



Gamma Bulletin

A Newsletter from the Gamma Knife Center, Cairo

Volume 2 No 1

March 2005

Official Opening of the Gamma Knife Center Cairo

The Gamma Knife Center at the Nasser Institute opened its doors to patients at the end of June 1991. Finally, on March 30th 2004 the center had its official opening. The occasion was the visit of



This picture of ministers approaching the lecture hall indicates the mood of the day. It was not only a bright day but the mood of all those present was sunny too.

the region's Ministers of Health to a conference organised under the auspices of the Arab League. It was a great day for the Center and we were deeply honoured that so many Ministers who are responsible for the health of such a large number of people were willing to be present at the opening of our Center.

The opening ceremony was in three parts. Firstly, there was a short orientating lecture at the Nasser Institute. This was followed by the ceremonial cutting of the ribbon by His Excellency, The Minister of Health and Population, Professor Dr. Tag El Din. Finally, there was a brief tour of the center to demonstrate the nature and scope of the work done there. The following pictures give a record of the events of that happy day. As can be seen their Excellencies were in good spirits on their way to the presentation about the Gamma Knife. It was gratifying for the Center to see with what attention the

Ministers listened to the presentation about the Gamma Knife Center. There were many questions. At the time of the official opening the Center had already treated 475 patients so there was plenty of material to show at the presentation. Not least the Center could present some information on its role in the treatment of children.

There was also a chance for some photo graphs at the lecture hall. The next picture shows the Center's patron His Excellency Stig Elvemar, the Swedish Ambassador and Dr. Mohamed Sharif, the Director of the Nasser Institute in the grounds of which the Gamma Knife Center is located. Dr.



The Ministers of Health from the Arab League countries listening to the lecture on Gamma Knife treatment, together with his Excellency the Swedish Ambassador, the Center's patron.

Sharif is an invaluable influence, helping the center. The Nasser Institute is a Ministry of Health hospital so that its director necessarily has a close relationship with the Ministry of Health and Population. This is something Dr. Mohamed has shared with the Gamma Knife Center, much facilitating the practical day to day administration of the Center. Since the Center is a joint venture between Sweden and Egypt, the ambassador is a key person in other aspects of the running of the Center which expresses its thanks to him.



Dr. Mohamed Sharif, Director of the Nasser Institute on the left and the Swedish Ambassador Stig Elvemar on the right



The Gamma Knife Center awaiting the opening ceremony. The flags of Egypt and Sweden outside for the first time.



Minister Tag El Din cutting the ribbon at the opening ceremony. From left to right are Mr. Moustafa El Asmar CEO of the Gamma Knife Center, His Excellency Dr. Mohamed Al-Noami, Minister of Health for Yemen, His Excellency Stig Elvemar the Swedish Ambassador to Egypt, The Minister, His Excellency Dr. Hamad Bin Abdullah Almanee, Minister of Health for the Kingdom of Saudi Arabia, Professor Dr. Mohamed Sharif, the Director of the Nasser Institute.

The official opening ceremony itself was the high point of our day. The ribbon was cut by his Excellency the Minister of Health and Population, Professor Dr. Tag El Din. The ribbon cutting ceremony was followed by a brief demonstration of the center and

its equipment by the clinical director Dr. Jeremy Ganz. Finally the day was over and it was time for goodbyes. This had indeed been a big day for the Gamma Knife Center Cairo. Moreover, the center was left with a clear impression of the breadth and depth of sup-

port that it has from the Health Authorities in Egypt which gives the center a feeling of hope and confidence for the future. The Center thanks all those who helped to make this day so memorable.



Dr. Ganz explaining to Dr. Tag El Din and the other Health Ministers the mechanism of the Gamma Knife.



Mr. Moustafa El Asmar saying goodbye to His Excellency Dr. Hamad Bin Abdullah Almanee.

Gamma Knife Center Cairo – Other Events in 2004/5

A Visit from Dr. Dan Leksell

The Center was very happy to have a visit from Dr. Dan Leksell. He is the son of the inventor of the machine and is qualified as an ENT surgeon. However, Dr. Dan, as executive vice-president of Elekta Instrument AB the Swedish company that makes the Gamma Knife has been deeply involved in the development and sophistication of the radiosurgery method. Moreover, having him at the Gamma Knife Center provided a tangible link with the past and the inventor of the machine.

Research as well as treatment

The Gamma Knife Center not only treats patients. Like any serious medical institution, particularly one which is managed according to Swedish principles it is very important not only to treat patients but also to continue to improve the quality of that treatment. This implies a responsibility to analyse and do research upon the ongoing work at the center. This is in no way experimenting on patients. It is rather the keeping of precise records so that



The day of Dr. Dan Leksell's visit. From left to right, Dr. Ayman Hafez the Gamma Knife Center's assistant consultant, Dr. Jeremy Ganz the Clinical Director, Dr. Dan Leksell son of the Gamma Knife inventor Lars Leksell, Dr. Amr Rifaat engineer and administrator and Dr. Wael Abelhalim Reda Consultant neurosurgeon to the Gamma Knife Center.

Another paper describes a simple method for making the treatment of

treatment is advisable and how this can be managed. In the Center's experience this swelling can be an uncomfortable interlude. However, it is rare and in our experience easy to treat.

1. Wael Abdel Halim Reda, Alla Abdel Hay, Jeremy C. Ganz A planned combined stereotactic approach for cystic intracranial tumors: Report of two cases J Neurosurg (Suppl) 97:610-612, 2002
2. Jeremy C. Ganz Gamma knife radiosurgery and its possible relationship to malignancy: a review J Neurosurg (Suppl) 97:644-652, 2002
3. Amr El Shehaby, Jeremy C. Ganz, Wael A Reda, Ayman Hafez Mechanisms of edema after gamma knife surgery for meningiomas: Report of two cases J Neurosurg (Suppl) 102:1-3, 2005
4. Jeremy C. Ganz, Wael A Reda, Khalid Abdelkarim, Ayman Hafez A simple method for predicting imaging-based complications following gamma knife surgery for cerebral arteriovenous malformations J Neurosurg (Suppl) 102:4-7, 2005
5. Amr El Shehaby, Jeremy C. Ganz, Wael A Reda, Ayman Hafez Temporary symptomatic swelling of meningiomas following gamma knife surgery: Report of two cases J Neurosurg (Suppl) 102:293-296, 2005

the successes and failures are documented. These findings can then be published to help other centers performing Gamma Knife Surgery. To this end the Center has published to date 5 papers in a top peer reviewed journal as shown in the table above. The papers describe a multi-modality treatment method for tumours which contain fluid. This method is aimed to reduce the risks of surgery to a minimum.

blood vessel abnormalities safer. One paper is a review of cancer in relation to the Gamma Knife. The other two papers describe how certain tumours can swell up temporarily and what

Doctoral Theses

In addition to publishing papers, the Gamma Knife Center works to support young doctors in training by providing clinical material and a proper milieu where they may work for their MD theses. The table at the bottom of the page shows the thesis topics covered so far. The Center is particularly proud that it is able to help doctoral students from all three major Cairo Universities. It is hoped to expand this activity into the future.

1. Acoustic Neuroma and radiosurgery	Cairo University
2. Meningiomas and Gamma Knife	Ain Shams University,
3. Difficult tumours and Gamma Knife	Ain Shams University
4. Arteriovenous malformations (radiology)	Al -Azhar University Nasser Institute

Meetings

Members of the Gamma Knife Center staff have been present at a number of meetings in the past year. These include the international Gamma Knife Society meeting held this year in Vienna. Then there was the Pan Arab

Neurosurgical Meeting held in Amman where papers were read. In Alexandria in the spring the Center presented papers to the Egyptian Neurosurgical Society. The Center was represented at a Medical Tourism Fair in Bahrain in December and a similar arrangement in

Kuwait in the Spring. In January 2005 the Center presented a paper at the Ministry of Health and Population's third Specialized Centers meeting Sharm el Sheikh. This meeting was graced by the presence of the Minister of Health Dr. Tag El Din.

Gamma Knife Center Cairo - Results

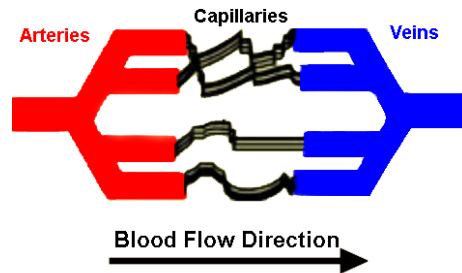
It takes time to accumulate enough patients to be able to write about the results of treatment. However, after three and a half years of activity it is now possible to present some results of the work the center has been doing. They will be presented for the most common illnesses treated at the center.

Arteriovenous Malformations

These are formed before birth. The name is shortened for convenience to AVM. They are congenital, meaning they are due to a defect of development. They are however not hereditary. This means they are not inherited.

Epilepsy

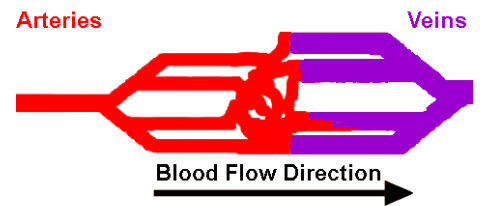
These AVMs may make their presence



Normal Circulation

In the normal situation, red blood (with oxygen) passes through capillaries. The oxygen leaves the blood which without oxygen is blue in colour. The capillaries are very narrow and the pressure driving the blood round falls as the blood passes through them. Thus the pressure in the veins is low.

known with epilepsy. The patient has one or more epileptic attacks and this



AVM Circulation

There are no capillaries so that the red blood (with oxygen) loses very little of its oxygen and remains much more red in colour in the veins. There are no capillaries to reduce the pressure in the blood. Thus the pressure in the veins is higher than normal. Veins are not made to resist high pressures. Thus bleeding may occur.

leads to investigation and diagnosis.

Bleeding

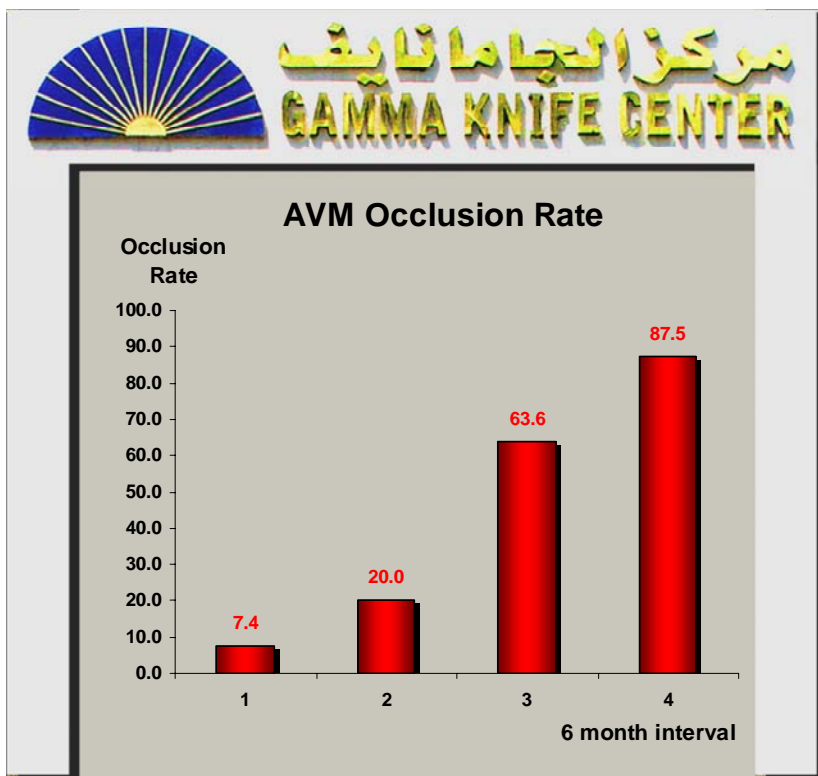
When a bleed occurs the patient may either have severe headache and vomiting starting suddenly. Another thing that may happen is the patient becomes unconscious for a period. On waking up the patient may or may not have some degree of paralysis.

Aims of Treatment

If the problem is epilepsy then medicine is given to help with that. This may or may not be enough. If the problem is bleeding then any damage left by the bleed is treated with physiotherapy and rehabilitation. Damaged brain cannot be replaced or repaired.

It is important to understand that the treatment is aimed at preventing another bleed or in bringing the epilepsy under control. Moreover, patients with epilepsy may bleed later so again the aim of treatment is to prevent that happening.

Thus the purpose of the Gamma Knife is to destroy the AVM so that it may not bleed again. One of the useful side



This chart illustrates the cure rate or occlusion rate as it is called over time. Occlusion means that the AVM is closed and blood may no longer flow through it.

The occlusion rates are measured at 6, 12, 18 and 24 months. It may be seen that the treatment takes time to work. Nonetheless, the great majority to date have closed and become safe within two years which is in keeping with the experience of other centers.

effects is that this will usually improve or even stop the epilepsy.

Treatment

AVMs may be treated by observation, though that is rarer today. Mostly interventions are tried. The commonest forms of intervention are surgery, embolization and radiosurgery (Gamma Knife).

Not all AVMs may be treated. Some are simply too big and complex. However,

once a decision is made to treat the lesion then a further decision must be taken as to which treatment method is best. In many instances a combination of treatments may be required.

Gamma Knife

The Gamma Knife cannot improve any symptoms due to damage done during a bleed. The image to the right shows the destruction rate of AVMs at the

Gamma Knife Center. This chart illustrates also how the successful treatments increase with time. These early results are amongst the best reported.

One of the nicest things about treating this condition is that the patient may in principle return to work and forget the illness. The Gamma Knife also has the advantage that it can treat AVMs which are not possible to treat in any other way

Acoustic Neuromas

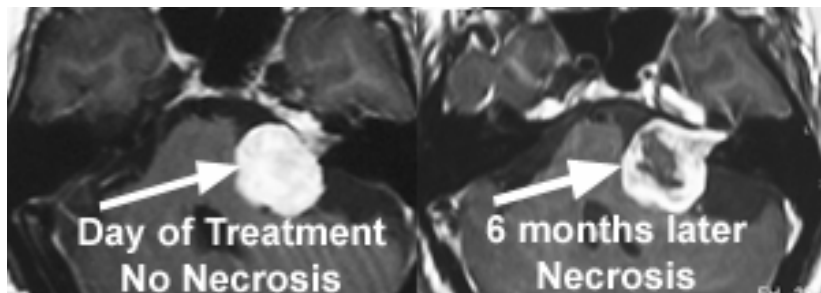
The acoustic neuroma is a benign (non cancer) tumour. It grows from the covering of one of the balance nerves. The acoustic neuroma affects roughly 9.5 people per million. While the acoustic neuroma grows from a balance nerve it is called acoustic because the commonest first symptom is deafness.

The diagnosis of acoustic neuroma is easily made with special hearing tests and the imaging technique MRI. The Gamma Knife has been used to treat acoustic neuromas for over 20 years and has a long record of controlling the growth of smaller acoustic neuromas without the discomfort and complications of surgery. The patients suffer deafness and noises in the ear and balance problems. These symptoms mostly do not get better with treatment but the tumour is controlled and does not then develop into a danger. Over time the annoying symptoms will improve though not the deafness. The biggest problem is to avoid a facial palsy with loss of movement in the face. This is a common complication after surgery. It is not seen in this series of over 60 patients and that is in keeping with the experience of others.

The chart refers to necrosis. This refers to a change on the images where the centre of the tumour ceases to take up contrast on MRI. It is a consistent indicator that the tumour is controlled. Shrinkage occurs later and in our material the frequency of shrinkage is clearly related to the duration of follow up. Only 4 tumours with short term follow up have failed to show this change of contrast enhancement at 6 to 12 months after treatment. This is most encouraging.



Acoustic neuromas are treated to prevent growth. If hearing is preserved then every effort is made to preserve it. In most however hearing is lost. If the tumour shows necrosis or cell death, then it is almost certainly controlled. Shrinkage takes longer. In our series the shrinkage rate is directly related to the time since treatment. The Oedema or swelling shown above was not serious but merely an inconvenience. No patient developed a significant facial weakness which is the Gamma Knife's greatest advantage.

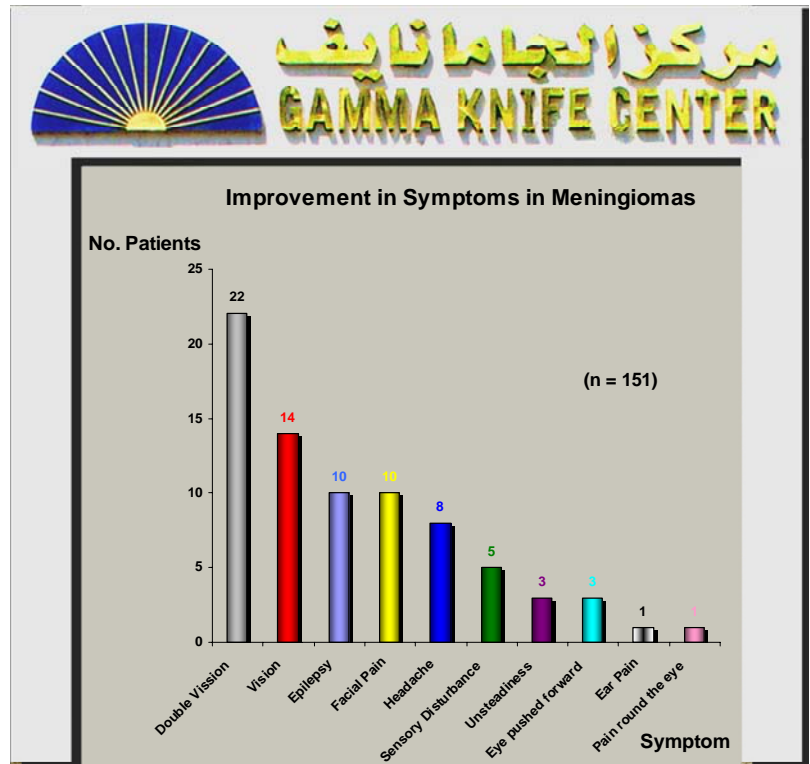


The image shows the tumour on the day of treatment and 6 months later. The loss of contrast enhancement is easy to see in the image on the right. This change will disappear with time so that the tumour returns to the appearance on the left. Nonetheless, the presence of this finding is virtually a guarantee that the tumour is controlled. Later, over the months and years to follow it will also shrink as we are seeing in our patients even though the follow up is still relatively short.

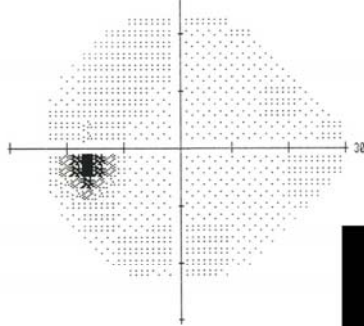
Meningiomas

These are tumours which grow from the membranes surrounding the brain. They are called meningiomas because the medical name of these membranes is meninges. Meningiomas may be large or small, hard or soft. Some may be observed but most need active treatment. They usually turn up after middle age. Many are difficult or impossible to remove by operation because of the blood vessels and nerves that they surround. They are often found in places which are impossible to approach without placing the patient at risk. For these reasons Gamma Knife treatment can be essential if such tumours are to be controlled. The main problem with them is their proximity to important normal blood vessels, both arteries and veins.

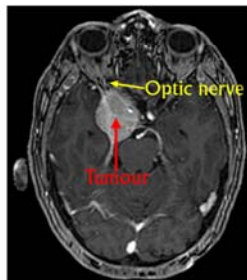
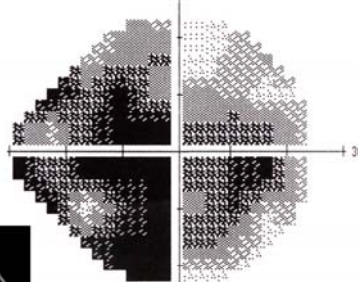
Meningiomas are by far the commonest illness that is treated in the Cairo



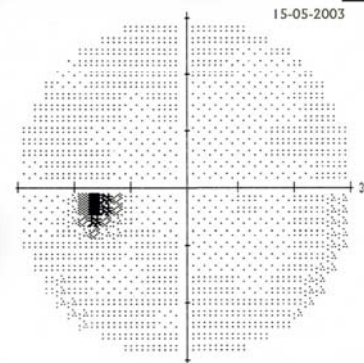
At treatment Left Eye 06-10-2002



At treatment Right Eye 06-10-2002

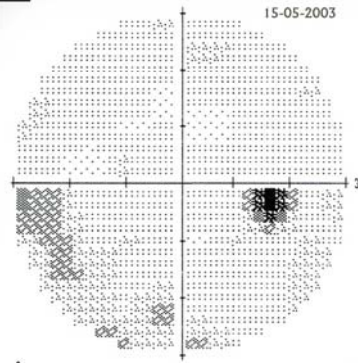


15-05-2003



6 months later Left Eye

15-05-2003



6 months later Right Eye

These are visual field examinations. The black areas are where the vision is lost. As can be seen the vision in the right eye improved significantly over 6 months. The reasons for this are not clear but it is not an isolated. The arrows indicate the tumour and optic nerve entering the front of the tumour.

Gamma Knife. To date over 220 have been treated, of whom 151 have been followed up and form the basis for reported results. In three patients the tumours swelled up for a period and gave rise to uncomfortable symptoms. These were relatively easy to manage and in the end the patients were better than ever after the setback was over. The remaining 147 had no problems but have shown a number of rather interesting findings.

There are multiple places where meningiomas may arise, but in short they may be divided into those arising from the base of the skull and those which are not. The skull base tumours are the large majority (84%). Symptom improvement occurs mainly in them. There is symptom improvement in 71 and no change in 79. Since these tumours shrink slowly the patients are warned that there may be a long while before they notice improvement. So it has been a pleasant surprise to see that improvement occurs earlier than expected. In addition, it is a consistent finding that in 40% of the patients, improvement in symptoms is noted before the tumours start to shrink. This is a new observation.

Another surprising finding is that some patients have had an improvement in vision where none was expected. In fact in situations where the patients

were specifically warned that treatment would damage vision. This is shown in the illustration on the next page.

It was noted at treatment that the nerve to the right eye went through the tumour and in places could not be seen. This meant that the nerve received a radiation dose above what is usually considered safe. This happened and yet at 6 months the vision in the eye was better. How this happens remains a mystery. It has happened more than once. It is just a matter of being grateful but remaining cautious about

vision. Very many of the tumours lie around the nerves from the eye and preserving vision is a major concern in this group of patients.

Timing of improvement

Since it takes years before consistent shrinkage of tumours occurs it is to be expected that symptoms will start to improve after a delay. Examination of our data shows that both subjective improvement of symptoms and the shrinkage of the tumour don't really get going until a year has passed.

Tumour Volume

The Gamma Knife Center staff is frequently asked what is the best size tumour to treat. The answer is of course the smallest one. Nonetheless, the answer is not a simple one since the size of the tumour is only one factor in the total assessment of the patient. Some of the meningiomas treated by the Center have been large by international standards. Nonetheless, with careful technique and attention to detail it does seem possible to treat them safely.

Neurofibromatosis 2

This is a rare hereditary condition with neuromas of the spinal nerve roots, acoustic neuromas and multiple meningiomas. The key to the diagnosis is acoustic tumours on both sides. The large number and spread location of these tumours makes surgery difficult. This is made worse because the facial

and hearing nerves go through the tumour and not round it as in the case of ordinary acoustic tumours. The major aim is to save hearing in the remaining hearing ear. Hearing preservation has been difficult in all types of therapy. In our material, 8 patients were treated with a total of 29 tumours. The table below indicates that to date the treatment has been quite successful in this

aim with only one patient losing hearing. Moreover, this patient had no useful hearing before treatment. The loss refers to a change in the hearing test not to functional hearing. Nonetheless more than 3 years must pass before one can be confident of the results. Even so this is a good beginning.

Patient No.	Tumour No.	Clinical Response
1	1	Completely deaf before treatment. Tumour controlled and shrinking
2	3	Acoustic neuroma and One meningioma show necrosis. One meningioma unchanged. Useful hearing preserved so far.
3	2	Previously operated on both sides. Treatment to remnants. The left ear was deaf. Useful hearing preserved in the right ear so far.
4	6	Bilateral acoustic neuromas and 4 meningiomas. Treatment has induced necrosis and shrinkage in all tumours. Useful hearing with a hearing aid is retained on the right side
5	7	Previous Linac treatment to a left Acoustic neuroma. The Gamma Knife treated the right acoustic neuroma and 6 meningiomas. All tumours controlled and hearing unchanged to date.
6	6	Normal hearing is retained. All treated tumours are under control.
7	1	Right sided tumour grew fast with no useful hearing before Gamma Knife treatment. Hearing on the left is worse but still useful so far.
8	3	Hearing in the right ear was lost before treatment. Hearing test worse after treatment, but no useful hearing before treatment. All tumours are controlled.

Epidermoid Cyst

A very special young lady from Syria, 9 years old was plagued with attacks of an illness which was just like meningitis. Investigations revealed a lump in front of the brain stem. This is a very sensitive large cable conveying messages to and from the brain and body. In addition it contains control centres for breathing and the heart beat. She was twice operated very expertly and a condition called an epidermoid cyst was found. This is a benign lump which is not really a tumour at all but behaves like one by growing and if not completely removed growing back. It consists of an outer wall containing fatty material like dead skin. This is very irritating and leakage produced her repeated attacks of meningitis like illness. This condition has a particular difficult characteristic. The wall of these cysts is fixed to the surrounding nerves and small blood vessels as if it were coated with superglue.

After much consultation it was decided to treat her. She was getting her attacks every three to four weeks. It was explained to her parents that every care would be taken but **this treatment for this condition had never been done before** and that the result was uncertain.

She had one further attack 6 weeks after the treatment. Since that time she has not had a single such attack and is doing well. Thus, it seems there may be a place for the Gamma Knife in this benign but difficult condition.

Epilepsy

There are many forms of epilepsy. Epilepsy is not so much an illness as a way the brain reacts to certain damaging influences, which may be anything from the high fever of a young child to a head injury or tumour at any age. Normally nerves communicate with each other by means of the passage of exquisitely co-ordinated electrical impulses. In epilepsy certain nerve cells discharge large numbers of impulses at the same time resulting in the cramps with which most people are familiar. Epilepsy is mostly treated with tablets. However, some forms prove medicine resistant. Over the years many attempts have been made to use surgical methods for these unfortunate people. Disappointingly there remains only one form of epilepsy which seems to respond to surgery, and that is epilepsy arising from the temporal lobe of the brain. This same form of epilepsy is suitable for treatment with the Gamma Knife, provided that the medical treatment is not sufficient. The number of patients referred is low at present

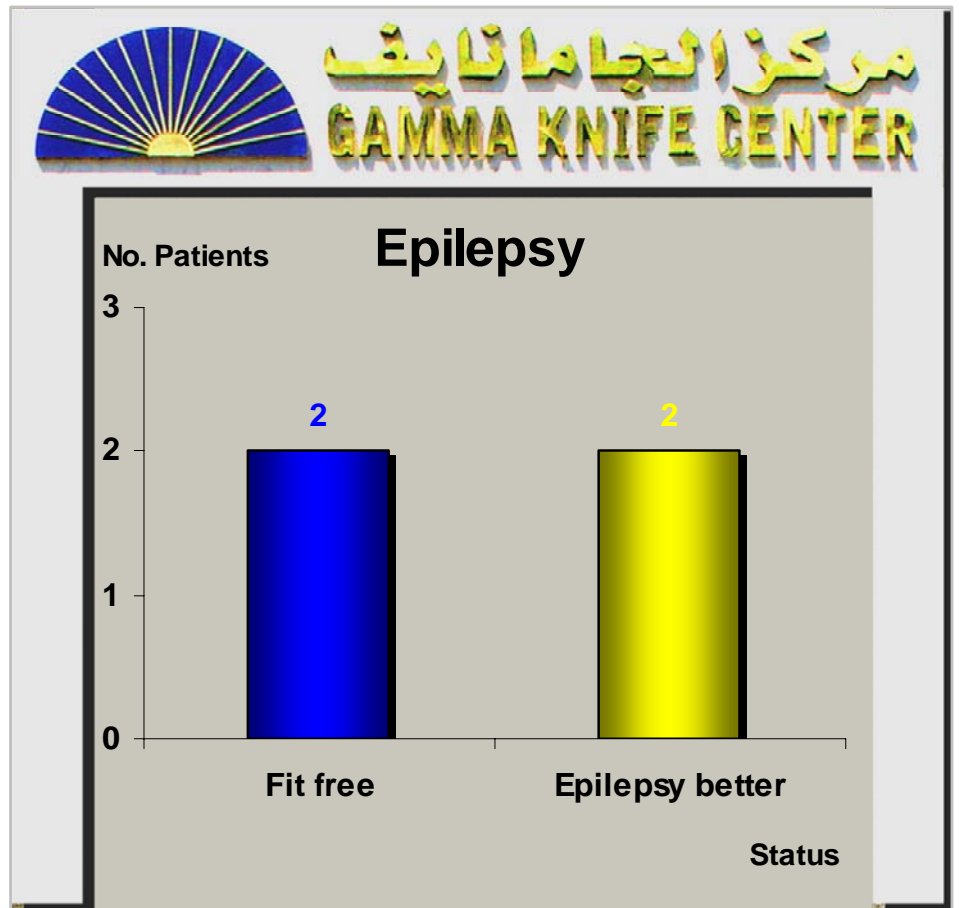
because few people know the advantages of the treatment. It is believed that with increasing awareness the number of patients will increase. The neighbouring chart shows that the treatment is effective. It is very

Epilepsy and Vascular Malformations

A significant number of AVMs and cavernous haemangiomas are associated with epilepsy. Indeed this may be the reason the patient goes to the doctor in the first place. Twenty four of the patients have had AVMs with epilepsy as a significant problem. In 19 patients it improved and in 5 it remained unchanged. Patients who fail to get better often have been messing with their medication.

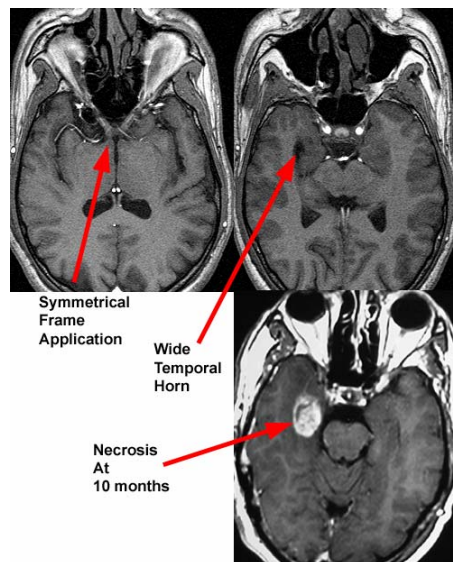
Another factor is that some patients get a single fit within 24 hours of treatment. This of itself does not require treatment. If the attack repeats then treatment will be required.

Cavernous haemangiomas are also associated with epilepsy and in this material 2 improved and 2 were unchanged. But the two unchanged have been messing with their medication.



important to ensure that the patients keep taking their medicine. Failure to take anti-epileptic medication is the most frequent cause of recurrent epilepsy in our experience.

The epilepsy illustrated in the chart above is epilepsy due to previous temporal lobe damage but not associated with a visible tumour or blood vessel malformation. The course following treatment is shown in the illustration below.



The temporal lobe is lower down in the brain and out to one side. It contains a cavity filled with fluid and it is dilated in these patients. In successful cases the death of the sick brain is seen at about 10 months after treatment. To achieve it a dose of 20 Gy will be needed to destroy the sick brain. The treatment replaces open surgery which removes the same bit of brain.

Meningiomas and Epilepsy

Patients with meningioma may also suffer from epilepsy. Twenty of our patients suffered from this problem. Twelve of them were better after treatment while 8 were unchanged. Five of the 8 patients who did not improve were not taking their medicine properly.

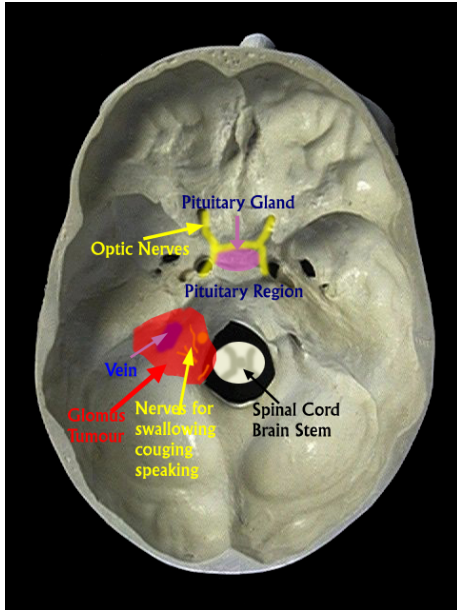
Other factors which could lead to epilepsy are the location of the tumour or the existence of brain damage following surgery. Neither of these factors was of any significance.

Pilocytic Astrocytomas and Epilepsy

There are 11 patients with this diagnosis and epilepsy is common amongst them. Yet again the major cause for lack of improvement in the epilepsy was the patient not taking their medication in the way suggested by the doctor.

Other diagnoses

The previous part of the bulletin have shown some of the commoner diagnoses which the Gamma Knife Center has



This skull base image shows the location of the pituitary gland and the location of a tumour called a glomus tumour. The pituitary gland is near to the nerves of sight. The glomus tumour is near to the nerves controlling speaking, coughing, swallowing and also the brainstem, which conveys nerve messages up and down. Damage to it can produce poor balance. The tumour also grows into the middle and inner ear producing deafness

Pituitary Adenomas

The pituitary gland is a tiny gland hanging under the brain in the center of the head. There are a variety of tumours which may arise there behaving in different ways. There are some tumours which produces symptoms just by expanding. These tend to be larger. There are some which present because of chemicals called hormones which they produce. These are:

1. Prolactinomas

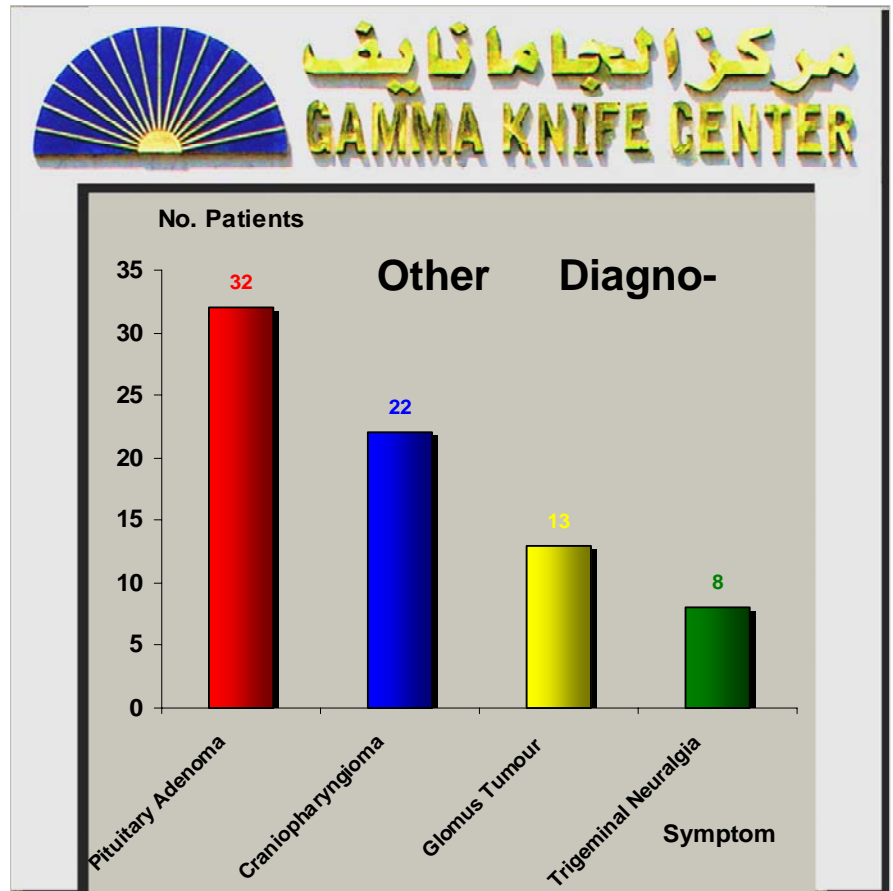
These produce a substance called prolactin in excess. This stops menstruation and fertility in men and potency in men.

2. Acromegaly

In these an excess of growth hormone is produced making for heavy features and big clumsy hands feet and jaws. Also there is a tendency to high blood pressure and diabetes

to manage. There are however a whole range of rarer illnesses, individually uncommon but adding up to a large number of patients. The distribution of

cases treated is shown in the chart below. What follows is a brief account of the management and results with some of these various conditions.



3. Cushing's Disease.

In this the hormone which controls steroid secretion is produced in excess leading to a variety of serious symptoms and disturbances which can be life threatening.

If there is no hormone production treatment consists of removing the tumour or killing it with radiation. If there is hormone excess it is also necessary to stop that over production which may be the major problem and indeed the major danger. Stopping hormone production needs a much higher dose of radiation than stopping a tumour growing so that this group of conditions are not easy to treat.

Tumours not making hormones.

Eight of these have been treated and they are all doing well. The tumour is unchanged or smaller in all the cases, indicating tumour control. All the patients had been previously operated

because in these tumours radiosurgery is never the first treatment of choice. It is rather to be used if surgery fails. It is probably better than radiotherapy which has been used much in the past because the volume of brain irradiated is much less and also the effective dose is higher. Provided care is taken about the nerves from the eyes this should be a fairly risk free procedure.

Prolactinomas

These tumours produce a substance known as prolactin. This is made in the pituitary gland. In men it affects potency. In women it is important for conditioning the breasts for breast feeding. Its correct secretion is also involved in regular menstruation. When the concentration in the blood rises menstruation stops and the woman is not able to have babies.

The standard treatment for these tumours is a medicine called parlodel which both reduces the production of

prolactin and also reduces the size of the tumours. However, not every patient can tolerate the medicine at a dose which works. This failure of treatment is the situation where it is usual to attempt surgery. Gamma Knife treatment has been mainly considered only when other treatments fail. In our experience of 15 patients 11 had received medicine and surgery before the Gamma Knife. Four had just received medicine. It is thus gratifying that with a short follow up 10 of 15 have achieved normal prolactin levels and in many cases started menstruating again. So far the patients are all still taking the medicine. The difference is that it now works at a tolerable dose. Over the next year or two attempts will be made to wean the patients off their

Cushing's Disease

This is the most serious of the illnesses due to an excess of pituitary hormone production. It is very important to cure it and in most cases this is achieved by surgery. However, for one reason or

another surgery is not always possible. The Gamma Knife Center has treated one patient with this disease and after one year her hormones were normal so she is cured.

Acromegaly

This illness means big extremities. It develops very slowly and is often



This picture shows the prominent chin and the extra bone over the eyes, which is characteristic of this illness.

missed by family, friends and even the local doctor, only to be diagnosed at once by a visiting doctor or even medical student. The appearances of the full blown disease are characteristic as shown in the illustrations below.

The appearance is not the only feature of importance though it obviously permits the diagnosis and its improvement is a measure of the success of treatment. Acromegaly is also associated with heart trouble and diabetes so it is very important to normalise the Growth Hormone values. The standard treatment is surgery with a success rate of about 75% in the best hands. However, if surgery fails then the Gamma Knife is a useful secondary line of treatment.

In the 7 patients the Center has treated one has an unchanged growth hormone in the other six the value is falling. None are normal yet but it is still much too early to expect that. So as a start it looks promising.

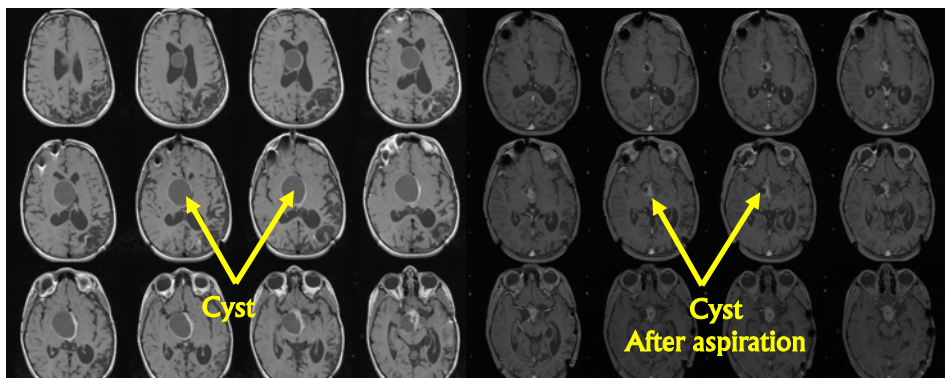
Craniopharyngiomas

This is a very difficult tumour to treat. It lives very close to the same place as the pituitary tumours outlined above. However, it is quite different in nature. It occurs mostly in children and it can impair sexual development and the control of weight. Often large bags of fluid called cysts grow out of these tumours making and the walls of these cysts stick to the surrounding brain. The aim of treatment is to remove solid tumour and permanently collapse the cyst without doing any damage. It is an aim which remains elusive after nearly 70 years of improving treatment. However, the Gamma Knife Center is following a policy pursued at other centers with promising results. The tumour is treated bit by bit and not all in one go. So far this seems very promising.

Nineteen children have been treated. Most have presented with headache, deteriorating vision or drinking and passing water too much. In all cases the tumours remain under control. In some periodic emptying of the cyst is

very well at school and seem to be high achievers.

It will be a long time before the success of this kind of treatment can be stated with certainty. It is possible that the treatment will need modifications



The cyst as such does not respond quickly to Gamma Knife treatment. Thus a special reservoir with a tube is put in place. The tube sits in the cyst and permits it to be emptied if the fluid keeps accumulating. This is a safety valve. It also helps make the total tumour volume less on the day of treatment which improves the efficiency and the safety of the treatment.

necessary. The children are a striking group because most of them are doing

along the way. This is however a good start in what is quite a large series for such an uncommon tumour.

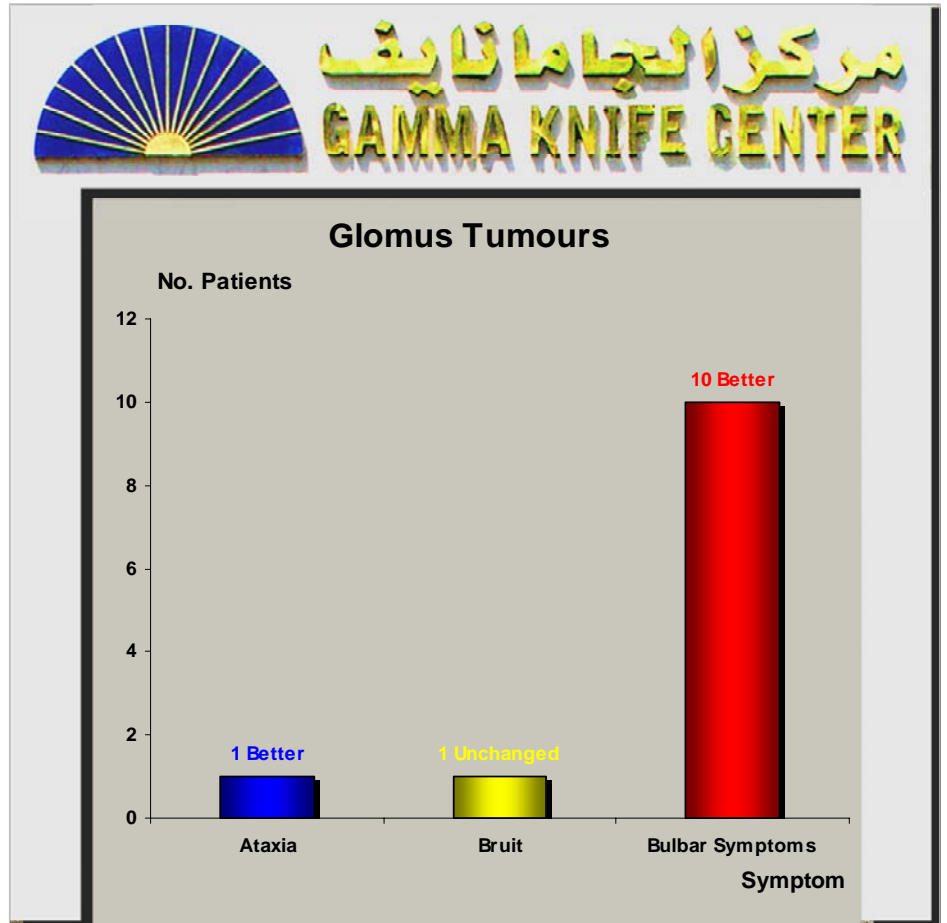
Glomus Tumours

The Glomus tumour location is shown in the figure on page 9. This tumour is benign and slow growing. However, it is very difficult to treat. The reasons are as follows. It grows into bone which makes it difficult to eradicate. It also means that it grows into the inner and middle ear producing a mechanical deafness. It has an extremely rich blood supply which means that at surgery the operation field is constantly obscured. There are important nerves controlling the vocal cords and swallowing which pass through the base of the tumour and are very difficult to visualise, identify and avoid. Finally, it compresses the brainstem which can also affect the voice and swallowing and in addition can lead to unsteadiness when walking. (These symptoms are called bulbar symptoms) Because of all these factors surgery has been plagued with complications and conventional radiotherapy has at best an uncertain effect. The Gamma Knife has been used round the world for these rare tumours and the Gamma Knife Center in Cairo has treated 12. The results have been rather surprising and are shown in the accompanying chart.



This boy before treatment (on the left) has his head tilted to the right with the chin rotated to the left. This is typical of damage to the 11th cranial nerve (nerve in the head). The head is straight at 6 months as seen on the right.

What has been truly surprising is that in common with the meningiomas the improvement has not been related to a reduction in size of the tumour. Moreover, there is more improvement than had been expected. In many instances the symptoms which improve cannot easily be illustrated since coughing and speaking cannot be put in print. However, the illustration above does show a concrete visible improvement after a few months.

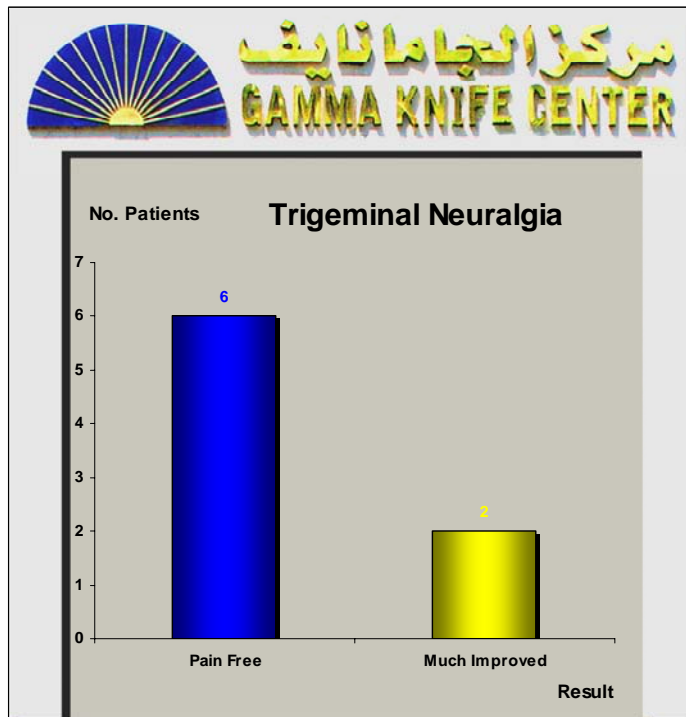


Trigeminal Neuralgia

This is a relatively common condition which produces facial pain of a characteristic type. There is nothing to find on examination so the whole diagnosis rests on the patient's account of his/her illness. The pains occur in

lightning attacks of short duration. The pain may be induced by touch, hot, cold, chewing, swallowing and a variety of other stimuli. The most common treatment is a drug called tegretol. This controls most people but not all. However, if this drug fails the alternatives

involve intervention either with an injection or an operation. These are major and uncomfortable procedures. In recent years the Gamma Knife has been tried in order to replace the more invasive and painful methods. It has had a great measure of success and is now being used at the Gamma Knife Center for this indication. All patients are still taking tablets but now 6 are pain free and the other 2 are relieved enough to be content.



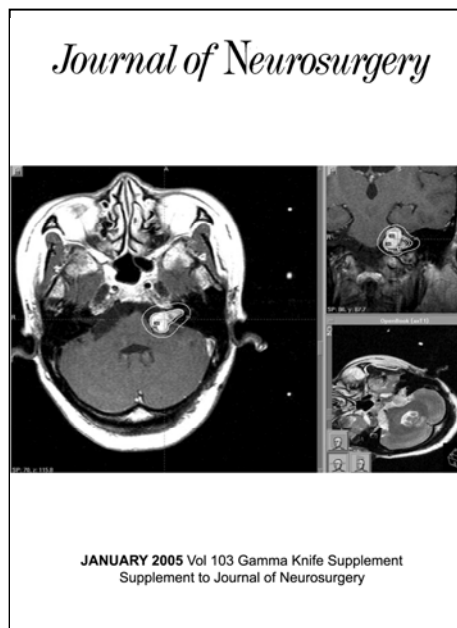
The Gamma Knife Center Cairo An International Center



Mr. Moustafa El Asmar, The Gamma Knife Center CEO in Bahrain at a Medical Symposium together with the Bahraini Minister of health and the Egyptian Ambassador to Bahrain.

Much time and effort is put into building contacts and relationships across the region. The meetings where the Center is represented were mentioned on page 4. Above is a picture of the Center's CEO Mr. Moustafa El Asmar at a symposium in Bahrain

The Center also receives frequent visits from foreign guests who in the last year have come from Jordan, Palestine, Syria, Saudi Arabia, Libya, Sudan, South Africa, USA, England, Norway, Sweden, Australia, Belgium amongst others. Foreign guests are always welcome to see what we have to offer.



Finally, the Center is proud to still provide the editor of the International Gamma Knife Society Proceedings which are published in neurosurgery's top professional journal, The Journal of Neurosurgery.