going to the landfill (64%) and creating biohazard (28%). Only 9% was recyclable waste.²

HOW TO IMPLEMENT GREEN ENDOSCOPY PRACTICE?

- Reduce unnecessary endoscopic procedures: It has been seen that in adult practice, 56% of upper GI endoscopies and 23–52% of colonoscopies are deemed unnecessary. There may be a low yield of endoscopic procedures that guide the management of some chronic scenarios, for example, endoscopy for simple dyspepsia and colonoscopy for irritable bowel syndrome. Recent guidelines suggest a nonbiopsy approach for celiac disease, deferring variceal screening in compensated cirrhosis, encouraging fecal calprotectin instead of endoscopy for monitoring of inflammatory bowel disease, and use of urea breath tests for *Helicobacter pylori* disease.^{3,4}
- Reusable vs disposable gowns: Personal protective equipment (PPE) accounts for 8–35% of endoscopic waste. Lower-risk routine diagnostic procedures can be performed with reusable cloth gowns with proper laundering. Single-use disposable gowns may be reserved for therapeutic procedures to ensure sterility. This may reduce carbon footprint by two-thirds.⁵
- Air vs carbon dioxide insufflation: Carbon dioxide (CO₂) insufflation can be reserved for longer, more complicated

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procedures. Simple diagnostic endoscopies can be performed with air insufflation.

- Artificial intelligence: Integration of artificial intelligence into regular endoscopy may significantly improve lesion detection rates in targeted biopsies and lower the need for repeated endoscopic procedures, thereby reducing waste generation.
- Energy efficiency: Investing in energy-efficient equipment, such as solar panels, light-emitting diode (LED) light sources, and low-power consumption devices, improves energy efficiency and reduces consumption. Heating, ventilation, and air conditioning setbacks when the endoscopy room is not in use.
- Reusable instrument device: Green endoscopy encourages the use of reusable accessories, instruments, and devices wherever possible.
- Waste management: In a survey of GI endoscopy staff, only 0.6% have a complete understanding of waste disposal.⁶ Proper training of healthcare staff on waste sorting and recycling initiatives can contribute to minimizing the environmental footprint of endoscopy units.
- Paperless documentation: Electronic reporting and dissemination by e-mail and other applications.
- Staff education, audit, and training: It is paramount to have a “green endoscopy champion” in every endoscopy unit to educate, reeducate, conduct routine audits, and review existing practice to identify areas of improvement.
- Need to have standard operating procedures for minimizing waste, waste disposal, recycling, and rational water use.

CONCLUSION

Green endoscopy is a “practice of conscience” and is now a necessity. We, as endoscopists, must act rapidly, contribute to the reduction of carbon footprint, and make the earth a sustainable habitat for our children.

Strategy	Environmental impact	Opinion
Energy-efficient equipment	Reduction in energy consumption during endoscopic procedures	Emphasizes the importance of minimizing carbon footprint while maintaining patient safety
Waste reduction strategies	Decreased generation of waste through proper sterilization and reuse of equipment	Supports the integration of waste reduction measures to minimize environmental impact
Sustainable material choices	Selection of eco-friendly materials for endoscopic tools, supplies, and packaging	Advocates for the use of sustainable materials to promote environmental sustainability
Recycling and proper disposal	Implementation of protocols for recycling and environmentally responsible waste disposal	Stresses the importance of responsible waste management to reduce environmental harm
Education and awareness	Training and raising awareness among healthcare professionals about green practices	Highlights the need for education and awareness to foster a culture of sustainability
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FUTURE DIRECTION

- Enhancing awareness among medical personnel and auxiliary staff regarding the risks and long-term consequences of waste and pollution.
- Establishing stringent standards for indoor air quality within the endoscopy unit, including conducting regular air quality assessments and potentially implementing CO₂ monitoring devices.
- Conducting all stages of endoscope disinfection in dedicated spaces equipped with proper ventilation or air extraction systems.
- Implement more rigorous efforts to minimize waste generation and enhance understanding of waste sorting practices.
- Improving disposal standards.
- Advocate for the adoption of safer and greener sterilization methods for medical devices, such as autoclaving and overincineration.
- Providing comprehensive education for personnel on the hazards associated with handling, storing, transporting, and processing medical waste.
- Adhering to established guidelines; continuously promoting prudent resource allocation and safe practices.

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