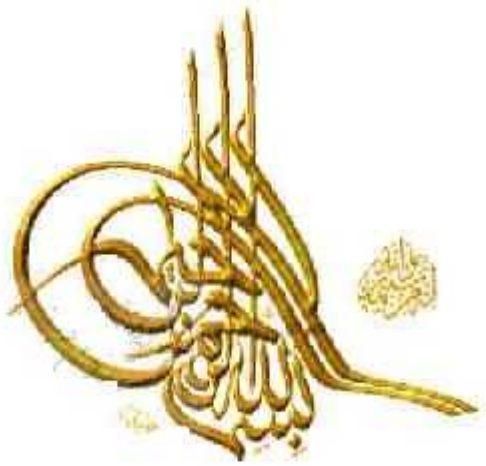

لَا يُكَلِّفُ اللَّهُ نَفْسًا إِلَّا وُسْعَهَا لَهَا
مَا كَسَبَتْ وَعَلَيْهَا مَا اكْتَسَبَتْ رَبَّنَا لَا تُؤَاخِذْنَا إِنْ نَسِينَا
أَوْ أَخْطَأْنَا رَبَّنَا وَلَا تَحْمِلْ عَلَيْنَا إِصْرًا كَمَا حَمَلْتَهُ عَلَى الَّذِينَ
مِنْ قَبْلِنَا رَبَّنَا وَلَا تُحَمِّلْنَا مَا لَا طَاقَةَ لَنَا بِهِ وَاعْفُ عَنَّا
وَاغْفِرْ لَنَا وَارْحَمْنَا أَنْتَ مَوْلَانَا فَانْصُرْنَا عَلَى الْقَوْمِ
الْكَافِرِينَ"

صدق الله العظيم

(سورة البقرة ٢٨٦)

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During this work I have collaborated with many colleagues for whom I have great regard, and I wish to extend my warmest thanks to all those who have helped me with my work.

I dedicate this to my country, which I miss,

To my wonderful family,

&

To my dear husband for his loving care and understanding.

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APPENDIX I

CONSENT FORM
For CT SCAN

Patient No……

Surname:…….

Forename: …….

PROPOSED INVESTIGATION

The doctor has advised that a CT scan of……..*(site)*
has been requested for me , *(name of patient)*……

Your doctor has asked for a special x ray examination called a CT scan or computerized tomography.During this test, a thin X ray beam is rotated around the area of the body the doctor wants more information about. The computer collects the data and uses it to make a very detailed 3-D picture which can help the doctors diagnose problems and plan treatment.

The scan itself is painless, but you will have to remain completely still on the examination table while the scan is being done.

RISKS

These are the commoner risks. There may be other unusual risks that have not been listed here. Please ask your radiologist if you have any general or specific concerns.

People are exposed to radiation from natural sources all the time. All x-rays involve a small extra dose of radiation. Dose of radiation used for CT examinations is carefully controlled to ensure the smallest possible amount is used that will still give a useful result. However, all radiation exposure is linked with a slightly higher risk of developing cancer.

The size of any increased risk depends on the age of the patient and the total amount of radiation received. The risk of any one scan is very small indeed, but increases if many scans are needed. The doctor(s) asking for this test will have weighed any risk against the benefit to be gained from the extra information the CT scan should provide.

I understand the procedure has the following specific risks and limitations:

- There is a very small risk associated with radiation exposure. This cannot be avoided.
- As a CT scan is usually avoided if a woman is pregnant, I should tell the staff if this may affect me
- If I suffer from claustrophobia, I may find it difficult to remain still within the scanner and should warn the staff beforehand

INDIVIDUAL RISKS

I understand the following are **possible significant risks and complications specific to my personal circumstances**, that I have considered in deciding to have this scan:

……

APPENDIX II

إقرار بالموافقة على إجراء تصوير مقطعي

الفحص المقترح :

نصحني الطبيب بأن التصوير المقطعي لـ .....(مكان التصوير) إجراء مرغوب به من أجلي ..... (اسم المريض) .

طلب طبيبك إجراء تصوير شعاعي خاص يدعى التصوير المقطعي ، و في أثناء ذلك ستصدر حزمة شعاعية رفيعة تدور حول منطقة الجسم التي أراد الطبيب معرفة معلومات أكثر عنها ، و سيقوم الكومبيوتر بجمع البيانات ليستعملها في عمل صورة ثلاثية الأبعاد شديدة التفاصيل و التي ستساعد الأطباء في تشخيص المشكلة و وضع خطة العلاج .

التصوير بحد ذاته غير مؤلم ، لكنك ستبقى ثابتاً على طاولة الفحص خلال إجراء التصوير .

المخاطر :

هذه هي المخاطر الأكثر شيوعاً ، علماً أنه توجد مخاطر أخرى غير اعتيادية لم تذكر هنا ، فمن فضلك اسأل طبيب الأشعة إذا كان لديك أي مشاكل عامة أو نوعية .

– الناس الذين يتعرضون إلى أشعة من مصادر طبيعية طوال الوقت .

– جميع الأشعة تحتوي على جرعة إضافية ضئيلة من الإشعاع .

– إن جرعة الإشعاع الصادرة عن أجهزة التصوير المقطعي هي مضبوطة بشكل جيد و ذلك من أجل التأكد من أن الأشعة المستعملة هي بأقل كمية ممكنة للحصول على نتائج مفيدة .

– كل أنواع التعرض للأشعة قد تزيد بشكل قليل جداً احتمال تطور السرطان .

إن حجم أي خطر يعتمد على عمر المريض و كمية الأشعاة الصادرة ، و إن خطر أي جهاز أشعة واحد هو في الواقع قليل جداً لكنه يزيد باستعمال عدة أجهزة .

قام الأطباء الذي طلبوا هذا الفحص بالموازنة بين أي خطر محتمل و بين الفائدة التي يمكن الحصول عليها من المعلومات الإضافية التي يعطيها التصوير المقطعي .

لقد فهمت أن هذا الإجراء له هذه المخاطر التالية :

- هناك خطر بسيط جداً عند التعرض للأشعة ، و لا يمكن تجنبه .
- باعتبار أن التصوير المقطعي يتم تجنبه عادةً عند المرأة الحامل فيجب أن أخبر الأطباء بذلك إذا كان يؤذيني .
- إذا كنت أعاني من رُهاب الأماكن المغلقة (الخوف من الأماكن المغلقة) فقد أجد صعوبة في البقاء ثابتاً داخل الجهاز و يجب إخبار الأطباء بذلك .

المخاطر الفردية :

لقد استوعبت أن الأمور التالية هي مخاطر فردية محتملة و مضاعفات خاصة بحالتي الشخصية و التي يجب أن آخذها بعين الاعتبار في اتخاذي لقرار إجراء هذا التصوير :

.....

.....

APPENDIX III

-Computer software (OsiriX)

OsiriX is an image processing software dedicated to DICOM images (".dcm" / ".DCM" extension) produced by imaging equipment (MRI, CT, PET, PET-CT) and confocal microscopy (LSM and BioRAD-PIC format). It can also read many other file formats: TIFF (8,16, 32 bits), JPEG, PDF, AVI, MPEG and Quicktime. It was fully compliant with the DICOM standard for image comunication and image file formats. OsiriX was able to receive images transferred by DICOM communication protocol from any PACS or imaging modality (STORE SCP - Service Class Provider, STORE SCU - Service Class User, and Query/Retrieve).

OsiriX had been specifically designed for navigation and visualization of multimodality and multidimensional images: 2D Viewer, 3D Viewer, 4D Viewer (3D series with temporal dimension, for example: Cardiac-CT and 5D Viewer (3D series with temporal and functional dimensions, for example: Cardiac-PET-CT). The 3D Viewer offers all modern rendering modes: Multi planar reconstruction (MPR), Surface Rendering, Volume Rendering and Maximum Intensity Projection (MIP). All these modes support 4D data and were able to produce image fusion between two different series (for example: PET-CT).

Osirix is at the same time a DICOM PACS workstation for imaging and image processing software for medical research (radiology and nuclear imaging), functional imaging, 3D imaging, confocal microscopy and molecular imaging.

APPENDIX IV

Limits of agreement (LOA)

Measuring the size of differences:

To quantify the size of the differences, we use the Limit of Agreement (LOA). The interpretation is that given one measurement (from observer or method 1) we expect with 95% confidence that the difference from a second measurement (from other observer or method) will be within the LOA. The clinical expertise must judge whether such a difference is acceptably/sufficiently small for two observations to agree. The systematic or average agreement is captured by the mean difference, and the agreement on the individual level is captured by standard deviation.

The LOA approach is suitable for a number of situations:

1-The same observer measures the same quantity twice (with sufficient time in-between to ensure independent values).

2-Two “interchangeable” observers each independently make measurements of a quantity.

In these situations we expect to have mean difference.

*It is clear that an imprecise method will agree badly with any other method

APPENDIX V

Landmark (Abbreviation)	***Definition***
Sella (S)	Midpoint of rim between anterior clinoid process in median plane
Nasion (N)	Midsagittal point at junction of frontal and nasal bones at nasofrontal suture
Orbitale (Or)	Most inferior point on infraorbital rim
Anterior nasal spine (ANS)	Most anterior limit of floor of nose, at tip of ANS
Posterior nasal spine (PNS)	Point along palate immediately inferior to pterygomaxillary fossa
Pogonion (Pog)	Most anterior point along curvature of the chin
Menton (Me)	Most inferior point along curvature of the chin
Gonion (Go)	Point along angle of mandible, midway between lower border of mandible and posterior ascending ramus
Porion (Po)	Most superior point of anatomic external auditory meatus (anatomic Po)
Articular (Ar)	The intersection of the posterior border of the vertical mandibular ramus and the outer margin of the cranial base
Point (A)	Is the point of maximum concavity in the midline of the alveolar process of the maxilla
Point (B)	Is the point of maximum concavity in the midline of the alveolar process of the mandible

APPENDIX VI

Abbreviation	*Definition*
LC	Lateral cephalogram
2D	Two-dimensional
3D	Three-dimensional
CT	Computed tomography
CBCT	Cone beam computed tomography