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Internet Age



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Advantages and disadvantages of the CyberKnife® system and how potential cases are assessed

**Apply on-line and without cost to a choice of CyberKnife® centres**

**Local web sites in 26 countries and regions**

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## HealthCare Global (HCG)

**Bangalore, India**



**HCG CyberKnife®**  
adding life to years Robotic Radiosurgery System

### Enquiries to HCG

**For CyberKnife enquiries only, to HCG and a choice of centres**

Please visit [www.cyberknifeservice.com](http://www.cyberknifeservice.com) and complete the [CyberKnife Enquiry Form](#)

This ensures that you provide the information which any CyberKnife centre will require for initial assessment.

You can also apply without charge to up to three CyberKnife centres at the same.

**For all other enquiries to HCG**

Please e-mail [hcg@mediluxhealth.net](mailto:hcg@mediluxhealth.net) and your enquiry will be passed to the correct department.



The world's  
most revolutionary  
Cancer Treatment System...  
Now in India

ACCURAY®

**CyberKnife®**

Robotic Radiosurgery System

Welcome to a revolutionary world of cancer treatment. CyberKnife®, the world's first non-invasive whole body robotic radiosurgery system is now available at HCG, South Asia's largest cancer care network.

CyberKnife® offers patients new hope for the treatment of tumors and lesions, including ones that previously have been diagnosed as inoperable or untreatable with existing technology.

CyberKnife® uses state-of-the-art real-time image guidance, similar to cruise missile technology, to precisely target tumors anywhere in the body with pinpoint accuracy and delivers intense doses of radiation.

Pinpoint accuracy allows HCG's highly qualified CyberKnife® Specialist team to treat even the most difficult to reach malignant or benign tumors, as well as abnormal tangles of blood vessels, while avoiding damage to surrounding healthy organs. The revolutionary new treatment destroys tumors without the need for invasive surgery, allowing the patient to go home immediately after treatment.

HCG CyberKnife® Center reaffirms our commitment to offering the highest standards of care for patients. This is a giant step forward in realizing our dream of a Cancer Free India.

Best Regards.

Dr. B S Ajai Kumar  
Director - CyberKnife  
HCG Enterprises Ltd.  
Bangalore



## What is CyberKnife® Robotic Radiosurgery?

CyberKnife® Robotic Radiosurgery System is the first and only robotic radiosurgery system designed to treat tumors anywhere in the body, including the brain, spine, lung, liver, pancreas and prostate.

CyberKnife® is a path-breaking cancer treatment system that delivers high doses of radiation with pinpoint, sub-millimetre accuracy. Because CyberKnife® can deliver radiation beams from virtually any direction, the radiation beams are focused precisely on the tumor minimizing damage to the surrounding healthy tissue and critical organs.

CyberKnife® does not use blades or scalpels – offering a pain-free, non-invasive option to patients when surgery is not possible or complex.

### CyberKnife® Facts

- Approved by the US FDA in 2001 to treat tumors and lesions anywhere in the body when radiation treatment is required
- Over 155 CyberKnife® systems currently operating in the world
- Over 60,000 patients have been treated successfully
- Currently more than 50% of all CyberKnife® procedures in the US are extracranial



# CyberKnife®

## The Technology Advantage

CyberKnife® is the world's first and only whole-body radiosurgery system. It combines real-time image guidance throughout treatment, unique Dynamic Motion Tracking™ and full-time robotics technology to treat tumors and lesions that were formerly inoperable.

### CyberKnife® system features include: Compact linear accelerator with express™

The compact X-band linear accelerator emits circular beams with secondary collimation ranging from 5mm to 60mm. This compact, lightweight system produces pencil-shaped beams of radiation that can be precisely delivered in almost any direction. This allows for superior conformality when treating patients.

### Robotic manipulator

CyberKnife® has a high-precision robotic manipulator made by Kuka®, one of the world's leading manufacturers of robots. The robot is capable of delivering a repeatability accuracy of less than 0.2 mm.

### X-Ray sources

Low-energy x-ray sources generate two perpendicular, oblique, diagnostic x-rays that locate bony landmarks or implanted radiopaque markers throughout the treatment process.

### Real-time Image detectors

High-resolution image detectors capture x-ray images and generate digital images of the patient's anatomy. New images are captured throughout treatment and are compared to the digitally reconstructed radiographs (DRRs) generated from the CT scans used in treatment planning. The imaging system then corrects for changes in the patient's position by sending a command to the robotic manipulator.

### AXUM Robotic treatment couch

The AXUM Automatic Patient Positioning System automatically and accurately aligns patients in one simple step, significantly reducing patient set-up times and increasing patient throughput.

### Synchrony™ respiratory tracking system

The Synchrony Respiratory Tracking System is the first technology in the world capable of delivering dynamic radiosurgery to targets that move with respiration. The CyberKnife® system synchronizes the Robotic Delivery System with motion of the tumor, so margins of less than one millimetre are needed to compensate for respiration.



## CyberKnife® stereotactic surgery vs. conventional radiation therapy

Conventional radiation therapy [radiotherapy] administers a broad beam of radiation from one or two directions in 30 to 45 treatments. It delivers low-dose beams of radiation over a period of 6-8 weeks – the time required to allow healthy tissue damaged during treatment to recover.

CyberKnife® stereotactic radiosurgery delivers high-dose beams of radiation — which can be more effective in killing tumors anywhere in the body. This system can deliver radiation beams from virtually unlimited directions with sub-millimetre accuracy. With radiosurgery, damage to surrounding healthy tissue is minimised; therefore the treatment can be completed typically in 3 to 5 days.

# CyberKnife®

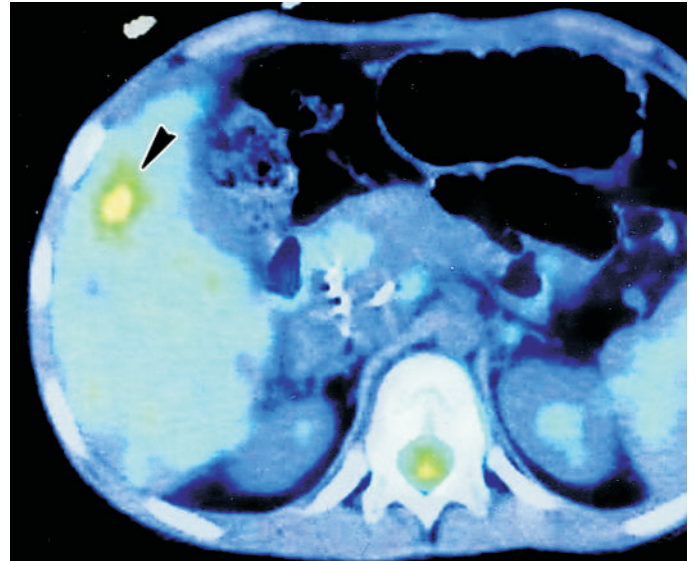
## Treatment process redefined

The team of HCG CyberKnife® Specialists plans a treatment course for each patient. At first, the patient undergoes a high-resolution image CT scan to determine the exact location and size of the tumor.

The image of the scan is then transferred to the CyberKnife® workstation, where a treatment plan is charted. MRI and PET scan are done where recommended and brought to this workstation and fused with the CT scan. The plan is essentially to determine the dosage of the radiation and restrict exposure to the neighbouring healthy tissues. After the plan has been developed the patient is ready to undergo treatment. Once the patient is settled comfortably, the CyberKnife® robot moves around the patient, targeting the areas affected by cancer.

Each session lasts for about 30 – 90 minutes, depending on the type and location of tumor. Patients may go through treatment in stages. A total of 3 to 5 sessions [one per day] may be required.

Some patients may experience minimal side-effects, but these usually go away within the first week of treatment. A follow up imaging is generally conducted using a combination of MRI, CT or PET-CT scans to determine the response to treatment.



### Tumours that can be treated with Cyberknife®

CyberKnife® is based on proven radiation technology. Successful case studies have been published in many medical journals. CyberKnife® treats both benign and malignant tumors in various sensitive and inoperable regions of the body:

- In the early stages of the disease when patients cannot be surgically treated
- Alternative option to surgery
- Intracranial Sites
- Metastatic Cancer
- Boost localised dosage after conventional radiotherapy
- Retreatment
  - Recurrent, including post - conventional radiotherapy recurrent cases
  - A treatment option that can be stand-alone or used in combination with other therapies
  - Therapy for a better quality of life



## Possible treatment areas

### CRANIAL RADIOSURGERY

Metastasis  
Meningioma  
Glioma  
AVM  
Trigeminal Neuralgia

### SKULL BASE RADIOSURGERY

Acoustic Neuroma  
Cavernous Sinus  
Parasellar Meningioma  
Pituitary Adenoma  
Pineal region tumor  
Craniopharyngioma  
Medullablastoma  
Chordoma  
Other space  
occupying lesions

### HEAD & NECK RADIOSURGERY

Schwannoma  
Nasopharynx tumor  
Primary and  
Metastatic Cancer

### LUNG/ THORACIC RADIOSURGERY

Primary and  
Metastatic Tumor

### PANCREAS & RENAL RADIOSURGERY

### LIVER RADIOSURGERY

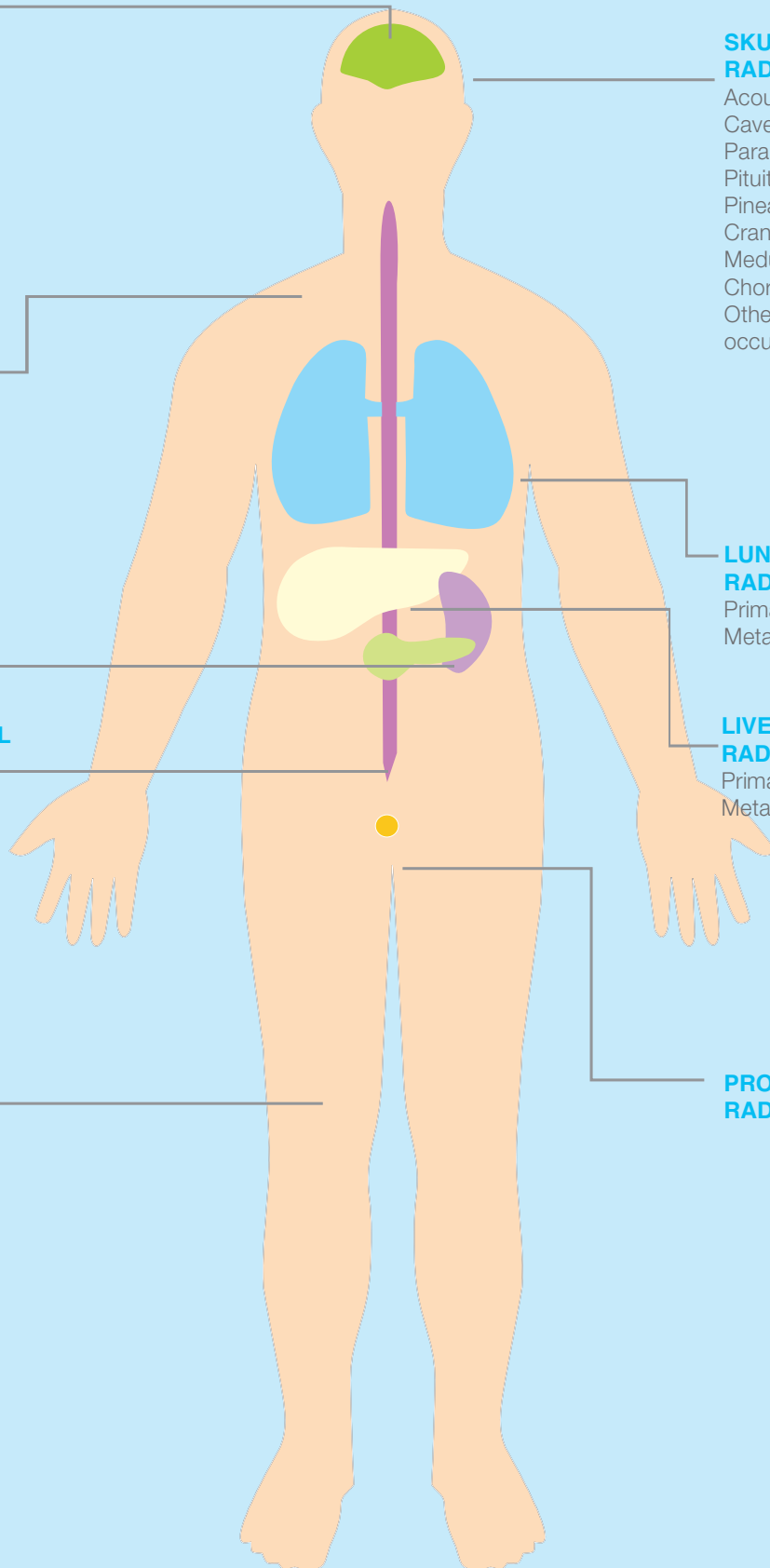
Primary and  
Metastatic Cancer

### SPINE/PARASPINAL RADIOSURGERY

Cervical  
Thoracic  
Lumbar  
Sacral

### PROSTATE RADIOSURGERY

### SKELETAL METASTASIS



# CyberKnife®

## The Patient Advantage

### Highest level of comfort

- Pain-free
- No anaesthesia
- No invasive head or body frame
- No breath-holding during treatment

### Superior quality of life

- Significantly reduces treatment time
- Treats only affected areas
- Minimises side effects
- Immediate return to normal activity

### Treats inoperable tumors

- Treats tumors anywhere in the body
- Pinpoint accuracy
- Dynamic motion tracking
- Stereotactic blood-less radiosurgery

### Non-invasive and pain-free

CyberKnife® offers a pain-free, non-invasive approach to radiosurgery that results in fewer complications than open surgery with comparable results.

### No invasive body or head frame

Owing to the accuracy of the targeting system, the patient is not held down by uncomfortable frames or braces to restrict movement. CyberKnife® zeroes in and sets its target on the affected area, automatically correcting for any movements made by the patient or the tumor. Unlike conventional radiotherapy, the CyberKnife® system uses the skeletal structure of the body, rather than invasive metal frames and skull pins, as a reference point for identifying the tumor position throughout the treatment. This allows the patient to settle comfortably during the treatment.

### Significantly reduces treatment time

The treatment duration is reduced significantly from about 5-6 weeks to a maximum of 5 days with one session per day, lasting about 30-90 minutes.

### Little or no recovery time

Patients can return immediately to their normal routine after the session is over. The treatment can be performed as an outpatient procedure.

### Minimises side effects

Since CyberKnife® targets only the affected areas with a high degree of precision there is minimal possible exposure to healthy cells by the radiation. The intensity of each individual beam isn't high; however the combined energy of the beams targets the cancerous tissue with the least possible effect on healthy organs. Hence, side effects are minimised.

### Treats inoperable tumors

Using a fully integrated robotic delivery system, CyberKnife® allows far superior reach and manoeuvrability to previously inaccessible and inoperable lesions such as lesions involving the spine, optic apparatus and pancreas. Robotic flexibility allows for isocentric as well as non-isocentric treatment. CyberKnife® can treat tumors anywhere in the body, including prostate, lung, brain, spine, brain, liver, pancreas and kidney.

### Pinpoint accuracy

CyberKnife® is unmatched by any other radiation therapy and radiosurgery system when it comes to accuracy. The system can essentially target only the affected area, sparing surrounding healthy tissue, minimising painful side-effects. Multiple beams of high-energy radiation can be delivered from up to 1200 angles to converge precisely on the tumor or lesion.

### Dynamic motion tracking

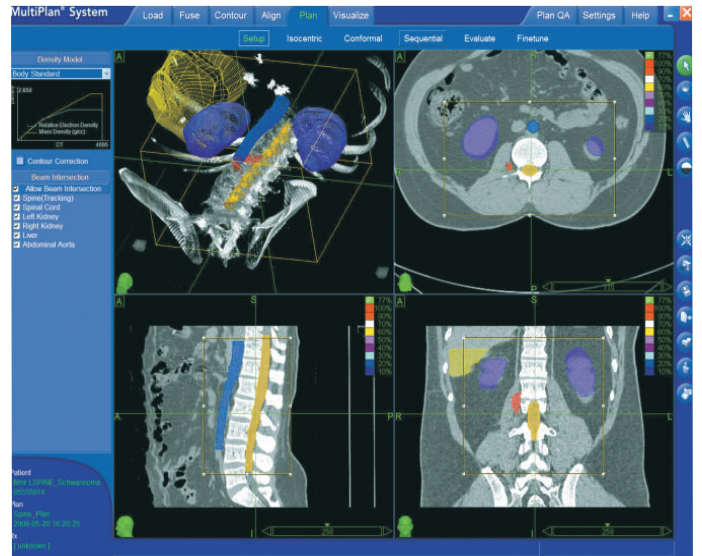
CyberKnife® uses real-time image guidance software to continually track and adjust for movement during treatment. It confirms tumor location prior to beam delivery, making it possible to treat lesions that move with respiration such as lung and pancreas tumors. The computer system is able to tell the CyberKnife® robot not only where the tumor is, but where it is in relation to the breathing cycle. It allows doctors to treat even small areas accurately because the robot synchronizes with the patient's breathing. This allows the patient to breathe easily and relax throughout the procedure.

### Higher radiation dose possible

Many patients who previously reached the lifetime dose limit of traditional radiation therapy to critical structures/tissues can receive additional treatment with CyberKnife® because of its targeted treatment precision. Gold seed implants near the tumor may be needed in some cases.

# CyberKnife® The Clinician Advantage

- A new treatment option for patients who refuse surgery, or when surgery is not possible or complex
- Continuously tracks, detects and corrects for tumor and patient movement throughout the treatment
- Provides unsurpassed Linear Accelerator manoeuvrability and complete access and coverage for tumor located anywhere
- Complements existing radiation therapy, IMRT or IGRT programs
- Enables superior flexibility in treatment planning:
  - Forward or inverse treatment planning
  - Isocentric or non-isocentric treatment plans
  - Simultaneous treatment of multiple tumors
  - Complements other targeted therapies



# HCG CyberKnife® Specialist team

HCG CyberKnife® specialists collaborate with the patient to devise a treatment that best suits the patient's needs. The team may include:

- Radiation Oncologists
- Speciality Surgeons
- Radiologists
- Medical Physicists
- Diagnostic and Therapy technologists

Each patient's treatment is personalised. The HCG CyberKnife Specialist team plans, manages and monitors the patient's treatment. The patient's clinician is a partner throughout the treatment process.



## How to contact us:

You can reach HCG CyberKnife® Center in 2 ways.

- Through your primary physician, surgeon or oncologist, who will be primarily responsible for arranging your treatment and he would be a part of our team.
- You can contact us directly at the HCG CyberKnife® Center, or email us at [info@cyberknifeindia.com](mailto:info@cyberknifeindia.com)

## HCG Cancer Care Network in India.

**Ahmedabad**  
HCG Medi-Surge Hospital  
Ph: +91.79.26408401 / 40010101

**Bangalore**  
HCG Bangalore Institute of Oncology  
Ph: +91.80.40206400

HCG Bangalore Institute of Oncology Speciality Center  
Ph: +91.80.40206000

HCG Gokula Curie Cancer Center  
Ph: +91.80.22182929 / 22182949

HCG Curie Center of Oncology  
Ph: +91.80.25631373 / 25538194

**Chennai**  
HCG Anderson PET CT Institute  
Ph: +91.44.43539444 / 99620.00048

**Cuttack**  
HCG Panda Curie Cancer Hospital  
Ph: +91.671.2686377 / 2686982

**Delhi**  
HCG SMH Curie Center  
Ph: +91.11.43006000-02

**Erode**  
HCG Cancer Center  
Ph: +91.424.2262035 / 4021845

**Hubli**  
HCG NMR Curie Center of Oncology  
Ph: +91.836.2228344 / 4250381

**Mysore**  
HCG Bharath Hospital & Institute of Oncology  
Ph: +91.821.4280011 / 22 /33

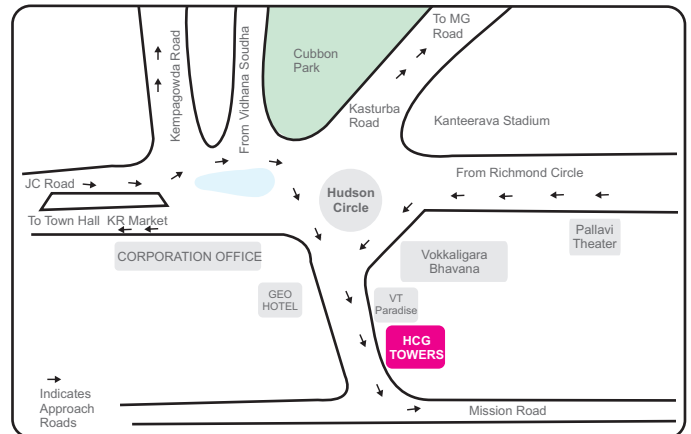
**Nashik**  
HCG Curie Manavata Cancer Center  
Ph: +91.253.2592666 / 2595666

**Ranchi**  
HCG Curie Abdur Razzaque Ansari Cancer Institute  
Ph: +91.651.6453194 / 2275300 / 2275900

**Shimoga**  
HCG Malnad Hospital & Institute of Oncology  
Ph: +91.8182.246800 / 246724

**Vijayawada**  
HCG Curie Center of Oncology  
Ph: +91.866.2436661 / 24332180

## How to get to HCG, Bangalore



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HealthCare Global Enterprises,  
HCG Towers, #8, Kalinga Rao Road,  
Sampangi Ram Nagar, Bangalore 560 027  
T: + 91 80 4020 6000  
F: +91 80 2248 5962  
[www.hcgoncology.com](http://www.hcgoncology.com)

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