CONCLUSIONS

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- Trans-catheter intra-arterial therapies and local thermal ablation have proved valuable in the battle against primary and secondary hepatic malignancies.
- Although unresectable primary and secondary hepatic malignancies are associated with high morbidity and mortality, loco-regional therapies hold much promise.
- The unique aspects of all such therapies are their minimal toxicity profiles and highly effective tumor responses while normal hepatic parenchyma is preserved.
- The results of our study show that loco-regional techniques were safe and effective in the treatment of metastatic cancer as demonstrated by a minimal complication rate, acceptable tumor response, and sustained reduction of tumor markers levels
- When using transarterially delivered therapies or loco-regional ablation techniques, meticulous patient selection and careful planning and execution are imperative and should be carried out with the participation of interventional and diagnostic radiologists, and medical and surgical oncologists.
- Despite these major advances in catheter techniques, imaging, and administration, further investigation remains warranted.
- Further investigations of survival statistics with these therapies and of the clinical applicability of gene therapy are still needed.

RECOMMENDATIONS

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Loco-regional interventional techniques should be considered one of the most effective and reliable treatment options for unresectable chemo refractory LM. Every physician should keep in mind that **Loco-regional interventional techniques** provide an adequate solution for the more advanced LM.

Co-operation between physicians from different departments ***(hepatologists, surgeons, oncologists and interventional radiologists)*** is mandatory to determine and provide the most beneficial therapeutic options for these critical patients.

If there are **lesions in both lobes,** the lobe with the largest tumor load is embolized first. TACE should be restricted to a single lobe or major branch of the hepatic artery at one time. The patient may be brought back after 1 month, to complete the procedure in the opposite lobe.

Three-dimensional **volumetric assessment** of the tumor may be performed in preference to the uni-dimensional or bi-dimensional evaluation. As it allows better understanding of the fluctuations in actual tumor size.

Future imaging evaluation of tumor response should routinely incorporate both anatomic and functional information of the tumor burden (PET/CT ,DWI.,SPECT).

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PROTOCOL

EVALUATION OF THE ROLE OF INTERVENTIONAL RADIOLOGY IN THE MANAGEMENT OF METASTATIC LIVER TUMORS.

تقييم دورالاشعه التداخليه في علاج أورام الكبدالثانويه

Protocol of a thesis submitted	خطة بحث مقدمة
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In partial fulfillment of the	إيفاءً جزئي
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INTRODUCTION

Malignant liver tumours are considered among the most common and lethal neoplastic diseases in Egypt, . Malignant liver tumours are significantly more prevalent among older age groups than younger age groups [1] .

Malignant liver tumors may be primary or secondary to other tumors. Primary hepatocellular carcinoma (HCC) is a highly malignant tumor of liver cell origin showing poor prognosis. Liver metastases from colorectal tumors are the most common hepatic metastasis ; the majority of cases of such metastases are inoperable and have a similarly poor prognosis. [2]

Hepatic metastases present one of the most challenging problems in clinical oncology. Among metastatic tumors to the liver, the most common is colorectal cancer. For colorectal cancer, the liver is the most common site of manifestation and liver metastases are the leading cause of death in such patients . Other tumors frequently developing hepatic metastases include lung, breast tumors, neuroendocrine tumors and gastrointestinal stromal tumors. [3-5]

Currently, the only curative treatment in patients with liver metastases of colorectal cancer is liver resection [5,6]. In addition to systemic chemotherapy, current loco regional therapies of unresectable liver lesions include hepatic arterial infusion of chemotherapeutic drugs, transarterial Chemoembolization(TACE) , radiofrequency ablation (RFA) , cryotherapy, laser-induced thermotherapy (LITT), and yttrium-90 radioembolization [6].

Chemoembolization is defined as a selective administration of chemotherapy usually combined with embolization of the vascular supply to the tumor. This treatment results in selective ischemic and chemotherapeutic effects on liver metastases [7-9] .

Chemoembolization is based on the concept that the blood supply to hepatic tumors originates predominantly from the hepatic artery [10,11]. Therefore, embolization of the hepatic artery can lead to selective necrosis of the liver tumor while it leaves normal parenchyma virtually unaffected [10]. It has been shown that anoxic damage increases vascular permeability and thereby promotes penetration of chemotherapeutic agents into the tumor [12] However, number, location, and size of the tumors, status of tumor capsule, blood supply to the cancer, and the interventional skill of the angiographer might influence the response to chemoembolization treatment [10,12].

Patients selection should be based on having liver tumors of a type known to respond to chemoembolization, such as HCC, colorectal metastases, neuroendocrine metastases, and ocular melanoma metastases and metastases from gastrointestinal sarcomas. Other tumor types have been treated with chemoembolization with little evidence of benefit [13].

In radiofrequency ablation, imaging techniques such as ultrasound, computed tomography (CT) are used to help guide a needle electrode into a cancerous tumor. High-frequency electrical currents are then passed through the electrode, creating heat that destroys the abnormal cells. [9]

In (LITT) a reproducible thermal injury to the hepatic tumors can be produced with neodymium yttrium aluminum garnet(Nd YAG) lasers leading to spherical volume of coagulative necrosis [14].

Cryoablation is a method of insitu tumor ablation in which subfreezing temperatures are delivered through penetrating or surface cryoprobes. [14]

Pre intervention imaging must include ultrasonography & CT to to define the position and size of the lesions to be treated , CTA to assess the patency of the portal vein & the vascularity of the tumor. [14,15]

Follow up with tri-phasic CT scans are obtained routinely after 1 month . CT scans are assessed for Changes in tumor morphology , size, overall liver size, to assess tumor vascularity and development of new lesions or metastases[16] .

Levels of tumor markers are measured routinely before and after intervention. A fall in tumor marker levels indicates a response to the interventional procedures while a subsequent rise in tumor markers levels indicates tumor recurrence, which may lead to the repetition of the interventional procedures [15,16,]

AIM OF THE WORK

The aim of this work is to evaluate the role of interventional radiology in treatment of patients with hepatic deposits.

SUBJECTS

This study will be conducted on 40 patients with hepatic deposits based on their own history, clinical picture, the imaging procedures, Laboratory investigations and/or biopsy referred to the radio diagnosis and intervention radiology department in Alexandria University Hospitals.

METHODS

Each patient will be subjected to the following algorithm:

1. Thorough history taking.
2. Complete physical examination.
3. Pre-intervention evaluation of the patient by:
    a. Triphasic C.T scan of the liver .
    b. Evaluation of tumor markers levels
    c. Liver function tests
    d. Serum urea & creatinine
    e. Serum Albumin & prothrombine time & activity
    f. Complete blood count (CBC)
4. Intervention techniques will include one or more of the following:
- TACE (trans-arterial chemo embolization)
- Radio frequency
- Trans- arterial chemo perfusion
- Bland embolization
5. Routine follow up of the patient after 1month using
    a. Tri-phasic C.T scan
    b. tumor markers levels (only if previously elevated)
6. Further 3months &/or 6 months follow up may be done according to patients condition)The procedure may be repeated in cases of revascularization of the tumor feeding vessels or subsequent elevation of the tumor markers levels by one or more of the previously mentioned techniques .
7. The medical ethics will be respected, the patient will be informed about the procedures, a written consent will be done.

RESULTS

The data obtained from different diagnostic modalities, clinical examination and post-embolization follow up of patients will be collected, tabulated and statistically analyzed.

DISCUSSION

The obtained results will be discussed and compared in view of the available literature.

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ARABIC SUMMARY

الملخص العربي

كان الهدف من هذه الرسالة تقييم دور التقنيات التداخلية الموضعيه (تقنيات الاجتثاث بالكي الحراري وتقنيات الحقن الكيميائي عبر الشرايين) في علاج الاورام الخبيثه الثانويه في الكبد وتحديد المؤشرات المناسبة، الموانع، والآثار الجانبية وفوائد هذه التقنيات.

وتضمن بروتوكول الحقن الكيميائي لدينا استخدام مزيج من عوامل العلاج الكيميائي (ميتوميسين، أدريامايسين، سيسبلاتين) مختلطة مع الزيت المعالج باليود ثم أعقب ذلك حقن جسيمات الإسفنج جلفوم لتحقيق السد الشرياني والانصمام كاملا.

تم تصميم استخدام جسيمات هيدروجيل البولي فينيل الكحول المحمله بعوامل العلاج الكيميائي (إيرينوتكان) كنوع جديد للطريقة لتحسين دقة تسليم عوامل العلاج الكيميائي و تترسب في الغالب داخل أنسجة الورم. .

الإيتريوم-٩٠ المجهرية تحمل بمثابة نقطة مصادر الإشعاع و عند تسليمها عن طريق الشريان الكبدي، تترسب في الغالب داخل أنسجة الورم.

وكانت المعدات المستخدمة في التردد الحراري النظام الطبي ريتا ، ويتكون الجهاز من مولد كهربائي، القطب إبرة، وسادة الأرض. المعدات اللازمة للاجتثاث بالميكروويف تتكون من مولد الميكروويف وأقطاب الإبرة .

في دراستنا، حدثت مضاعفات قليلة، الأكثر شيوعا كانت متلازمة ما بعد الانصمام

نظرا للوقت القصير نسبيا من دراستنا وعدم التجانس النسبي في مجتمع الدراسة، لا يمكن أن تقدر معدلات البقاء على قيد الحياة.

التقنيات التداخلية الموضعيه أثبتت أنها فعالة جدا في التسبب في إزالة التغذيه الدموية للورم وانكماشه. في أطروحة لدينا في نهاية فترة المتابعة، أظهرت ٥٩.٥٪ من المرضى استجابة جزئية، أظهر ٨.٥٪ استجابة كاملة، ..، وكان ٣٢٪ من المرضي لم يستجيبوا للعلاج .

وقد أثبتت التقنيات التداخلية الموضعيه أن تكون مفيدة جدا في تخفيف أعراض المرضى وتحسين أسلوب حياتهم. اعترف العديد من المرضى بأنهم قاموا حياة طبيعية تماما بعد التقنيات التداخلية الموضعيه على الرغم من تدهور الأوضاع قبلها. وكان التحسن الكبير في ظروف المرضى استنتاج شائع جدا في دراستنا.

وكان التقييم باستخدام الاشعه المقطعيه ثلاثيه المراحل علي الكبد و دلالات الاورام معايير الذهب لتقييم مرحلة ما قبل و ما بعد التقنيات التداخلية الموضعيه وكذلك التخطيط للدورات المقبلة و يعد استخدام الاشعه المقطعيه ثلاثيه المراحل علي الكبد على نحوصحيح أمر بالغ الأهمية للتشخيص و تحديد القرار السليم للمرضى.

في هذه الدراسة، تم تقييم الاستجابة باستخدام حجم الورم وفقا للمبادئ التوجيهية لمعايير تقييم الاستجابة في الأورام الصلبة . كما تم استخدام توهج الورم كمؤشر على الاستجابة للعلاج على النحو الموصى به من قبل الجمعية الأوروبية لدراسة أمراض الكبد ولقد ثبت انخفاض في توهج الورم استجابه للتقنيات التداخلية الموضعيه في هذه الدراسة.

من ناحية أخرى.... التغييرات الوظيفية تحدث قبل التغيرات في حجم الورم،و يمكن استخدام التصوير الوظيفي ولا سيما التصوير بالانبعاث البوزيتروني و التصوير بالرنين المغناطيسي الوظيفي خاصه الانتشار المرجح و هذا التصوير لديه القدرة على تحديد الاستجابة المبكره للعلاج .

بناء على نتائج هذه الدراسة نستنتج أن ئ

الملخص العربى

لجنة الإشراف

أ. د. شريف السيد محمود حجاب .....
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تقييم دور الاشعه التداخليه في التعامل مع ثانويات اورام الكبد

رسالة علمية مقدمه من

الطبيب
محسن أحمد عبد المحسن

للحصول على درجة

الدكتوراه

فى

الأشعة التشخيصية والتداخلية

لجنه المناقشه و الحكم علي الرساله **موافقون**

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مقدمة إلى كلية الطب– جامعة الإسكندرية
إستيفاء للدراسات المقررة للحصول على درجة

الدكتوراه

فى

الأشعة التشخيصية والتداخلية

مقدمة من

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بكالوريوس الطب والجراحة - جامعة الإسكندرية، ٢٠٠٢
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