אגודת ידידי המרכז הרפואי זיו צפת (ע"ר)
SOCIETY OF FRIENDS OF ZIV MEDICAL CENTER, Zefat (R.A)
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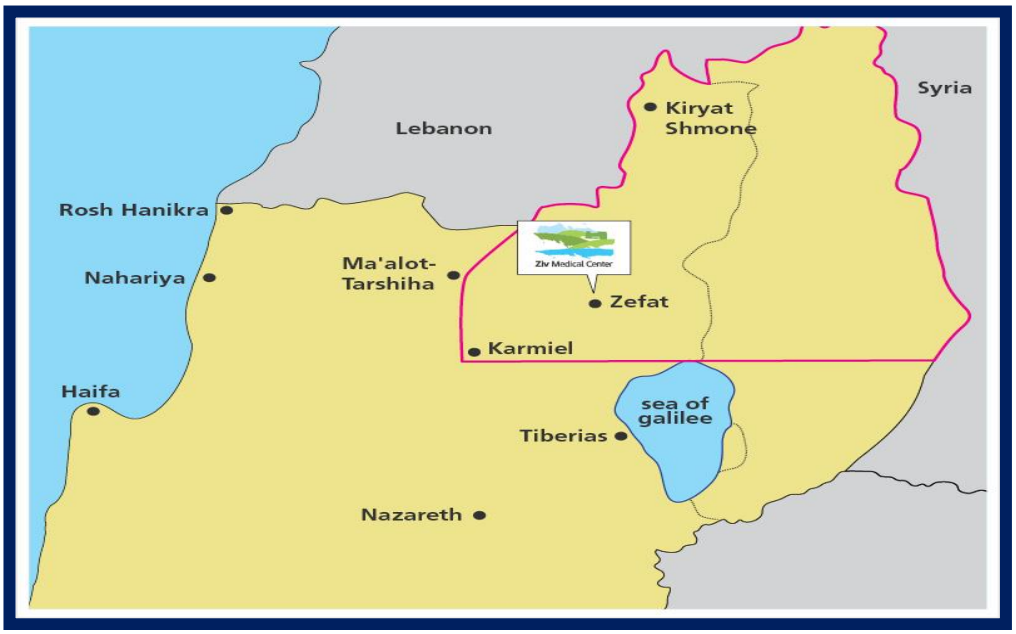
ZIV MEDICAL CENTER

SPECT/CT Imaging

June 2018

Ziv Medical Center, Zefat, Israel

Catchment Area



Borders with Syria (aerial distance 30 km/19 miles)
and Lebanon (aerial distance 11 km/7miles)

Contact person: Ilana Arviv, Project Coordinator, Mobile 972-50-8434073

P.O.BOX 35, Safed, Tel: 972-4-6828591, Fax: 972-4-6923418

Email : Friends@ziv.health.gov.il

Ziv Medical Center

Ziv Medical Center, a general hospital in the north of Israel, located in Zefat, serves the Upper Galilee and northern Golan Heights. Ziv's multi-ethnic patients include Jews, Muslims, Christians and Druze, as also reflected in its multi-ethnic staff. The hospital, in its current location, opened its doors in 1973 and has grown steadily over the years.

Ziv's comprehensive services now include 331 in-patient beds, laboratories and imaging facilities, out-patient clinics, a regional trauma unit, new Child Health Center, mental health services for adults and children, a nursing school and a research center. A Radiotherapy Institute was opened in June 2017, and a PET-CT Institute was inaugurated in April 2018. Ziv Medical Center has been designated to develop comprehensive oncology services for the entire Galilee region.

The hospital is affiliated with the Bar Ilan University Faculty of Medicine which opened in Zefat in 2011. This academic affiliation serves to strengthen Ziv's role in training physicians and increasing research capacity, while it has brought high quality medical and academic professionals to take senior positions in the hospital. In June 2017, Ziv Medical Center received accreditation from the Joint Commission International Standards for Hospitals. Ziv is committed to providing high quality care to the population at all times.

Imaging and Nuclear Medicine

In recent years, the imaging technology at Ziv has been significantly upgraded, including the opening of an MRI Unit and the addition of two new state-of the-art CT machines. A new, very sophisticated Radiotherapy Unit was opened in June 2017.

Ziv Medical Center's Nuclear Medicine (NM) institute of launched a new PET-CT facility that will address the needs of people in the north of Israel in April 2018. There is a worldwide growing utilization of PET-CT, based on the evidence that functional and morphologic correlative images produced by this methodology improve diagnostic accuracy, especially for oncological patients.

Dr. Moshe Bocher, one of the pioneers in the fields of clinical and research PET in Israel, joined Ziv's medical team as Head of the PET/CT Institute. Dr. Bocher, a graduate of the Faculty of Medicine of the Hebrew University of Jerusalem and Hadassah Hospital where he specialized in Nuclear Medicine, took part in the development of Hybrid imaging, including participation in the process of creation of the first clinical PET/CT worldwide, that took place around the year 2000, by Elscint/GE engineers, in Haifa. In addition, Ziv Medical Center recruited Dr. Sion Koren as the hospital's chief medical physicist. Among Dr. Koren's responsibilities are the acceptance and commissioning of the new equipment, recruiting and training of new staff in the Radiotherapy, Oncology, MRI and PET/CT facilities.

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The critical missing element required for modern patient care is SPECT/CT imaging.

SPECT/CT Imaging

Similar progress is consistently reported for SPECT-CT, a modality which is rapidly gaining acknowledgement as the technology for optimizing the diagnostic capabilities of single photon imaging. This is becoming the base of regular nuclear medicine applications, with very considerable impact on patient management. The main advantages of SPECT-CT are:

1. Using the X-ray CT map for quantitative corrections of the nuclear medicine images, that are mandatory for elimination of artifacts, and also for the realization of the new revolutionary capabilities of modern gamma cameras, providing absolute physiological quantitation in SPECT, similar to PET.

2. SPECT and CT are tomographic imaging procedures, each one with separately proven good diagnostic performance. SPECT produces computer-generated images of local radiotracer uptake, while CT produces 3-D anatomic images of X-ray density of the human body. Combined SPECT/CT imaging provides sequentially functional information from SPECT and the anatomic information from CT, obtained during a single examination. By precisely localizing areas of abnormal and/or physiological tracer uptake, SPECT-CT improves diagnostic accuracy, and can also aid in achieving accurate dosimetric estimates as well as in guiding interventional procedures or in better defining the target volume for external beam radiation therapy, so that it also improves radiotherapy treatment outcomes.

Diagnosis and characterization of disease by CT imaging is based on morphologic criteria such as size, texture and tissue attenuation. CT provides information regarding changes in organ size and tissue density, as well as their precise spatial localization and topographic landmarks. However, structural data do not necessarily correlate with the metabolic status of disease. The later information is provided by nuclear medicine imaging that is based on the bio-distribution radioactive agent over time and space, thus visualizing dynamic physiological and pathophysiological processes that define the functional characteristics of disease.

Whole body assessment is possible and is common in nuclear medicine, yet, often, scintigraphic images lack accurate anatomic landmarks for precise localization and characterization. The above mentioned considerations explain why morphologic and functional imaging modalities are actually complementary and combining SPECT with CT lead to a more accurate diagnosis and later to improved treatment outcomes.

Ziv Medical Center wishes to replace its 10 year-old SPECT-alone gamma camera, upgrading it to a modern SPECT-CT camera, with the aim of providing a state-of the-art medical service to the people of the north of Israel, in all fields of regular nuclear medicine, including cardiac, orthopedic and oncological studies. It has been reported that

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moving from SPECT-alone to SPECT/CT could change diagnoses in about 30% of cases. The combined effect of introducing both a new state-of-the-art gamma camera and the new technology of SPECT-CT, at our institute is expected to greatly improve our medical service.

Funding Request

Item	Cost in $US
SPECT CT	750,000
TOTAL PROJECT	**750,000**
Amount Required	

Your donation will be used towards purchasing the SPECT/CT camera.

Donations

For further information and donations please contact:
Ms. Ilana Arviv, Project Coordinator
Tel: 972-4-6828591; 972-508434073; Email: friends@ziv.health.gov.il

Transfer to Ziv Medical Center's account in Israel:

The Society of Friends of Ziv Medical Center
Registered Israel Charity no. 58-000-510-6
Bank name: LEUMI, Bank no. : 10
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Account no. : 2000555
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Please make sure to add: donation recommended for Society of Friends of Rebecca Seiff Hospital, Zefat Israel, Charity no. 58-000-510-6.

Addendum

Glossary:
PET - Positron Emission Tomography.
CT - (X-ray) Computerized Tomography.
SPECT - Single Photon Emission Computerized Tomography (regular nuclear medicine).

SPECT-CT is where two different types of scans are taken and the images or pictures from each are merged together. The fused scan can provide more precise information about how different parts of the body function and more clearly identify problems.

SPECT images are obtained following an injection of a radiopharmaceutical that is used for nuclear medicine scans. The injected medication sticks to specific areas in the body, depending on what radiopharmaceutical is used and the type of scan being performed.

The radiopharmaceutical is detected by a nuclear medicine gamma camera. The camera or cameras rotate over a 360 degree arc around the patient, allowing for reconstruction of an image in three dimensions.

Computed tomography (CT): CT images are obtained while you lie on a bed that moves into a ring shaped X-ray machine. Again, the X-ray machine rotates over a 360 degree arc around the patient, allowing for image reconstruction in three dimensions. The X-ray machine from the CT scanner rotates much faster than the gamma camera, so the CT part of the study takes less time than the SPECT study.

The similarity between SPECT and CT in the method of image processing allows the images to be combined. Combining the information from a nuclear medicine SPECT study and a CT study allows the information about function from the nuclear medicine study to be easily combined with the information about how the body structure "looks" in the CT study.

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