Issue 04/11

Newspaper post

TheSynapse

The Medical Professionals' Network

Exclusive

TheSynapse Magazine 2012 Photography Competition

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Of paradoxes and words

As I attend the various initiatives of Puttinu Cares sprouting practically all over Malta I become increasingly aware of the prevalence of paediatric cancers. Indeed the incidence of cancer in the genral population in Malta has increased over the past few decades (Source: DHIR, Malta). Something which everyone knows, you may say. And with today's medical advances, as our Health Minister, Dr Joe Cassar quoted last month, Cancer may indeed be a Word, Not a Sentence. However personally, I do not find any refuge whatsoever in these statements.

So I ponder on this. Many people have suggested different reasons why the incidence of cancer has increased (apart from better screening, that is). Chemicals used to maximize the yields of husbandry which ultimately end in our Sunday Roast, obesity, more work-related stress affecting more people (including our female counterparts who are ever increasingly being successful at breaking the glass ceiling), changing life-styles such as increased sedentary work, smoking, promiscuity, radiation which enters our food chains including fish and crops, longevity, and the list goes on. It is also worth mentioning that the environment with its array of increasingly resistant viral infections certainly does not help. And obviously Malta is not immune to all this.

However I would like to add a couple of points with respect to the local scenario. The greatest disasters striking Malta in the last century were WWI & WWII. Obviously this entailed considerable loss of lives but not only. There was no hygiene, inadequate food, medicine was lacking, medical technology was almost non-existent and our medical resources were scarce. People (and children) survived because most probably they were able to overcome these hardships ie had a robust genetic makeup. So if a child was weak, it died. There was little or no hope for children to live if they suffered from acute respiratory distress, cardiac problems or acquired a severe infection. In fact it was common practice for parents at that time to have many children, even up to twenty, also to compensate for the loss of siblings. Some or many died, depending on where you lived and your income, which could buy you some comfort and food, relatively speaking.

On the other hand, babies born today including those born prematurely or with a life-threatening medical condition are offered an armamentarium of medicines together with cutting edge technology and medical expertise. Thus they have excellent chances to survive and live a normal so-to-speak life. Something which a child living during any war does not have. The achievements of today's medicine could in fact be depicted in the 1940's as real miracles.

And this is fair and just. Everyone wants his own child to live. But let us reflect on this. This means that most probable, that same child who was helped by modern medicine to survive an acute or chronic life-threatening condition or a severe congenital anomaly is on average, weaker than a normal healthy child.

Now, I ask, if that same weak child/adoloscent is exposed to the factors mentioned previously, doesn't this mean that ultimately this will not only translate into an increased susceptibility to illnesses like any normal healthy child/adoloscent but such transition will proably occur at an earlier stage since the genetic make-up is weaker? In such cases, ironically enough, medicine aided the survival of a child which otherwise would probably have died, but then that same child, during its life, is at its mercy!

And when these weaker subjects will eventually procreate (and the chances of them meeting other weaker partners will gradually increase with time, as more medical advances will help even more patients survive more childhood diseases) doesn't this mean that the same weak genetic profile is propagated? And a vicious circle seems to emerge ... ultimately it seems that by default, medicine is becoming increasingly self-sustaining... S

Ian Ellul

Ian C Ellul

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Medicinal uses:
The ground seeds have been used medicinally to impart a strawberry flavour to unpalatable medicines. They have been used as a condiment with food to stimulate the appetite and aid digestion. The plant has also been used as an antipyretic and expectorant.

Reference: Lanfranco G. Hxejjex Medicinali u ohrajn fil-gzejjer Maltin. Media Centre Print; Malta. 1993

Photography: Guido Bonett ARPS AMPS

Imiquimod cream – a novel patient-administered treatment for malignant and pre-malignant skin lesions

LAWRENCE SCERRI

It is a well established fact that the incidence of sun-related skin damage (photo-ageing) and neoplastic transformation (photo-carcinogenesis) has progressively increased in recent decades as a result of cultural and occupational trends leading to increased sun exposure and use of sunbeds, particularly in Caucasian populations.

Consequences of chronic sun-damage include actinic (solar) keratosis (AK), basal cell carcinoma (BCC) and squamous cell carcinoma (SCC). AK presents as a scaly keratotic plaque which varies in thickness from thin to hypertrophic (including keratin horn). AKs are considered to be mildly pre-malignant, and the rate of transformation to invasive SCC is thought to be less than 1%. In fact most SCCs develop within a pre-existing AK. The in-situ pre-invasive form of SCC is known as intra-epithelial carcinoma or Bowen's disease. Clinically, this can sometimes look similar to superficial BCC. It typically presents as a flat scaly plaque on an erythematous background, rather like a psoriasiform plaque. It is most commonly found on the extremities, but sometimes also on the head, neck and trunk. The commonest clinical variants of BCC are nodular BCC and superficial BCC. Superficial BCC typically presents on the trunk or extremities as flat pink/red annular lesion often with some scale and a subtle raised translucent edge. It may also contain some pigment. Another name for superficial BCC is multi-centric BCC.

Apart from the common UV-related aetiology, AK, superficial BCC and Bowen's disease, have one other thing in common. They exhibit an excellent response rate to treatment with a topical immune response modulator known as Imiquimod (Aldara™). For AKs to respond to imquimod they must not be hypertrophic. Indeed, this product which comes as a 5% cream is licensed for treating these 3 types of lesions, apart from genital warts. Traditional treatments include: cryotherapy, curettage and cautery (C&C), topical 5-fluorouracil, and lately, photo-dynamic therapy (PDT) for AK; cryotherapy, C&C, excision, topical 5-fluorouracil, radiotherapy and PDT for superficial BCC; cryotherapy, C&C, excision, topical 5-fluorouracil and PDT for Bowen's disease.

Imiquimod acts through toll-like receptors, predominantly expressed on dendritic cells and monocytes, to induce production of cytokines and chemokines which promote both innate and adaptive cell-mediated immune response against the dysplastic/neolastic cells.

The recommended treatment regimes are: 5 times a week, Monday to Friday, for 6 weeks for superficial BCC; 5 times a week, Monday to Friday, for 6-12 weeks for Bowen's disease. For AK, it should be used three times per week on alternate days (Mon-Wed-Fri) for 4 weeks. After a 4 week treatment-free period lesions should be assessed and if any lesions persist treatment can be repeated for another 4 weeks. Maximum duration of treatment is 8 weeks.

A box of Imiquimod contains 12 packets, each containing 12.5mg of cream. The cream should be applied as a thin layer to the target area at bedtime and washed off with mild soap and water the following morning. Contact with the eyes, lips and nostrils should be avoided, and hands washed before and after application. No more than one packet should be used at each application. Partially used packets should not be saved or reused. Local skin inflammatory reactions are common. Flu-like symptoms such as malaise, fever, nausea, myalgias and rigors may also occasionally accompany local reactions. Patients should be forewarned about the possibility of these reactions. A rest period of several days may be taken if patients cannot tolerate the intensity of the reaction. The safety of imiquimod cream applied to areas of skin greater than 25cm^2 for treatment of AKs has not been established, and hence should be avoided. Exposure to sunlight should be avoided or minimized during use of imiquimod cream because of the possibility of increased susceptibility to sunburn. The safety of imiquimod in pregnancy and nursing mothers has not been established, and hence caution should be exercised in these situations.

Topical imiquimod represents a novel highly effective patient-administered treatment for non-hypertrophic AKs, superficial BCCs and Bowen's disease. In view of the high incidence of adverse reactions to this agent, prescribers must pay particular attention to appropriate patient selection and should take time to thoroughly explain the treatment regime and common side-effects during the initial consultation.

The safety of herbal medicinal products

EVERALDO ATTARD

The primary aim of the EU, with the registration of herbal medicinal products (HMPs), is the protection of the European citizens from fraudulent and unsafe products. In fact, the EU is rather rigorous on this issue and therefore manufacturers are obliged to deal with safety issues. Although a Traditional Herbal Medicinal Products would have been in circulation for centuries, it is possible that with time, research proves the presence of toxic substances within the product. As herbal remedies are derived from nature, uneven conditions of growth and different varieties of a specific plant species may contribute to the emergence of previously-insignificant plant toxins. This has been also experienced with herbs and plants that are used for culinary purposes. Therefore to ensure the safety of herbal medicines, proof can be demonstrated by employing a battery of *in vitro* and *in vivo* tests.

The classical toxicity assays for herbal medicinal products are genotoxicity tests. These tests are based on the potential damage of plant constituents to DNA. The three most common forms of DNA damage and fixation are gene mutation (a change in the sequence of bases), chromosome mutation (structural alterations) and genome mutations (alterations in the chromosome number).

The front line genotoxicity test is the AMES[1] test. The test is performed by culturing *Salmonella typhimurium* or *Escherichia coli* strains that lack a specific amino acid, such as histidine or tryptophan, and challenging this culture with a suspected mutagen. A mammalian (rat) liver homogenate is added in case a compound requires metabolic activation prior to exhibiting its mutagenic effect. The revertent colonies are counted for the different mutagen concentrations to determine the extent of mutagenesis induced by the suspected compound.

The Mouse Lymphoma Assay is carried out on HMPs that exhibit a positive Ames test. Instead of the bacterial culture, this test utilises a mammalian cell model which distinguishes between gene and chromosome mutation. The result obtained is compared with a database containing information on different chemical entities.

The Rodent Micronucleus Test is appropriate to carry out if the DNA toxicant tested *in vitro* exhibits chromosomal alterations. In this test, the target organ is the bone marrow instead of the liver. Since the test involves the use of live animals, the rational use of animals, and whether the test is actually measuring what is expected, are taken into consideration. On the other hand, the use of an animal model may show more realistic results on the fate of the compounds under test. This establishes whether the compound requires hepatic activation, and whether it reaches the target organ.

Toxicological markers are widely used for herbal medicines, and these are classified into biological and chemical markers. Biological markers may be divided into direct and indirect toxicity indicators. The DNA-methyl green assay is an *in vitro* indirect method that determines the DNA binding capacity of potential toxicants. For potential toxicants which require metabolic activation, an indirect method involving the use of a rat model is utilised. The degree of toxicity can be determined by taking forestomach samples and separating the fragments by planar chromatography. This is typically performed for aristolochic[2] acid. Chemical markers are determined by analytical techniques such as GCMS for the presence of phellandrene in essential oils of plants, and HPLC analysis for the presence of coumarins in plant extracts.

More recently, *in silico* methods have been developed, superseding most *in vitro* and *in vivo* methods. Although *in silico* models are classically used to predict the binding capacity of substrates to receptors, these are now used to determine qualitative and quantitative structure-toxicity relationships (STRs). A STR is a qualitative model that associates the toxic properties with a chemical substructure (structural alert) or a property limit value. This is based on chemical similarities. Quantitative STR relates the structure of the potential toxicant to the toxicity of structures that have been already studied and included in a database. The prediction is not merely on a structural resemblance but on a value-based result with the degree of toxicity.

The technique of toxicogenomics is also a relative prediction tool. In this case, neither whole animals nor cell lines are used for testing. DNA microarrays reveal gene expression when a liver slice model is challenged with the potential toxicant. This data is compared to data of already-established toxicants in a database.[3]

Hepatotoxicity is one of the most important toxic effects, exhibited by substrates, on the human body. Risk assessment for hepatotoxicity is performed in an animal model. Doses are repeated at 28 days, 90 days and after 1 year and the effect is assessed as standard histopathology by light microscopy.[4] These tests are only mandatory for products authorized as medicinal products but not for those placed on the market as food supplements.

If toxicity is established for a marketed herbal medicinal product, this is immediately withdrawn from the market. However, if the product is presented for registration, it is not allowed to reach the market unless it meets the required safety standards. In the latter case, the product may be considered as a 'minus variant' which might require a slight modification. However, this modification should justify a safer profile. S

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KAREN ATTARD
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Management of consumers' pharmaceutical waste in a pharmacy setting - Part II

Incompatible products and liquid medicines

Products that might cause particular hazards if mixed should be kept separately in order to protect from consequences of mixing incompatible products. Thus, liquids, syrups, suspensions, inhalers, creams, ointments will all have to be returned directly to the pharmacist in their original containers and stored in a metal cabinet until the date of collection by a waste carrier.[1]

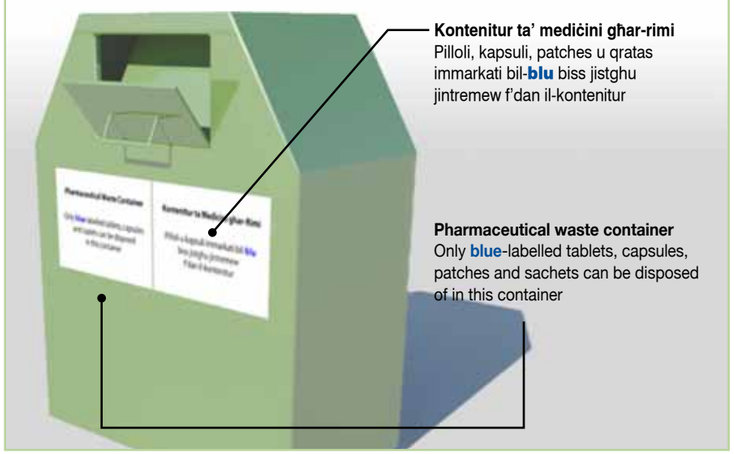
Waste containers

As part of this scheme, consumers will receive durable re-sealable plastic bags to place their pharmaceutical waste. Special waste containers (Figure 1) will be placed in front of pharmacies. They should be made of a metal resistant to corrosion and fire and less prone to theft. The colour chosen (in this case green) should be such that makes the container distinguishable from post boxes and garbage bins. Once the lid is opened, the pharmaceutical waste can be placed and it cannot be retrieved again. Labels will clearly show the purpose of this container and it will instruct what can be disposed of in this manner and what cannot be disposed as such.

The Returned Medicines Register

The 'Returned Medicines Register' (Table 1) is used to keep a record of all the medicines returned directly to the pharmacy. It should be in the form of carbon copy paper so as to give a receipt to the Waste collector upon collection of the waste.[2] The Returned Medicines Register should be concise but still containing all the relevant information needed upon collection, while not very time-consuming.

Figure 1: Open Pharmaceutical Waste Container



Pharmaceutical waste management

It is imperative to distinguish between hazardous medicines and hazardous pharmaceutical waste. They will all be ultimately incinerated, but it is important for them to be segregated at the point of collection.

Hazardous medicines

Hazardous medicines should be returned to the pharmacist by hand. The returned medicines should be left in their original packaging and they should be placed in the specialised sealable bags.

Once returned to the pharmacist, they should be stored in a lockable metal cabinet and logged on the 'Returned Medicine Register'.

Non-hazardous solid dosage forms

Non-hazardous solid dosage forms such as tablets, capsules, caplets, patches and powders (sachets) should be disposed of in their original packaging in the waste container found in front of the pharmacies (Figure 1). Any quantity may be discarded in this manner provided that they are still in their original packaging and they are not hazardous in nature.

Non-hazardous non-solid dosage forms

This refers to syrups, suspensions, creams, ointments and inhalers. These should be left in their original packaging and placed in the special sealable bags before returned to the pharmacist. However these are not disposed of in the waste container to minimise the risk of contamination and mixing of incompatible products but are returned by hand to the pharmacist. Again, all the returns have to be logged on the 'Returned Medicine Register'.

Waste management in the pharmacy

A system should be in place so that each pharmacy should manage its own pharmaceutical waste by returning them to the respective agents. The agents should then contract a private waste management company to manage their waste in an ethical and safe way ensuring total compliance with legislation.

Facilitating the segregation process

In order to facilitate the segregation between hazardous waste ie waste which should be disposed of in the waste container and waste which should be returned to the pharmacist; each medicinal product should be colour coded respectively with small coloured stickers. This can be done either by the manufacturers, by the importers or by staff at the pharmacy during pricing. The colour codes which can be used include:

RED - for hazardous medicines
BLUE – for waste which can be disposed of in the waste containers
GREEN – for waste which should be returned directly to the pharmacist

This is done to help people use the proposed scheme successfully and to minimise errors.

Waste carriers

Waste carriers will be contracted by waste contractors to visit the pharmacies weekly. The waste container is emptied once weekly and the pharmaceutical waste should be collected together with a copy of the register, so as to know what kind of waste is present to reduce hazards when handled, and to allow for eventual safe incineration.

Waste contractors

Waste contractors are companies specialised in the field of waste management. These obtain the necessary permits from local authorities and manage waste of different origin according to European standards. They are in charge of:

- Collecting waste;
- Transporting waste in authorised appropriate vehicles;
- Storing waste in specialised stores when required;
- Ethically and safely managing and disposing of waste as required by European standards.
- Best management practice

The best management practice is High Temperature Incineration (HTI), carried out in a licensed and documented manner to provide a full audit trail.[3] Since Malta does not have an HTI facility which reaches the 1100°C required to incinerate hazardous pharmaceutical waste, the best solution is the exportation of such pharmaceutical waste to incineration sites in the EU for eventual complete destruction.

Acknowledgement

The authors acknowledge the assistance of Mr Clayton Curmi and Mr Nicholas Caruana with the design of the waste containers.

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Table 1: Returned Medicines Register

					Drug type			Reasons why medicine was returned							
Name of Pharmacist	Date	Name of medicine	Formulation	Concentration or dosage	OTC	POM	DDA	Expired	Discontinued by patient	Discontinued by company	Doctor ordered new medicine	Patient felt better	Adverse or allergic reaction	Patient passed away	Other

NICE 2011 recommendations on the management of Alzheimer's disease by acetylcholinesterase inhibitors & memantine

CHARLES SCERRI

The National Institute of Clinical Excellence (NICE) has lately overturned its decision to restrict the use of acetycholinesterase inhibitors and memantine in patients diagnosed with Alzheimer's disease (AD). It is estimated that such a policy U-turn will offer access to a significant number of individuals who were previously denied these medications. This short article will focus on the latest developments and recommendations by NICE on the use of these pharmacological agents in the managment of AD.

AD is the most common form of dementia accounting for about 50-70% of the cases. It is the most common neurodegenerative disorder in the elderly with a prevalence rate that increases exponentially from 2-3% in the general population at the age of 65 years to that exceeding 40% after the age of 85 years. Given the trend towards an increase in the elderly population worldwide, the prevalence of AD is expected to double in the next forty years. In Malta, it is estimated that currently the number of individuals with dementia almost reaches 4,500. This figure is expected to almost double, reaching 2% of the Maltese population by the year 2050[1]. In addition to the huge costs involved in the medical management of AD, its psychosocial burden on caregivers and society in general is enormous.

Pathologically, AD is characterised by the presence of amyloid plaques and neurofibrillary tangles in the brain coupled with significant loss of cholinergic tracts in areas associated with learning and memory. The disease is a multistage process initially characterised by a decline in short-term memory, faulty judgment and personality changes. At later stages, memory decline worsens and activities of daily living and communication skills become gradually impaired. In the final stages, the patient becomes mute, withdrawn, incontinent and unable to walk with the consequence of becoming bedridden and prone to illness and infection.

Acetylcholinesterase inhibitors (AChEIs) were the first pharmacological agents for the management of AD approved by the relevant health authorities. Locally, three AChEIs are clinically available: donepezil, rivastigmine and galantamine. Their major therapeutic effect is reported to be their ability to maintain cognitive function compared to placebo over a three year period or less[2,3]. These drugs are particularly useful in mild to moderate stages of AD. A later addition to the list of drugs recommended for use in AD patients was memantine, a compound that appears to block pathologic neural toxicity associated with prolonged glutamate release[4]. In randomised clinical trials, this drug demonstrated the ability to delay cognitive decline and is recommended for the use in moderate to severe AD.

In 2006, NICE advised that donepezil, rivastigmine and galantamine should only be used to treat moderate stage AD and that memantine should be reserved for clinical studies involving individuals with moderately severe to severe AD. This meant that in the UK, these drugs could not be used to treat the disease in its mild form via the NHS. As expected, these restrictions were met with strong resistance and various organisations across the UK voiced their concerns about this approach, highlighting the need for NICE to reassess its views. These included Alzheimer's Society, Age Concern, Counsel and Care, Dementia Care Trust, the Royal College of Nursing, the Royal College of Psychiatrists and the British Geriatrics Society.

Even Alzheimer's Europe called for NICE to revise its recommendations and allow patients at all stages of the disease to have access to the various drug treatments.

The discussion on the use of such drugs continued and after considering evidence from a number of recent scientific publications on the cost-effectiveness of these agents as well as feedback from drug manufacturers, professional and patients groups and other consultees, NICE reversed its

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Letter to the editor

PROF ALBERT CILIA-VINCENTI

Victor Grech's piece ("Lydgate, brain drain and the Maltese medical profession", The Synapse Magazine, 03/11) touches on a difficult subject indeed. I am not (as stated) a retired doctor, but am now a freelance surgical pathologist and teacher of disease mechanisms who chose to terminate employment by the state monopolies for health services and medical teaching. Some of my reasons for resigning my University position, and to turn down an offered post-age-61 NHS contract, had to do with the content of Professor Grech's feature. I was tired of working far longer hours than some colleagues in other specialities in both the NHS and medical school set-ups. I did wonder whether paying consultants, and senior university teachers, a fee per item of service, rather than a straight salary, would quickly dispose of waiting lists and university teachers' absenteeism. The MAM's main concern has been, for several decades, the maintenance of the "half-day-hospital" status quo (no out-patient sessions in the afternoons, etc) because private practice time is more highly priced than salary and pension rates by top-earning clinicians, who regard "ownership" of teaching hospital beds more remunerative. MAM has never expressed any concern about colleagues who have worked significant number of years for both the British and Maltese NHS and then discover, at age 61, that a good part (if not all) of their Maltese 2/3 pension is withheld, because current Maltese social security law does not permit them to enjoy the two pensions they've contributed to. An important omission in Victor Grech's piece is the recognition of Malta's small size problem. Some might be patting themselves on the back for churning out around 80 new doctors annually, for local postgraduate training programmes, and for the expansion of consultant posts (but still half-day-hospital work pattern). The UK "release valve" for our doctor over-production might gradually close (a population of only 400,000 would not need 80 new doctors annually). A consequence of that might be unethical attempts at "expanding the private market" by punishing unwitting patients with unnecessary expensive tests and procedures for body malfunctions which could otherwise be corrected by nutritional and lifestyle changes (if only the medical school had taught them how to do it). Another problem related to our small size is perhaps best illustrated by a friend of mine who paid to have some ceramic-work lessons and was told that not all the professional skill secrets of the trade were available for sale. I'm sure readers would understand the consequences of similar attitudes in medical postgraduate education. Another problem exacerbated by our small size and private practice is possible obstruction to repatriation of highly skilled doctors, or obstructions to their promotion to senior positions once they return. Readers will forgive me for not having the time to find and quote the precise references, but they might remember that lawyer Giovanni Bonello contributed a few articles to the Maltese Medical Journal, one of which highlighted how local doctors prevented other Maltese doctors from returning after training overseas at the time of the Crusaders, and another one how some of them acquired land as a gift from the Grandmaster.

NOTICE BOARD

Invitation to participate in a survey

As part of an MSc in Public Health Medicine, one of our members is carrying out a study on Medication Errors. You are being invited to participate in a short, completely anonymous survey which may be found on http://www.thesynapse.net/articles/viewarticle.asp?artid=13424. Your cooperation is greatly appreciated.

Doctor Wanted

Ethnically Maltese speaking General Medical Practitioner required to work in Copernicus Clinic, Keilor Downs, Melbourne Australia, in a modern computerised clinic with nurse and auxiliary staff. Will eventually replace retiring doctor. On-site lodging available. Please call +61416296337 or email vsammut@copernicusclinic.com.

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6th Biennial Primary Health Department Conference 2011 to be held on 11/10/2011

Malta's Primary Health Department wishes to invite prospective delegates to submit abstracts for the 6th Biennial Primary Health Department Conference 2011 "Primary Health in Malta - from the Cradle to the Grave?" that will take place at the Westin Dragonara Resort, St Julian's, on Tuesday, 11th October, 2011. The Organising Committee intends to apply for CME / CPD points to be awarded to participants. For further details please click http://www.thesynapse.net/events/view.asp?eventID=131 for the call for abstracts which closes on the 29th July 2011. Kindly book this date in your dairy!

TheSynapse Magazine 2012 Photography Competition

Since the beginning of 2010, TheSynapse magazine front page has featured a photograph of Maltese plants which were renowned for their medicinal properties. We have been lucky enough to be given permission to use these pictures by none other than Guido Bonett who holds various prestigious nature photography awards.

We are pleased to announce the launch of a Photography competition for members of TheSynapse where we invite submissions from all members of the medical professions, including students. The best six photographs will be used for the front page of TheSynapse magazine for 2012. Obviously the photographer will be acknowledged. The theme of the photography competition will be **Malta and Medicine** and you can submit any photo that fits into this broad category. The photographs will be uploaded on to a specific website and anyone can vote for the best picture. Votes from the website will account for 50% of total votes whereas the other 50% will be from a panel of expert and well renowned local photographers who will act as judges. Details of the website address and prizes will be announced in the coming weeks. The Photo Contest Rules, Terms and Conditions may be acessed on **www.thesynapse.net**

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NICE 2011 recommendations on the management of Alzheimer's disease by acetylcholinesterase inhibitors & memantine

decision through the publication of a technology appraisal report in March 2011[5]. Recommendations set out in this guidance report include:

- The three acetylcholinesterase inhibitors (AChEIs) donepezil, galantamine and rivastigmine are recommended as options for managing mild to moderate AD;
- Memantine is recommended as an option for managing AD for people with moderate or severe AD;
- Treatment should be recommended only by specialists and when considered to have a worthwhile effect on the cognitive, functional and behavioural symptoms;
- Patients should be reviewed regularly and treatment adjusted depending on the symptoms as reviewed by a specilised team. The carer's view should also be consulted at follow-up;
- Although treatment with AChEIs should be started with the drug with the lower acquisition cost, an alternative AChEI could be prescribed if found to be appropriate based on adverse event profile, patient compliance, medical comorbidity and dosing regimens;
- Communication difficulties and sensory or learning disabilities should be taken into consideration when assessment scales are used to determine the severity of AD;
- Healthcare professionals should not rely solely on cognition scores in circumstances in which it would be inappropriate to do so, such as in sensory impairments, communication difficulties or level of education.

In conclusion, these latest recommendations by NICE are in line with accumulating evidence showing that these drugs enhance activities of daily living, reduce behavioural disturbances, slow cognitive impairment and decrease caregiver stress thus delaying institutionilisation. Unfortunately in Malta, AD is not among the list of chronic disorders on the Fifth Schedule of the Social Security Act and therefore these drugs are only available in the community as an out-of-pocket expense. It is hoped that the local health authorties follow the example of the majority of countries in the European Union and reimburse AD drugs to all those individuals suffering from this debiliating disease. S

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Management of erectile dysfunction with a novel orodispersible formulation of the PDE-5 inhibitor vardenafil

MARIA CORDINA

Erectile dysfunction (ED) is a medical condition which can affect men of all ages. As men live longer and the prevalence of cardiovascular disease and diabetes continue to increase, the problem of ED will become more prominent. The condition affects men both physically and emotionally. The profound psychological effect that this condition has on men should not be underestimated. A man with the problem of ED may feel robbed of his identity, may develop feelings of dissatisfaction with life in addition to anxiety, depression, low self-esteem and a decrease in quality of life.[1,2]

While it is well know that the treatment for ED has come a long way from painful intracavernosal injection therapies to the widely available, effective, well tolerated phosphodiesterase type 5 (PDE-5) inhibitors, a large proportion of men still fail to seek treatment.[3,4] In addition, the lack of adherence rate of men who have initiated therapy is high, with up to 80% choosing to discontinue therapy.[5]

Various reasons for failing to seek therapy have been proposed including lack of support, fear or denial of the issue, and the possibility that health care professionals do not feel sufficiently comfortable discussing the problem or patients themselves do not feel comfortable broaching the subject.[6,7] In addition, it was found that younger men fail to seek therapy because they believe that their ED will resolve spontaneously, while older men accept it as a natural part of aging.[8]

Different studies have identified several reasons for discontinuation of therapy with PDE-5 inhibitors including ineffective treatment, side effects, partner reluctance, difficulties with general practitioner, embarrassment and financial issues. [9,10]

While failure to seek therapy and discontinuation of therapy may be due to any one factor or a combination of factors listed above, data published in 2001 suggests that the needs of men with ED and their partners are still not being met by the available therapy.[11] Eardley *et al* described the ideal ED drug as one which would be effective, safe, rapid, 'on demand', tolerance free, cheap, no effect on desire, discreet, spontaneous, long acting, unaffected by food drink and other drugs, accepted by partner and curative.[12] While the available oral doses of PDE-5 inhibitors incorporate many of the features stated above, none can be described as 'ideal'. Furthermore, there appears to be the perception by a significant proportion of users that the therapy available is inconvenient.[10]

The availability of the new formulation of the PDE-5 inhibitor vardenafil, as an orally disintegrating tablet (ODT) formulation offers the possibility of increasing convenience, offering a greater degree of discretion, reducing the degree of embarrassment, thereby enhancing patients' adherence to therapy.

Vardenafil OTD can be taken anywhere as it dissolves in the mouth within seconds without the need for water leaving a pleasant minty taste in the mouth.

As an ODT formulation, vardenafil, disintegrates in the mouth by the action of saliva. It is mainly absorbed across the GIT with about 8% being absorbed through the mucus membranes in the mouth, bypassing first pass metabolism thereby providing an improved bioavailability over the film coated formulation. However, the minor differences in pharmacokinetics between the film-coated preparation and the OTD do not have any clinically meaningful effect on onset of action, duration of action and safety.[13, 14]

The safety and efficacy of the new vardenafil formulation has been studied significantly in two phase III clinical studies - the POTENT studies. The key findings demonstrate that the 10mg ODT formulation is:

- equally effective in patient over 65 years of age as those under 65 years of age;
- effective regardless of underlying conditions or co-morbidities of diabetes, dislipidaemia and hypertension;
- effective regardless of severity of ED.

Overall the new formulation of vardenafil 10mg has a safety and efficacy profile similar to the film-coated formulation. [13, 14]

Clinical studies have indicated that OTD formulations are very well

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ALBERT CILIA-VINCENTI

THE SERIES

Healing & Disease Reversal

This series reviews Dean Ornish's evidence-based claims of healing & disease reversal by dietary and lifestyle changes. He is a California University Professor of Medicine in San Francisco. This instalment discusses energy balance and dietary content.

There's no mystery in how to lose weight – burn more calories and/or eat fewer ones – it's all about energy balance. Exercise burns more calories. Simple changes like using stairs instead of the lift, parking a little further from your destination, and walking 30 minutes a day, can make a significant difference – small changes can eventually lead to big improvements.

An easier way than portion control to consume less calories, is to eat less fat, because fat (whether saturated, monounsaturated or polyunsaturated) has more than twice the calories per gram of protein or of carbohydrate. Eating less fat means consuming fewer calories without having to eat less food, thus increasing satiety without adding calories.

Food volume (and not calories) primarily determines how full you feel. Most good (complex) carbohydrates, like fruits and vegetables, are low in fat (low caloric density) and high in fibre, so you feel full before consuming too many calories. Researchers at Pennsylvania State University found that healthy women instinctively ate about 3 pounds of food daily, irrespective of whether the foods were high or low in calories. They found that those on a low-fat diet plus fruits and vegetables lost more weight than those on a low-fat diet alone.[1]

Food consumption data from the US Department of Agriculture's National Food Consumption Surveys (NFCS) and the Continuing Survey of Food Intakes by Individuals (CSFII) states, "Individuals of all ages who consume a diet with fewer than 30 per cent of calories from fat, consistently have lower energy intakes. The data suggest that reducing fat intake is one effective strategy for also reducing total energy consumption. Given the increasing rates of obesity in the US at an earlier age, dietary-fat reduction may be an effective part of an overall strategy to balance energy consumption with energy needs".

Another cause of getting too many calories is consumption of too many bad (simple) carbohydrates. These are low in fibre, and large quantities of calories can be consumed without feeling full. Factory processing and lack of fibre may cause these foods to have a high glycaemic index and often a high glycaemic load, are absorbed more rapidly, causing blood glucose spikes and insulin surges. These surges may cause a reactive hypoglycaemia, increasing hunger and a desire to eat more simple carbohydrates in a vicious circle, sometimes called "carbohydrate cravings". An optimal diet is therefore low in both fat and bad carbohydrates.

Protein also helps increase satiety, and both plant proteins and animal proteins achieve this. However in general, plant-based proteins and seafood-based proteins are more healthy than animal-derived ones.[2] Body weight is inversely associated with dietary fibre and carbohydrates, and is positively associated with protein intake. Meat has virtually no dietary fibre.

Professor Ornish's dietary advice is about abundance, not deprivation – feeling better, not just living longer. He emphasises eating more foods that are beneficial rather than just eating fewer unhealthy ones. There are at least 100,000 substances in foods that have powerful anti-cancer, anti-heart disease, and anti-ageing properties. They include phyto-chemicals, bioflavonoids, carotenoids, retinols, isoflavones, genistein, lycopene, polyphenols, sulforaphanes and others. These protective factors are essentially found in fruits, vegetables, whole grains, legumes, soy products and some fish. These are rich in good carbohydrates, good fats, good proteins, and other protective substances.[3]

Ornish's Preventive Medicine Research Institute conducted a double-blind, placebo-controlled, randomised controlled trial looking at the effects of pomegranate juice in people with coronary heart disease. After only 3 months, they found that blood flow to the heart was improved in those who drank one eight-ounce glass of pomegranate juice each day, whereas patients on placebo got marginally worse.[4]

Other studies are showing that pomegranate juice may help prevent and even slow the growth of prostate cancer and other tumours. A particular study showed that a daily eight-ounce glass of pomegranate juice may reduce the recurrence of prostate cancer. Researchers claim that the effect may be so large as to help older men outlive the disease.[5]

Red wine may be good for your heart, but you can receive similar benefits from unfermented wine, i.e., grape juice. Substances such as flavonoids in grapes help keep arterial walls flexible, improve blood flow and reduce risk of thrombosis. They also help keep blood cholesterol from ending up in your arterial walls. Antioxidants in grape juice appear to linger longer in the body than in wine, according to researchers at the University of California's institute of wine science at Davis, suggesting that alcohol may actually hasten the breakdown of antioxidants in the blood.

Researchers at Harvard Medical School and the National Institute on Aging, report that resveratrol, a natural substance found in the skin of red grapes and red wine, helps reduce the harmful effects of a high-calorie diet in mice and significantly extended their life span. However, the amounts of resveratrol given to the mice were equivalent to drinking 750 to 1,500 bottles of red wine daily.

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Management of erectile dysfunction with a novel orodispersible formulation of the PDE-5 inhibitor vardenafil

accepted by patients and this has led to an improvement in adherence to therapy.[15] In fact a recent study found that acceptance of a PDE-5 inhibitor formulation by patients was high, in which case this could lead to improved adherence to therapy.[10]

This new formulation offers a significant advantage over the film coated formulations in terms of discretion and convenience. It fits much easier into the patient's life style and is removed from the traditional way of 'taking medicine' possibly enabling the individual to feel less like a 'patient'.

Health care professionals should be proactive in seeking to increase awareness regarding availability of therapy for men with ED. They should be comfortable discussing issues related to sexual health and provide an atmosphere of openness which encourages the individual to discuss his problem. Clinicians would be able to make the proper assessment whilst allowing the individual to address any concerns about his condition and the therapies available. Once the communication channels are open, they could also encourage the involvement of partners which, in most cases, is extremely beneficial in obtaining a successful outcome. Since ED may be an indicator of other conditions such as occult coronary artery disease, cardiovascular disease, depression and diabetes, they may take the opportunity to make other health interventions.[16,17]

It is of paramount importance that clinicians are receptive to their individual patient's needs and priorities, and selection of the appropriate therapy made accordingly.

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MARIKA AZZOPARDI

The e-doctor

Many people said it was impossible and a huge risk. We expected this, but all doctors rose to the challenge...

When Hugo Agius Muscat became a medical doctor in 1985, little did he guess that one day he would hang up his coat and sidestep clinical practice. Yet, as National eHealth Co-ordinator within the Ministry for Health, the Elderly and Community Care, he is all but immersed in medicine as never before. Indirectly so, but there you have it.

"The last time I practised was in 2008 and had reduced my family practice to a part-time commitment. Now I am devoted fully to public health practice. I left full-time clinical practice in 1989 to work on health informatics. Do I miss the clinic? I would be lying if I said I didn't."

Dr Agius Muscat speaks of his present responsibilities with utter dedication, recalling the steps along the way. His interest in information and research was discovered during a family medicine vocational course he attended whilst working at Health Centres. He read for a Master of Science in Health Information Science at the University of Warwick and has a Certificate in Hospital Management from Birmingham University. He eventually became Consultant in Public Health Medicine, and later Chief Information Management Officer and Head of Knowledge Management in the Office of the Prime Minister.

Organ recital in Salzburg, 2005

"After five years at OPM, certain policies changed so I decided to return to the Health Department. My studies in health informatics and epidemiology led my "e-profession" to develop in line with "e-developments" occurring within the health services at the time. I became involved in the migration process from St Luke's Hospital to Mater Dei Hospital in 2006, which involved a huge IT tender I was requested to manage as Director of Information Management & Technology."

His mission was not easy – to successfully launch an effective IT system at Mater Dei. One particular date is firmly etched in his mind, 12th November 2007, when ... "Mater Dei went digital overnight during the ward migration process when we introduced what we call the PACS - Picture Archiving and Communication System - whereby medical images are created, stored, transmitted and viewed digitally."

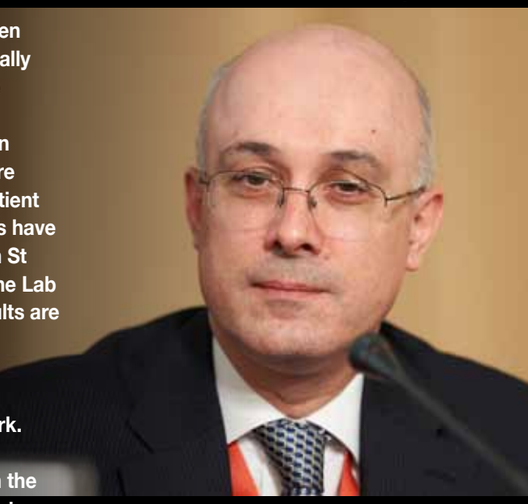
"Many people said it was impossible and a huge risk. We expected this, but all doctors rose to the challenge, even older staff who had no affinity with computer systems. The credibility gap is not always easy to fill when you're promoting new technology. Ultimately, doctors were satisfied with the system – they could prepare a diagnosis on images viewed whilst a patient was still walking to their clinic from the Medical Imaging department, thus facilitating the patient's experience within the hospital setting."

Dr Agius Muscat's work is not technical in itself, but involves change management to improve systems, creating an interface between IT and health. "PACS was an obvious case through which everybody benefited, revolutionising work flow dramatically. Doctors can hardly imagine ever going back to what had been standard practice for so long. It eased the process of consultation between doctors or consultants, especially where emergency services are concerned." Another success was the Laboratory Information System. Today all lab results are sent directly into electronic patient records. Mater Dei laboratories have a shorter turnaround time than St Luke's did and, coupled with the Lab Info System, investigation results are processed faster.

Routine monthly checking of recovery systems ensures everything works like clockwork. MITA has installed increased discipline and good practice in the way Government runs its IT systems. The next big step involves having all patient records go electronic. "Much bedside work is done with patient file in hand – we're considering mobile devices so doctors can access information over Wi-Fi and update immediately. Providing 600+ doctors with such a system involves significant expense and organisation which takes time."

A hot issue concerns access to patient records. Dr Agius Muscat acknowledges the weak link of communication between hospital and family doctors but states the solution isn't to provide unlimited, uncontrolled, continuous access to patient records. Through the 'myHealth Record' system, patients and their trusted doctors will be able to gain access to hospital discharge letters and investigation results. "Patients are more articulate about health issues and more involved in their own health. It is the right of patients to know everything about their health, however control and security around data have to be high. Normal email transmission over standard systems is not secure. Where emergency care is concerned, certain divulgation of information without specific consent is justifiable, but otherwise, patients will be given the option to authorise or de-authorise doctors to access records as required."

We speak of his varied publications ranging from a study on family practice published with Paul Carabott in 1989 to an extensive collection of research studies on old organs in Malta and Gozo, published in 1999.



Ministerial eHealth Conference in Budapest

In a side-track to high-brow IT talk, I prod this doctor cum IT specialist about his other passion – organ playing. "I became first fascinated during 1974, aged 13, during an organ concert by Dun Karm Scerri who was organist at St John's. Today, only four organists hold an LRSM in organ performance, myself, Dion Buhagiar, Frederick Aquilina, and Elisabeth Conrad (whom I tutored)."

He has been an organist at Valletta's St Paul's Anglican Pro-Cathedral since 1983. He also directs the St Paul Choral Society's choir of 60 voices, having established its reputation as a leading polyphonic choir in Malta. Dr Agius Muscat does take a break to spend time with his family, wife, two sons and one daughter ... "At the end of the day, I have more time to dedicate to my family and organ-playing than I had when fully immersed in clinical practice. However, I practise on my electronic organ at home, at night. It is akin to having a pipe organ at home, but of course I have to wear headphones to isolate the sound – otherwise not only my family but all the immediate families in the neighbourhood would raise a chorus of complaint." S

Piles and more... dealing with incompetent veins

ADRIAN MICALLEF

Clinical features vary with the severity of CVI: in general, the more proximal the valve failure, the more severe the effects

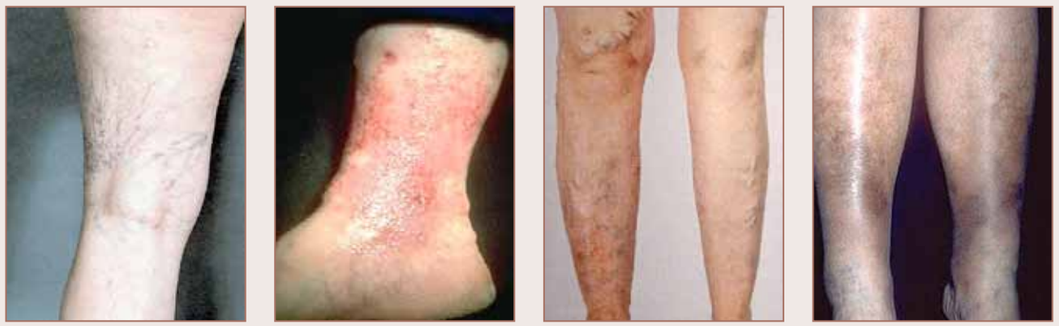
The day that man took his first steps on his two hind legs is considered a milestone in the evolutionary dominance of mankind. Yet this feat has borne with it one huge burden – the human being is just about the only species to suffer from varicose veins and haemorrhoids, the visible effects of venous insufficiency.

Chronic venous disease (CVD) has been described as 'an abnormally functioning venous system caused by venous valvular incompetence with or without associated venous outflow obstruction, which may affect the superficial venous system, the deep venous system, or both'.[1] With the minor inclusion of post-thrombotic syndrome, the majority of CVD can be attributed to chronic venous insufficiency (CVI) which is the pathophysiological mechanism for both abnormal leg veins and haemorrhoids.

Leg veins

The primary pathology here is incompetence of the supporting valves within the deep and superficial venous systems as well as the perforating veins connecting these two systems,[2,3] leading to backflow and clinical sequelae. Valve defects may have a genetic component, and a family history of CVD is a strong risk factor for developing features of this condition. However, external factors definitely play a part in the onset and severity of the clinical expression. A sedentary lifestyle, prolonged standing and wearing of high heels all interfere with the calf muscle pump which is indispensible for efficient venous return. Obesity and pregnancy interfere with venous return and increase back pressure. There is also hormonal influence, which contributes to the increased prevalence of venous problems in women especially in multiparae and those on hormone treatment. Hot environments, cardiac insufficiency and, of course, age are other risk factors for developing CVI.

Figure 1: Initial signs of chronic venous insufficiency



Telangiectasia | Varicose eczema | Varicosities & oedema | Pigmentation

Figure 2: Comparison of different therapeutic approaches to chronic venous insufficiency

	Telangiectasia	Reticular veins	Varicosities	Oedema	Trophic changes	Ulcers	Haemorrhoids
Venotonics	■	■	■	■	■	■	■
Elastic compression	■	■	■	■	■	■	■
Sclerotherapy	■	■	■				
Phlebectomy		■	■				
Stripping		■	■	■			
Hemorroidectomy							■
Ligation							■

■ Positive effect

Clinical features vary with the severity of CVI: in general, the more proximal the valve failure, the more severe the effects. Symptoms include leg heaviness or pain and night-time cramps, worsened with heat and immobility and improving with activity and elevation. The signs of CVI start initially with the appearance of superficial terminal tributaries such as telangiectasis and reticular veins progressing through to varicose veins, oedema, varicose eczema and pigmentation, and ultimately to the appearance of ulceration.

Haemorrhoids

Haemmorhoids can be considered as the local (anal) expression of CVI, with varicosities of the rectal venous plexus being initially asymptomatic but eventually progressing to discomfort, itching, bleeding and eventually acute inflammation and thrombosis. Apart from the general lifestyle risk factors described for leg veins, additional local risks factors include change in bowel habits, prolonged coughing or sneezing, rectal pathology and local trauma (including intercourse).

Management of CVI

The therapeutic objectives of treating CVI in leg veins and haemorrhoids are threefold: (1) immediate clinical improvement; (2) prevention of evolution of venous disease; and (3) prevention of complications such as post-thrombotic syndrome. Unsightly spider and reticular veins are often a reason for referral for cosmetic removal although they may be symptomatic, and can be treated with procedures like sclerotherapy[4] and laser ablation. Sclerotherapy[5] and endovenous ablation with laser or radiofrequency[6] are also effective minimally invasive treatments for minor varicosities, but for advanced disease surgery, vein ligation or stripping is often necessary. Haemorrhoids may also be managed conservatively initially with topical treatment but eventually require interventions such as sclerotherapy, excision or rubber band ligation.

Phlebotonics (venotonics) are a class of recently developed compounds, mostly plant-derived, which have been clinically proven to have a corrective effect on CVI by improving venous tone, decreasing capillary permeability, increasing lymphatic drainage, and reducing release of inflammatory mediators by inhibiting migration and activation of leucocytes.[7] Diosmin is a well studied venotonic in both leg vein insufficiency[8] and haemorrhoids;[9] it is a natural flavonoid and comes in either micronized or coaggregated (600mg) forms; the latter allows for a more convenient dosage regimen for the conditions indicated. This is due to the coaggregation of diosmin, which increases residence time of the active principle in the organism, because of its entry in the enterohepatic cycle.

Of course, improving general lifestyle measures are central to the long-term success of these interventions. Weight loss, a more active lifestyle, wearing correct footwear (maximum of 3-4cm heels), a high-fibre diet, avoidance of hot environment, as well as wearing of support garments and avoiding constrictive clothing are all factors which should be highlighted in the family doctor's surgery when managing this medically important condition.

The signs of CVI start initially with the appearance of superficial terminal tributaries such as telangiectasis and reticular veins progressing through to varicose veins, oedema, varicose eczema and pigmentation, and ultimately to the appearance of ulceration

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Prevention of Hepatitis B, C and HIV... H-CUBE project

CHARMAINE GAUCI

Infectious hepatitis and HIV constitute a major global health risk. At the moment it is estimated that 350 million people are infected chronically with Hepatitis B (HBV), around 170 million people are chronically infected with Hepatitis C (HCV) and 33.3 million are living with HIV. Malta, through the Health Promotion and Disease Prevention Directorate, has joined an EU-funded project targeting these three infectious diseases. This project, named H-CUBE, aims to provide a strong basis for monitoring health determinants in STDs spreading. The general objectives of the project are to identify and disseminate good practices, contents and tools about Hepatitis B, Hepatitis C and HIV training programmes and prevention campaigns. The aim is to help Public Administrations and NGOs in the EU, particularly in Italy, Romania, Greece, Slovenia, Poland, Czech Republic, Bulgaria, Hungary, Cyprus, Malta and Lithuania.

All information gathered is being used to organise, targeted training courses for health care personnel directly involved in the prevention, treatment and support services. Malta at present is conducting e-learning courses for healthcare workers and counsellors. Another target group is parents. This course will help parents become more aware on these specific infectious diseases issues and to be able to give detailed information to their children.

Additionally, prevention campaigns in many meeting venues for young people, the population most at risk of infection, will be organised in the participating countries. In Malta these were launched on the occasion of the first official WHO World Hepatitis Day on the 28th of July and will be ongoing throughout summer. This project is very useful for Malta. These three disease have been identified as priority diseases in an exercise done to identify priority infectious diseases in Malta and ties in well with the sexual health policy which the Ministry for Health, the Elderly and Community Care is fully committed to implement. More information on the project can be found at http://www.hcube-project.eu.

Ultrasound of the wrist ligaments

PIERRE VASSALLO

Injuries of the intrinsic and extrinsic wrist ligaments can lead to chronic wrist pain and carpal instability, while injuries of the triangular fibrocartilage complex (TFCC) are a frequent cause of ulnar-sided wrist pain. In the recent past, magnetic resonance (MR) arthrography was the preferred imaging modality for the evaluation of these structures, but good results can also achieved with standard MR imaging, computed tomographic (CT) arthrography and more recently ultrasonography (US). Advantages of US of the wrist over MR imaging and MR arthrography include: lower cost, no intraarticular injection of contrast material, no ionizing radiation, no limitations due to MR incompatible implants, and real-time visualisation with possible dynamic evaluation. However US is operator dependent and requires high quality equipment.

Imaging should start with radiography, which helps provide crucial information on the osseous anatomy and is an important adjunct in the initial clinical assessment of these structures in everyday orthopedic practice. US has proved valuable in the evaluation of the wrist and hand. It allows visualization of foreign bodies, various tendon injuries and abnormalities, retinacula, ganglion cysts, annular pulleys, vessels, and nerves, including evaluation of carpal tunnel syndrome, joint effusions, and inflammatory arthropathies. The use of US in the evaluation of the wrist ligaments and TFCC is still evolving and has shown promising results.

The anatomy of the ligaments of the wrist is complex. The ligaments are divided into the intrinsic group, which includes those ligaments that lie in between and bridge the carpal bones, and the extrinsic group, which refers to those ligaments lie on the surface of the carpal bones and that attach the palmar or dorsal surfaces of the carpal bones to each other and to the radius or ulna. This arrangement may be oversimplified by stating that the intrinsic ligaments are intraarticular while the extrinsic ones are extraarticular.

The intrinsic ligaments bridge the carpal bones and are named by the bones that attach to. These include the scapho-lunate, luno-triquetral, trapezio-trapezoid, trapezo-capitate, capito-hamate, scapho-trapezio-trapezoid, scapho-capitate and triquetro-capitate ligaments (Figure 1). Of these ligaments, the two most frequently injured are the scapho-lunate ligament (SLL) and the luno-triquetral ligament (LTL). Both the palmar and dorsal components of these ligaments are visible on US (Figures 2-5).

Disruption of the SLL and LTL may cause pain and instability. On plain radiographs, an intercarpal distance of 4mm or more taken with a clenched fist is indicative of an intrinsic ligament tear. A distance less than 4 but greater than 2mm is equivocal, while a distance less than 2mm is normal. It is well known that intrinsic intercarpal ligamentous disruption occurs due to age degeneration and is usually asymptomatic. Ultrasound is able to visualise tears of both the dorsal and volar bands of the SLL (Figure 6a and b) and LTL ligaments.

The extrinsic ligaments are divided into two groups, those on the dorsal aspect and those on the palmar aspect (Figures 7 and 8). At the palmar aspect of the wrist, a triangular area of weakness (called the space of Poirier) is present that lies between the proximal and distal rows of ligaments. This accounts for the frequency in perilunate and lunate injuries and dislocations. The extrinsic ligaments are stiffer, while the intrinsic ligaments are more elastic and allow a greater degree of intercarpal motion.

Ultrasound can visualised all dorsal and palmar extrinsic ligaments with great accuracy (Figures 9 and 10) and tears of these ligaments can be efficiently confirmed with this technique.

The triangular fibrocartilage complex (TFC) is also well visualised (Figure 11). Various types of injury/degeneration of the TFC complex are readily confirmed by ultrasound (Figures 12 and 13).

In conclusion, US shows promising results in the evaluation of the varying normal and abnormal anatomy of the intrinsic and extrinsic wrist ligaments and the TFCC, and provides an alternative imaging method to MR imaging, MR arthrography, and CT arthrography in the evaluation of these structures. With the constant improvement in US technology, standardisation of imaging techniques, increased operator experience, dynamic imaging, and clinical correlation, US may is playing an increasing role in the evaluation of the intrinsic and the extrinsic wrist ligaments and the TFCC. S

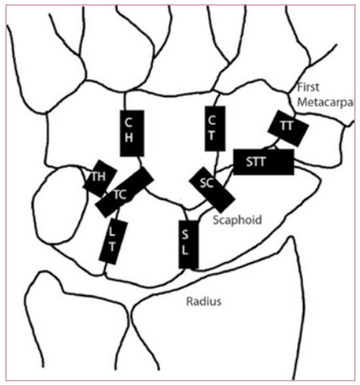


Figure 1: Schematic diagram of the intrinsic ligaments of the wrist

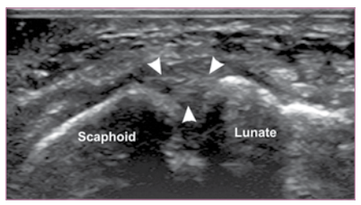


Figure 2: US of the dorsal band of the scapho-lunate ligament

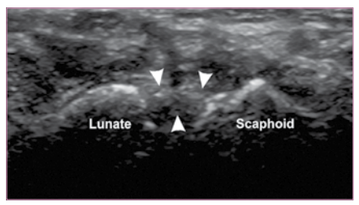


Figure 3: US of the palmar band of the scapho-lunate ligament

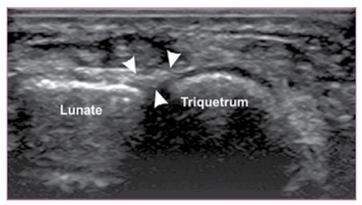


Figure 4: US of the dorsal band of the luno-triquetral ligament

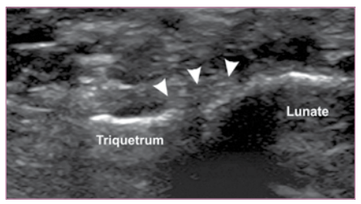
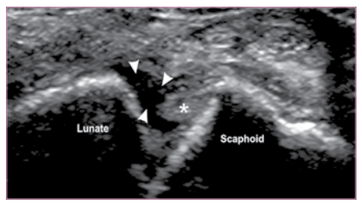


Figure 5: US of the palmar band of the luno-triquetral ligament



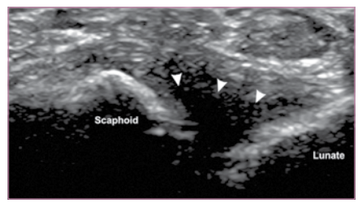


Figure 6: US showing torn dorsal (a) and volar (a) bands of the scapho-lunate ligament

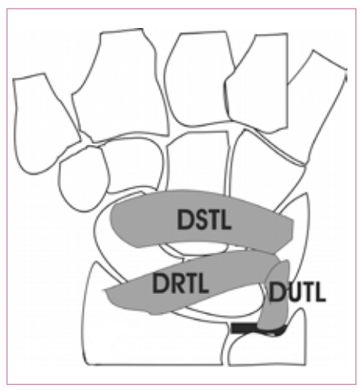


Figure 7: Schematic diagram of the dorsal extrinsic ligaments of the wrist: DRTL = dorsal radio-triquetral ligament, DSTL = dorsal scapho-triquetral ligament, DUTL = dorsal ulno-triquetral ligament

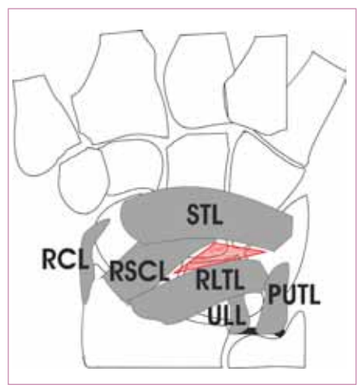
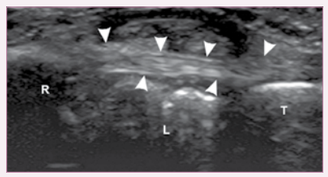
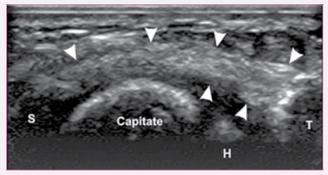


Figure 8: Schematic diagram of the palmar extrinsic ligaments of the wrist: PUTL = palmar ulno-triquetral ligament, RCL = radial collateral ligament, RLTL = radio-luno-triquetral ligament, RSCL = radio-scapho-capitate ligament, STL = scapho-triquetral ligament, ULL = ulno-lunate ligament. The red triangle indicates the space of Poirier





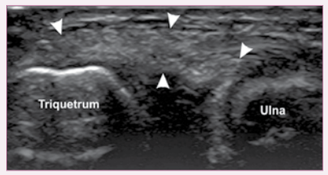
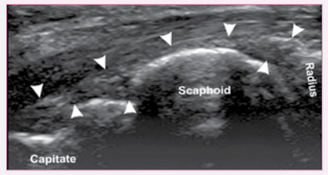
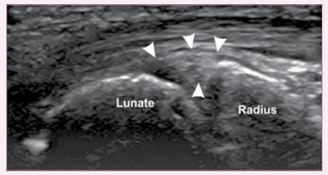


Figure 9: US of the dorsal radio-triquetral ligament (DRTL) (a), the dorsal scapho-triquetal ligament (DSTL) (b) and the dorsal ulno-triquetral ligt (DUTL) (c)

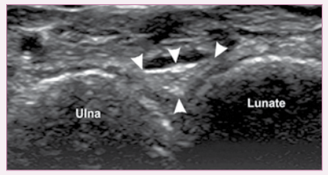
Figure 10



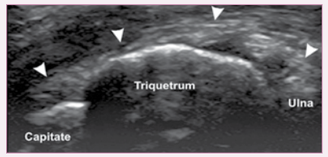
(a), The US of the palmar radio-scapho-lunate ligament (RSLL)



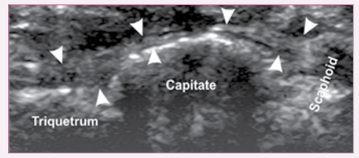
(b) The US of the radio-luno-triquetral ligament (RLTL)



(c) The US of the palmar ulno-triquetral ligament (PUTL)



(d) The US of the palmar ulno-lunate ligament (PULT)



(e) The US of the scapho-triquetral ligaments (PSTL)

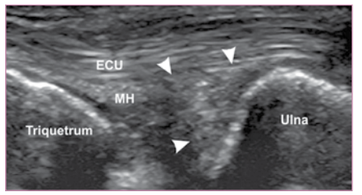


Figure 11: US of the triangular fibrocartilage (arrowheads) filling the gap between the distal ulna and the triquetrium. MH – meniscus homologue, ECU – extensor carpi-ulnaris tendon

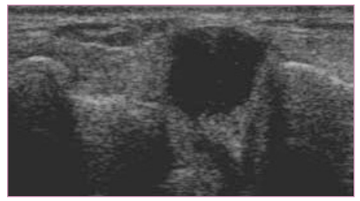


Figure 12: US showing a ganglion within the TFC complex

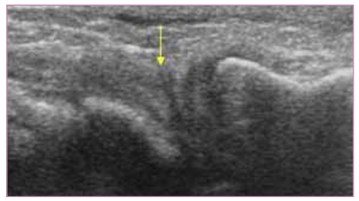


Figure 13: US showing a TFC complex tear (arrow)

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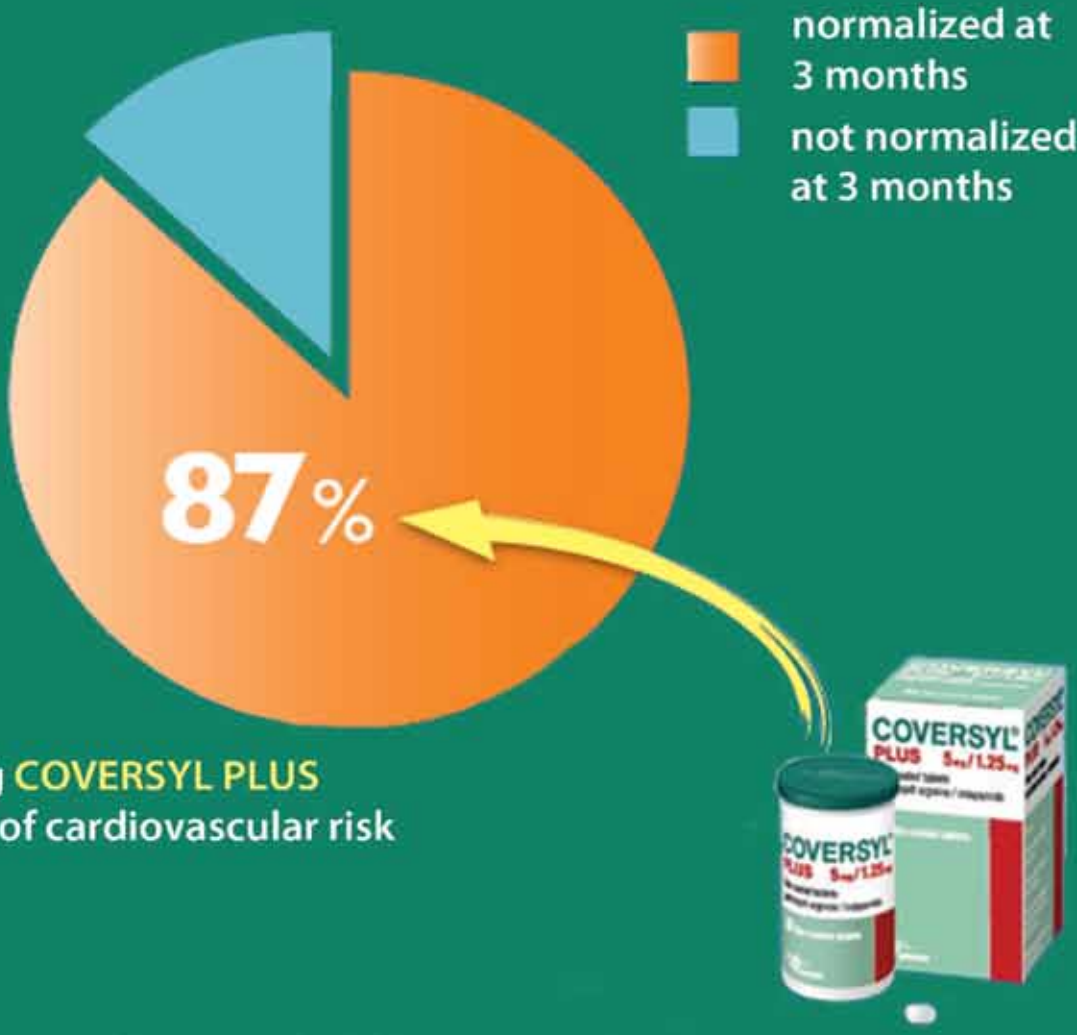

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