Oncologic Applications Of Molecular Coincidence Detection: Its Impact On Patient Management

THESIS

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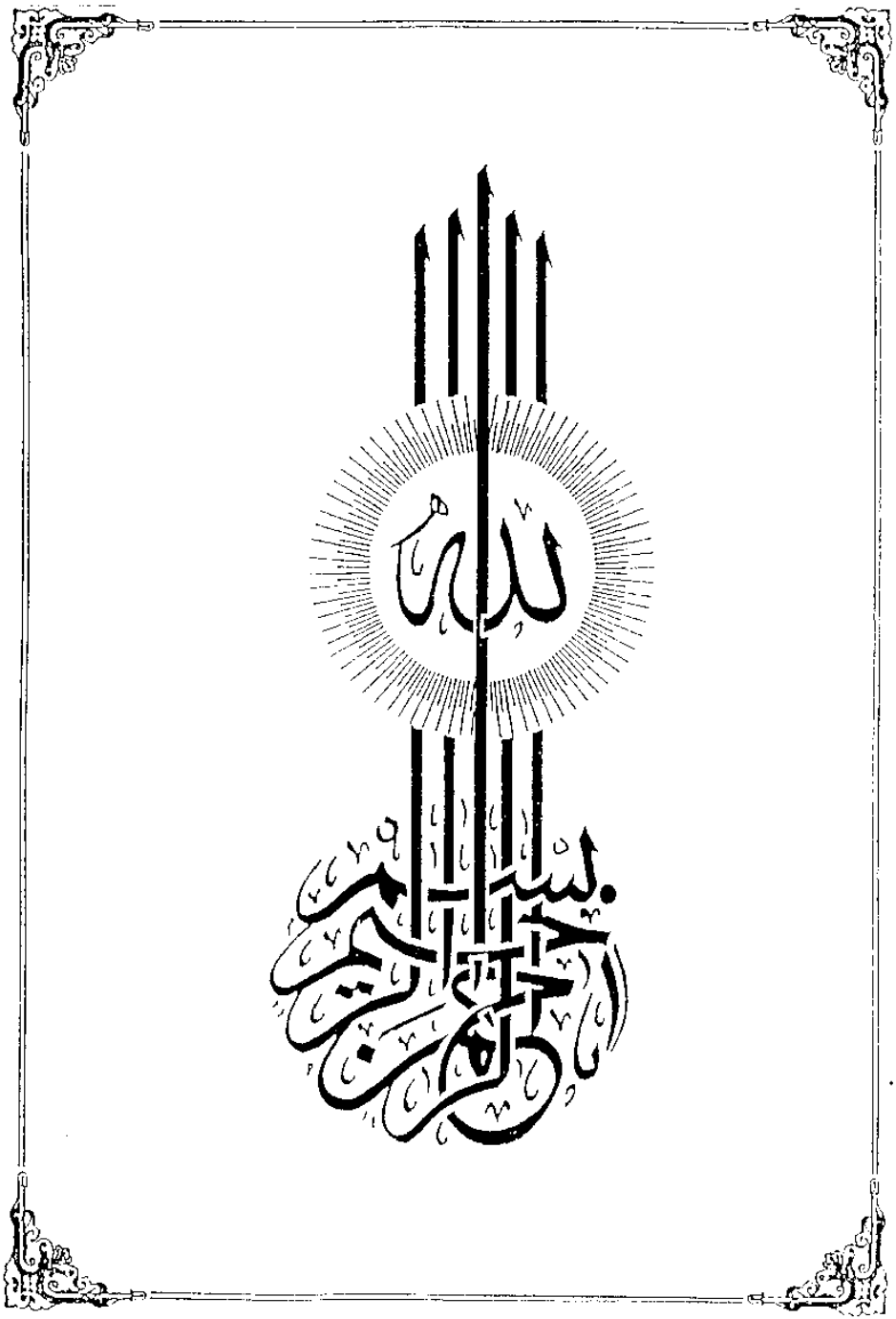

LIST OF ABBREVIATION

No	Abbreviation	Meaning
1	AIDS	Required Immunedeficiency Syndrome
2	B.Epith.mass	Benign Epithelialmass
3	BSA	Body Surface Area
4	B & ST	Bones and Soft Tissue
5	CA	California
6	Ca	Cancer
7	cc	cubic centimeter
8	C inflam.	Chronic Inflammation
9	CT	Computed Tomography
10	3-D	Three Dimensional
11	2DG	2-Deoxy-D-Glucose
12	FDG	Fluoro-2-deoxy-2-glucose
13	FGS	Female Genital System
14	FN	False Negative
15	FP	False Positive
16	Fu	Follow up
17	Ga-67	Gallium-67 citrate
18	GIT	Gastrointestinal Tract
19	GLUT	Glucose Transporter

19	GLUT	Glucose Transporter
20	H & N	Head & Neck
21	HCC	Hdepatocellular Carcinoma
22	hTg	Human Thyroglobulin
23	ICRP	International Committee for Radiation Protection
24	Interst.foibro.	Interstitial Fibrosis
25	^{131}-I	Iodine-131
26	kg	Kilogram
27	kcps	Kilo counts per seconds
28	keV	kilo electron volt
29	Leom.	Leomyo sarcoma
30	LUL	Left Upper Lung Lobe
32	mCi	millicurie
33	MCD	Molecular Coincidence Detection
34	MGS	Male Genital System
35	MRI	Magnetic Resonance Imaging
36	MIBG	Metaiodobenzyl Guanidine
37	Met	L-methyl-"C-methionine
38	NSCCa	Non Small Cell Lung Carcinoma
39	^{18}0	Oxygen-18

40	PET	Positron Emission Tomography
41	PNET	Premitive Neuro Ectodermal Tumor
42	PVNS	Premitive Villo Nodular Synovial Sarcoma
43	RLL	Right Lower Lung Lobe
44	PUL	Right Upper Lung Lobe
45	SPECT	Single Photon Emission Computed Tomogrpahy
46	STS	Soft Tissue Sarcoma
47	SUV	Standard Uptake Value
48	Tc-99m MIBI	Technetium-99m sestamibi (Methoxy isobutyl isonitrile).
49	T/B	Tumor/Background
50	TP	True Positive

* Adding this list is suggested by Prof. Dr. Asmaa Ali Hassan

ERRATA LIST

Page	Default	Correctin
11	(Actolun et al, 1992 and Kao et al, 1993)	(Actalun et al, 1992)
20	m/Ci	mCi
24	Brownnell et al,	Brownnell et al, 1980
24	Reivich et al,	Reivich et al, 1979
24	Jones et al,	Jones et al, 1982
24	IRCP	IRCP 1988
24	Mejia et al,	Mejia et al, 1991
25	In thee cases FDG can provide	sentence repeated
26	A multicenter comp. . table (4)	A multicenter. . is presented in table (4)
29	Pat	Patz
29	Higahsi 1995	Higashi, 1993
62	The 109 study group	The 122 study group
62	Fourth 5 patients with brain	Senstence repeated.
95	FDG PET 9/25/98	T_1 & T_2 dorsal vertebrae proved . . . received chemotherapy.
100	Delbeke et al study	Delbeke et al study 1998
103	16-Buchpiguel CA . . 1998	16-Buchipiguel CA . . 1994
106	38-Ginsberg R , . 1993	38-Ginsberg R, . . 1998
106	41-Haberkarn U, . . J Nucl med	41-Haberkorn U, . . J Nucl Med
111	86-Moog F, . . 1999	86-Moog F, . . 1998
112	99-Ottos, Nettelbladt ..	99-Ottos A, . . J Nacl Med 1995; 46: 47 P.
114	119-Schiepers C, . . 1995	119-Schiepers C, .. 1996
116	133-Tonami N, . . 1977	133- Tonami N, . . 1997
116	136-Valk P, .. 1995	136-Valk P, . . 1996
117	145-Warburg O, . . 1991	145- Warburg O, . . 1931

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I Introduction

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The rationale behind using fluorine-18 fluoro -2- deoxy -2- glucose (FDG) positron emission tomography (PET) and dual head coincidence imaging (DHCI) in detection of malignant tumors is to measure and quantify glucose utilization rate in detection of malignant tumors. With increasing malignant transformation, tumor cells regulate up their membrane glucose transporter proteins and increase the enzymes associated with the non-oxidative as well as the oxidative metabolic pathways of glucose. These alterations in neoplastic cells explain the enhanced tumor cell glucose utilization and differential accumulation of FDG in malignant cells more than normal ones (Kahn et al 1990).

Computed tomography (CT) and magnetic resonance imaging (MRI) can determine tumor volume and anatomical location however, both fall short in their ability in many instances to differentiate benign from malignant lesions, detect whether lymph nodes are involved by tumor tissue or not, assess the response to cancer treatment, detect early recurrence and differentiate post-treatment fibrosis and necrosis from malignant recurrence (Sokoloff et al 1998).

Non-positron emitting radiopharmaceuticals such as gallium-67 and thallium-201 that accumulate in viable tumor tissue suffer from their poor emission characteristics and low tumor detection specificity (Matsuno et al 1992). Even tracers with favorable nuclear properties for SPECT imaging such as technetium-99m methoxyisobutyl isonitrile (Tc-99m MIBI) were found to have a low tumor retention index and low tumor to background ratio (Nishiyama et al 1997).

II Aim Of The Work

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We aim to review the results of FDG-DHCI studies performed at our institution, between August 1996 and April 1998, to evaluate the sensitivity, specificity, positive predicative value, negative predictive value and accuracy of this new modality and correlate FDG DHCI results with other imaging modalities (CT/MRI) and pathological examination in order to determine the implication of the DHCI technique in management of cancer patients.

III Review Of Literature