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Primary - Secondary Interdisciplinary Care

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Journal of the Malta College of Family Doctors

The mission of the Journal of the Malta College of Family Doctors (JMCFD) is to deliver accurate, relevant and inspiring research, continued medical education and debate in family medicine with the aim of encouraging improved patient care through academic development of the discipline. As the main official publication of the Malta College of Family Doctors, the JMCFD strives to achieve its role to disseminate information on the objectives and activities of the College.

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Novelty beyond the novel coronavirus

Dr Anton BUGEJA

Around three years have passed since the first case of novel coronavirus was detected in China. A few weeks later the World Health Organisation declared a pandemic. The creation and dissemination of a vaccine has since brought a slow return to normality.

There is no doubt that the pandemic changed certain aspects of our lives. For weeks on end social encounters were curtailed while our plans for trips abroad were shelved or modified. Our personal activities were adapted to an online dimension with all the benefits and challenges this brings with it. Our professional life also changed. Many of us have had to restructure their practice and reorganise patient encounters. Dealing with respiratory cases changed drastically and new ways of practicing medicine, such as telemedicine, were embraced. General practitioner (GP) trainees saw their training programme suspended temporarily, then change with their summative assessment modified in ways unthinkable a few months back. Beyond online lectures, meeting colleagues in a venue for a continuing professional development evening now has competing alternatives.

In many ways this reality reflects various other less noticeable changing aspects of our profession. The very meaning of what a general practitioner is has changed over the years, sometimes drastically and suddenly, other times slowly and imperceptibly. The very experience that defined *it-Tabib tal-Familja* by being a doctor working in a town or village treating the patient (one of an extended family of patients) is now unfamiliar to many newcomers within the profession. Likewise, new work opportunities for GPs in management, education and other subspecialties have emerged that were unthinkable two decades ago. Along the years we saw our work modelled by changes in family and social structure and ever-increasing encounters with foreigners and their cultures. We had to update ourselves with numerous and continuous changes in guidelines and the appearance of new investigative technology.

If change, novelty, transformation are part and parcel of being a general practitioner, we need to ask ourselves how this is being communicated to the newcomers in the profession. The Malta College of Family Doctors, fully aware of the need to embrace change, has been pro-active in this regard. It has overseen the rewriting of *A Curriculum for Specialist Training in Family Medicine for Malta* to a new revamped second edition. The monumental task undertaken originally by Falzon Camilleri and Sammut (2009) has now been updated by a good number of our colleagues with the input of an even greater number of foreign peer reviewers. Through this curriculum, trainers and trainees alike are encouraged to undertake "research in the management of change: using evidence from within and outside healthcare." Further recommendations are made in the section entitled "Change Management" in Chapter 7 in this curriculum (Psaila, 2021).

The Journal of the Malta College of Family Doctors (JMCFD) is now ten years old! A small editorial team used the resources provided by the College and the generous contributions of the authors to bring together a journal that will undoubtedly remain a tangible document to what happened in our speciality over the past decade. Although a few words cannot do justice to the hard work undertaken by the contributors,

such anniversary merits at least some general comment. Through the pages of the JMCFD, some colleagues have shared with us studies on areas of their own special interest. Others have tackled evolving themes such as mental health and personal competence to receive treatment. It is satisfying to see how these articles and others have since been reflected in legislative changes or promoted ones that had recently occurred.

Many papers have audited many aspects of local general practice. Although peer review has ensured high standards in such contributions, a review of the conclusions reached in such papers highlights that translation of guidelines into practice is an area where improvement is certainly required. This is certainly achievable and the studies concerning training in our speciality model the way forward. From reflection on defining terminology to repeated high quality auditing and study, various papers have ensured that changes implemented in the training programme are evidence-based and address the needs of the trainees and the objectives of the programme. In view of this it comes as no surprise that our speciality continues to attract many younger colleagues. It is only by studying, auditing and promoting the right changes that we can ensure that general practice continues to flourish locally in the years to come.

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Dr Anton BUGEJA
MD, Cert. Diab (ICGP), FMCFD
Co-Editor JMCFD (till June 2022)
Senior General Practitioner, Primary HealthCare, Malta
Email: anton-carmel.bugeja@gov.mt

Deterioration in general condition secondary to polyarthritis in an elderly patient – a case report

Dr Lara CAMILLERI and Dr Mark FARRUGIA

ABSTRACT

Introduction

Deterioration in general condition is a common presentation in elderly patients. However, it is often a sign of an underlying potentially reversable pathology. As a result, a thorough assessment is often required since it can prove detrimental if left untreated. The following case report gives a clear example of this.

Case Summary

An 83 year old lady was admitted to the acute hospital in view of speech disturbances and lower limb weakness. Her daughter noted an acute on chronic deterioration in general health over the previous weeks. She was found to be hypothermic. The underlying cause was not identified from initial investigations, so she was transferred to a rehab hospital once the hypothermia resolved. She then developed an asymmetrical migrating polyarthropathy involving medium and large joints of the right side of her body. She had a history of gout, so a trial of colchicine was given until blood results were available. She responded significantly and a diagnosis of pseudogout was made.

Conclusion

This is an unusual presentation of pseudogout which often manifests as a monoarticular arthritis. However, multimorbidity and polypharmacy associated with ageing, predispose to atypical presentations of common diseases. In turn, there may be delayed or misdiagnosis leading to inadequate treatment with consequent 'deterioration in general condition'. As a result, a comprehensive geriatric assessment often involving a multidisciplinary team approach is the gold standard management in geriatric medicine.

Key Words

Deterioration in general condition, geriatrics, immobility, atypical presentation, polyarthritis.

INTRODUCTION

'Deterioration in general condition' (DGC) is a common presentation to hospital or clinics amongst people of old age (Aouaneche and Pepersack, 2012). However, this is a broad and non-specific term which may encompass various signs and symptoms. A study conducted by Aouaneche and Pepersack (2012) defined DGC by three main symptoms including asthenia, weight loss and anorexia. More than half the patients admitted with DGC, had an underlying acute medical or surgical pathology and the other 45% had an associated geriatric syndrome (Aouaneche and Pepersack, 2012). This indicates that DGC is often a sign rather than a diagnosis, so the underlying cause should be sought. Moreover, elderly people often have single or multiple chronic diseases associated with polypharmacy, all of which alter the person's physiological response to illness. This may lead to

an unusual presentation of disease, one of which being DGC (Hofman, et al, 2017). This in turn may lead to misdiagnosis and further deterioration with increased risk of hospitalisation and institutionalisation.

The following case report has the following objectives: (i) to highlight how DGC is a sign or symptom rather than a diagnosis; (ii) to raise awareness on how common conditions may present atypically in the elderly; (iii) to raise awareness on hypoactive delirium and (iv) to aid in management planning of polyarthritis in the elderly. Written informed consent for publication of the patient's clinical details was obtained from the patient.

CASE SUMMARY

An 83-year old woman, presented to the emergency department with sluggish speech and lower limb weakness. This was preceded by a two week history of deterioration in general condition which manifested in reduced mobility and functionality. She lived alone but was well supported by her daughter. Pre-morbidly, she mobilised with a stick and was independent in personal activities of daily living. Past medical history included hypothyroidism, chronic kidney disease, congestive heart failure, hypertension, atrial fibrillation, peripheral vascular disease, eczema, diverticular disease, gout and osteoarthritis. Drug history included folic acid 5mg daily, calcium carbonate 500mg daily, allopurinol 100mg alternate days, apixaban 2.5mg twice daily, levothyroxine 50mcg daily and bumetanide 1mg daily. There were no recent changes in treatment.

On admission, she was found to be hypothermic but examination was otherwise normal. A computerized tomography (CT) scan of the brain was normal. In view of her symptoms, a magnetic resonance imaging (MRI) brain was also done which excluded any acute cerebrovascular events. A chest X-ray, serial electrocardiograms (ECGs), and blood tests were also within normal limits, except for kidney failure which was stable compared to previous results. C-reactive protein (CRP) was mildly elevated at 15 mg/l. Thyroid function tests were also normal. Other parameters were stable. She was admitted for active rewarming and intravenous hydration. Bowels were opened regularly, and she did not have any signs of infection or rashes on physical examination. She was noted to have a low urine output and a rising CRP, so urinalysis and urine microscopy, culture and sensitivity were taken. Escherichea Coli was cultivated. However, this was only sensitive to nitrofurantoin, septrin and augmentin which could not be prescribed in view of the low creatinine clearance and penicillin allergy. Moreover, the patient was asymptomatic and the CRP was down trending spontaneously. The patient also reported worsening knee pain since a few weeks before admission. In fact, a knee X-ray was performed where osteoarthritic changes and chondrocalcinosis were identified. However, these were deemed to be chronic in nature and the patient was prescribed paracetamol.

She was eventually transferred to a rehabilitation hospital. Upon transfer, the patient started complaining of neck pain. A cervical spine X-ray was performed and showed severe degenerative changes, osteophyte formation and disc narrowing. The patient denied any headaches, nausea, jaw claudication or visual disturbances and neurological examination was intact. As a result, the neck pain was deemed musculoskeletal in nature, so analgesia with paracetamol and codeine and physiotherapy were prescribed. However, over the next two days, she developed a migrating asymmetrical polyarticular arthritis, where all the large and medium joints of her right side, including shoulder, elbow, wrist, knee and ankle became inflamed, swollen and tender. Small joints were spared. She was afebrile, had no rashes and vital signs were normal. However, the patient's pain was not responding to conventional analgesia and more joints were becoming inflamed. She also reported that since admission to hospital, she was being given allopurinol daily instead of alternate days.

At this stage, the main differential diagnosis, were crystal arthropathy or reactive arthritis but other causes of polyarticular arthritis had to be excluded. As a result, the following investigations were taken:

- Full blood count
- Renal function and electrolytes
- Viral screen including Hepatitis screen, Epstein Barr Virus (EBV), Cytomegalovirus (CMV), Toxoplasma, Human Immunodeficiency virus (HIV).
- Inflammatory markers: CRP and Erythrocyte Sedimentation Rate (ESR)
- Autoimmune screen: Rheumatoid Factor, Antinuclear Antibody (ANA), Antineutrophil Cytoplasmic Antibody (ANCA), Anti-cyclic citrullinated peptide (Anti CCP), Extractable nuclear Antigen (ENA), Anti-ds DNA, Antimitochondrial antibodies (AMA), Anti-smooth muscle antibodies (ASMA), Anti-liver kidney microsomal antibody (LKM), Anti gastric parietal cell antibody (AGPC), Complement (C3, C4), and Serum protein electrophoresis (SPE).
- Creatinine Kinase (CK)
- Uric acid
- Procalcitonin
- Blood cultures
- Urinalysis and cultures
- Thyroid function tests
- Liver function tests

Non-steroidal anti-inflammatory drugs (NSAIDs) were contraindicated in view of her co-morbidities, so a trial of colchicine was started until blood results were available considering her history of gout. Symptoms responded significantly to the colchicine. Blood results revealed the following abnormalities: elevated CRP of 240 mg/L (range 0-5 mg/L), elevated ESR levels of 120 mm 1st Hr (range 33-37 mm 1st Hr), elevated Rheumatoid factor IgM at 151 IU/mL (range 0-15.9 IU/mL), mildly elevated uric acid at 382 umol/l (results before admission were above 420 umol/l), IgA mildly elevated at 5.14 g/l (range 0.70-4.0 g/l) and procalcitonin was also elevated at 0.829 ng/mL (range 0.02-0.046 ng/mL). The other investigations described above were within normal limits.

Consequently, a rheumatology consult was done which concluded that the diagnosis of pseudogout was likely considering the patient's history, marked clinical response to colchicine and the chondrocalcinosis on a previous knee x-ray. It was advised to give a seven-day course of colchicine 0.5mg twice daily and a rheumatology follow-up was organised. The patient's pain resolved, including her knee pain. This allowed her to comply with rehabilitation which enabled her to regain her previous level of functioning and return home.

DISCUSSION

Diagnostic challenges in the elderly

The above case is a typical example of how a common and simple complaint like worsening knee pain can be detrimental to frail elderly people. For instance, no obvious signs of sepsis or biochemical causes for the hypothermia were identified at the emergency department. However, this case occurred during the winter months. The knee pain led to reduced mobility which is a risk factor for hypothermia in the elderly, especially if they do not have proper heating at home. Immobility is also associated with other dangerous consequences including thromboembolism, sarcopenia, falls, increasing frailty, constipation, increased susceptibility to infections specifically pneumonias and urinary tract infections, pressure ulcers, osteoporosis and hypercalcaemia (Guedes, Oliveira and Carvalho, 2018). Immobility will also lead to reduced access to resources especially for those with limited social support, thereby increasing the risk of malnutrition, dehydration and social isolation. Social isolation in the elderly is also associated with sensory deprivation, cognitive decline and possible delirium (Yang, et al, 2009).

This is further complicated by the altered physiological response secondary to age related physiological changes, multimorbidity and polypharmacy, all of which lead to atypical presentation of illnesses (Hofman, et al, 2017). For instance, the patient suffered from both osteoarthritis and gout which have a similar presentation. Moreover, the initial presentation to the emergency department was a stroke mimic with the impaired speech and lower limb weakness. However, this was excluded with MR imaging of the brain. In fact, these symptoms were most likely a manifestation of hypoactive delirium secondary to the pain, immobility and hypothermia.

Confusion and delirium in the elderly

Acute confusion or an altered mental state in the elderly, most commonly occurs secondary to delirium. Delirium results in an acute change in attention, orientation and cognition which fluctuates and occurs secondary to an underlying physiological condition (Yang, et al, 2009). Psychological symptoms might include disorientation, lack of concentration, confusion, hallucinations, language abnormalities, sleep-wake cycle disturbances, restlessness or agitation, reduced mobility or slower movements, change in behaviour, apathy or low mood. Examination findings and physical symptoms depend on the underlying cause (Hosker and Ward, 2017). Moreover, there are different subtypes of delirium. The most commonly mentioned subtypes are those based on the type of psychomotor behaviours, namely hyperactive delirium, hypoactive delirium and mixed delirium consisting of fluctuations between the other two (Gagliardi, 2008).

Hypoactive delirium accounts for around 50% of all subtypes with the mixed type being most common at 80% (Hosker and Ward, 2017). Despite this, hypoactive delirium forms part of the greater proportion of undiagnosed delirium and worse outcome (Gagliardi, 2008; Hosker and Ward, 2017). Misdiagnosis of hypoactive delirium with other causes of cognitive impairment is an important reason of worse outcome. In fact, hypoactive delirium can be easily mistaken for depression or even dementia if the course is protracted (Gagliardi, 2008; Mitchell, et al, 2014). All these can fall under the term of DGC, and one should aim to distinguish between them since two conditions are potentially treatable whereas the diagnosis of dementia carries great stigma and can affect long term planning. The onset and fluctuation of symptoms is a key feature to distinguish between delirium and the other two conditions. However, all three conditions can overlap as highlighted in Table 1 (Gagliardi, 2008; Yang, et al, 2009; Hosker and Ward, 2017).

Hypoactive Delirium, Depression and Dementia

- Cognitive impairment and depression are risk factors for delirium.
- Overlapping symptoms in cognition, mood, and behaviour occur in the three conditions.
- Delirium increases the rate of progression of dementia and may take up to 12 months for delirium to resolve partially or completely.
- Acute events including medical problems, are associated with higher risk of developing depression.
- Dementia is associated with an increased risk of depression.
- A major depressive episode in old age, may exacerbate cognitive impairment and increase the risk of developing dementia.

Table 1: Hypoactive Delirium, Depression and Dementia

Locally the Mini Mental State Examination (MMSE) is a popular tool to assess cognitive impairment. However, this will only indicate the presence or absence of cognitive impairment, but it will not give you the underlying cause, so it is not adequate to distinguish between the three (Mitchell, et al, 2014). The National Institute of Care and Excellence (NICE) delirium guidelines recommend the use of the DSM-V criteria on which multiple assessment tools have been developed including the Confusion Assessment Method and 4AT scores which are more specific to diagnose delirium (Grover and Kate, 2012).

Comprehensive Geriatric Assessment

Cognitive assessment is part of the comprehensive geriatric assessment (CGA) which is the gold standard assessment in geriatric medicine. It incorporates various components including medical, physical, psychological, psychiatry, socioeconomic, functional and nutritional assessments (Parker, et al, 2018). History taking and physical examination are often the first steps of a CGA. A collateral history is often required in those who

have cognitive impairment or communication problems. If done properly, these can often be enough to reach a diagnosis without requiring further investigations. However, this might be difficult in elderly people, especially those who present atypically. In fact, the history and examination will often enable us to formulate a differential diagnosis or a problem list of multiple issues. More often than not, these cannot be managed simultaneously so continuous review and re-assessment is necessary, with possible involvement of other health care professionals.

This is highlighted in the case discussed. For instance, a collateral history was taken from the patient's daughter at the emergency department which reported the acute onset of symptoms, pointing towards a diagnosis of delirium or an acute medical problem as opposed to dementia. Moreover, the history was also useful in identifying a diagnosis of the polyarticular arthritis upon transfer to the rehabilitation hospital. The patient had an established diagnosis of gout which was based on one acute attack involving her first metatarsophalangeal joint two years previously. Gout does not typically present as a polyarticular arthritis but rather as a monoarticular arthritis. This applies for pseudogout, but it differs clinically from gout with regards to the most common joint involvement. For instance, gout affects mostly metatarsophalangeal joints while the knee joint is the most common joint involved in pseudogout (Sidari and Hill, 2018). As a result, the worsening knee pain which was not responding to conventional analgesia before admission which led to DGC, was most likely the primary and typical presentation of pseudogout. Moreover, the patient also reported a medication error where higher doses of allopurinol where prescribed upon admission to hospital. Allopurinol is a xanthine oxidase inhibitor used as a uric acid lowering agent. Although these should be continued during an acute gout attack if the patient was already taking them, any acute reduction in serum uric acid can precipitate or prolong an acute gout attack (Abhishek, Roddy and Doherty, 2017). As a result, the increased doses of allopurinol might have resulted in an acute reduction in serum uric acid which was also evident in biochemical results. This medication error coupled with the untreated acute attack, the patient's co-morbidities, polypharmacy and acute events might have led to the atypical more diffuse joint involvement of pseudogout.

Differential diagnosis of polyarthritis

There are multiple pathologies other than pseudogout, that typically present as a polyarticular arthritis, so these had to be excluded. Table 2 describes different causes of arthritis and their clinical presentations (Baron, Lee and Keystone, 1982; Amezcua-Guerra, et al, 2013; Lahu, et al, 2015; Pujalte and Albano-Aluquin, 2015; Abhishek, Roddy and Doherty, 2017; Sidari and Hill, 2018; Freilich and Larsen, 2018; Alpay Kanites, Celik and Bes, 2019; Salehi-Abari, 2020; Mandi, O'Dell and Romain, 2022; King, Flaherty and Finley, 2022). When clinical signs and symptoms are not enough, further investigations might help the clinician reach a diagnosis.

Table 2: Differential Diagnosis of Arthritis and Clinical Presentation (Part 1)

		*Amount of joint involvement			Symmetry of joint involvement		**Type of joint involvement			*** Onset		**** Progression			Specific joints involved	Other clinical manifestations
		Mono (1)	Pauci (2-3)	Poly (>4)	Symmetrical	Asymmetrical	Small	Medium	Large	Acute	Chronic	Migratory	Additive	Intermitten		
Connective Tissue Disease	Rheumatoid Arthritis (RA)			X	x		x x	x	x	x	x		X		Metacarpophalangeal and interphalangeal	Rheumatoid nodules and joint deformities. Fevers, uveitis, Lung fibrosis
	Systemic Lupus Erythomatosis (SLE)			x	x		x x	x	x	x	x	x			Knees, carpal joints, joints of fingers especially proximal interphalangeal joints	Malar rash Oral ulcers Kidney and lung involvement Drug history due to drug induced lupus
	Scleroderma (SSc)	X	x	x x	x		x x				x			X	Distal interphalangeal joints, first carpometacarpal joint, metacarpal and metatarsal joints	Limited SSc p/w CREST Syndrome Diffuse SSc p/w skin thickening, renal crisis and cardiac involvement Sclerodactyly Raynaud's Phenomenon
	Adult Still's disease		x	x	x		X	x	x	x			X		Wrist, knees and ankles	Fever Evanescent, macular, salmon-pink rash.
	Sjogren's			x	x	x	X	x		x				X	Metacarpophalangeal joints, knees, ankles, shoulders and metatarsophalangeal joints	Arthralgia Keratoconjunctivitis sicca Xerostomia
	Sarcoid			x	x			x		x	x	x	X	X	Ankle joints	Erythema nodosum Acute uveitis Lung involvement
Crystal Arthropathy	Gout	X				X	X		X	X		X			First metatarsophalangeal joint or knees.	Appearance of dactylitis/cellulitis. Gout tophi
	Acute Calcium Pyrophosphate Crystal Deposition (pseudogout)	X		x		x	X	x	x	x		x		x	Knee joints. Upper extremity site as an initial site of inflammation should raise the suspicion	Polyarticular attacks tend to be accompanied by low grade fever.
Vasculitis	Polymyalgia Rheumatica (PMR)		x x	x	x		X	x	x x	x			X	x	Shoulders, Neck and Pelvic girdle	Arthralgia and morning stiffness/stiffness. Low grade fever. Giant cell arteritis with temporal headaches and tenderness. Monocular visual loss.
	Polyarteritis nodosa			x	x		X	x	x	x	x		X		Ankles (joints below the knees)	Rash, gangrene, proteinuria, hematuria hemoptysis, gastrointestinal tract bleeding, stroke, headache, wrist drop. Affects small and medium sized vessels.
	Hanoch Shonlein Purpura (HSP)		x			x			x	x		x		x	Hips, knees, and ankles	Purpuric rash Renal Impairment Affects small vessels
	Granulomatosis with polyangiitis		x	X	x	x	X	x	x	x	x	x	X		Knees and ankles but also small joints of the hands	Charge Strauss- asthma, intermittent lung infiltrates, hypereosinophilia with eosinophilic vasculitis effecting skin, nervous system, and internal organs. Wegener's granulomatosis presents with fever, fatigues, weight loss and reduced appetite with vasculitis causing rash and effecting musculoskeletal and central nervous systems, ear, nose and throat, and internal organs.

Table 2: Differential Diagnosis of Arthritis and Clinical Presentation (Part 2)

		*Amount of joint involvement			Symmetry of joint involvement		**Type of joint involvement			*** Onset		**** Progression			Specific joints involved	Other clinical manifestations
		Mono (1)	Pauci (2-3)	Poly (>4)	Symmetrical	Asymmetrical	Small	Medium	Large	Acute	Chronic	Migratory	Additive	Intermittent		
Spondyloarthropathies	Ankylosing spondylitis		X			X		x	x x		x		X		Mainly spine and sacroiliac joints.	Uveitis Pulmonary fibrosis. Back pain improves with exercise.
	Psoriatic arthritis		x			x	X	x	x	X	x		X		Sacroiliac joints, distal and metatarsophalangeal joints	Psoriatic skin rash Uveitis
	Reactive arthritis		x			X	X	x	x x	x		x	X		Knees	Triad of uveitis, urethritis and enteritis
	Inflammatory bowel disease		x x	X		x	x	x	x x	x		x		X	Knees, ankles, wrists, elbows and hips	Signs and symptoms of Crohn's disease and Ulcerative colitis.
	Polyarticular Juvenile idiopathic arthritis			X	x		x x				x		X		Temporomandibular joint	Pain Joint destruction, osteopenia and osteoporosis. Temporomandibular joint involvement leading to micrognatia, Uveitis and internal organ involvement. Salmon-colored evanescent rash and fever.
Infectious	Bacterial	X				x			x	x		x	X		Knee (50% of cases), hip, shoulder, ankle and wrist.	Fever Pain
	Viral			x	x					x		x	X		Knees	Rash Fever
Other causes	Osteoarthritis	x	x	x		x	x		x		x		X		Interphalangeal joints, first carpometacarpal joint, first metatarsophalangeal joint, knees, hips and facet joints of the lower cervical and lower lumbar spine.	Heberden nodes. Morning stiffness lasts for less than 30 minutes.
	Endocrine disorders		x	x	x	x	x	x	x	x			X		Hands and knees in hypothyroidism, shoulders in hyperthyroidism, ankylosing spondylitis like disease in hypoparathyroidism, Charcot's Arthropathy (foot) in diabetes mellitus	Arthralgia and morning stiffness. Myxedematous arthropathy Synovial thickening, ligamentous laxity and effusion. Signs and symptoms of hypo/hyper-thyroidism
	Malignancy	Adenocarcinoma of the lung, mesotheliomas, and lymphomas have been associated with the development of hypertrophic pulmonary osteoarthropathy manifesting in periostitis of hands and ankles) Lung cancer can present with Jaccoud–like arthropathy manifesting as chronic, rheumatoid like, non-erosive deformities of the hand. Colon cancer and multiple myeloma may be manifest with pyogenic arthritis. Paraneoplastic syndromes can present as remitting seronegative symmetric synovitis with pitting edema. Patients with pancreatic cancer can manifest with an amalgamation of arthritis and panniculitis. Thymoma can manifest as a lupus-like syndrome.														

* Amount of joint involvement:
Monoarthritis = 1 joint, pauciarthritis = 2-3 joints, polyarthritis = more than 4 joints.
** Types of joint involved:
Small joints = metatarso and metacarpo phalyngeal joints, ankle and wrist; medium = elbow and knees; large = hips, shoulders, sacroiliac and spine.
*** Onset: Chronic = present for more than 6 weeks; acute = present for less than 6 weeks.
**** Progression:
Intermittent = Same joint involvement in different attacks and symptoms resolve completely between attacks.
Migratory = Joint symptoms during a particular attack resolve and appear in a different joint in subsequent attacks.
Additive = Joint symptoms persist after attack with involvement of new joints in subsequent attacks.

Table 3 describes the type of investigations indicated in arthritis, together with their findings and clinical relevance (Baron, Lee and Keystone, 1982; Amezcua-Guerra, et al, 2013; Lahu, et al, 2015; Pujalte and Albano-Aluquin, 2015; Abhishek, Roddy and Doherty, 2017; Sidari and Hill, 2018; Freilich and Larsen, 2018; Alpay Kanitez, Celik and Bes, 2019; Salehi-Abari, 2020; Mandi, O'Dell and Romain, 2022; King, Flaherty and Finley, 2022).

Table 3: Investigations of Polyarthritis

3.1 – BIOCHEMICAL INVESTIGATIONS	
Complete blood count	Cytopenias in systemic lupus erythematosus (SLE) Eosinophilia in Churg Straus Vasculitis Polycytemias in myeloproliferative disorders Anaemia in chronic arthritis
Erythrocyte Sedimentation Rate (ESR) and C-Reactive Protein (CRP)	Non-specific and can be elevated in infection, inflammatory conditions and malignancy. CRP usually normal in systemic lupus erythematosus.
Rheumatoid Factor	Rheumatoid Arthritis Systemic Lupus Erythematosus Sjogren's Vasculitis Chronic infections May be positive in malignancy
Antinuclear Antibody (ANA) including titre and pattern	Systemic Lupus Erythematosus Polyarticular juvenile idiopathic arthritis Sjogren's Scleroderma May be positive in healthy females Malignancy
Extractable nuclear Antigen (ENA) – indicated if ANA positive	Systemic Lupus Erythematosus Sjogren's Scleroderma

Anti-ds DNA	Systemic Lupus Erythematosus
Antineutrophil Cytoplasmic Antibody (ANCA)	Rheumatoid Arthritis Vasculitis p-ANCA: Churg Strauss and microscopic polyangiitis c-ANCA: Wegener's granulomatosis
Anti-cyclic citrullinated peptide (Anti CCP)	Rheumatoid Arthritis (High specificity)
Antimitochondrial antibodies (AMA)	Sjogren's Systemic Lupus Erythematosus Autoimmune hepatitis Primary biliary cirrhosis Myocardial dysfunction Chronic infections
Human Leukocyte Antigen (HLA)	HLA B-27 positivity in Ankylosing spondylitis
Anti-Ro ant Anti-La	Sjogren's
Anti-Smith antibodies	Systemic Lupus Erythematosus
Anti-Scl 70 antibodies	Scleroderma
Serum Angiotensin converting enzyme (ACE)	Elevated in Sarcoidosis
Anti-smooth muscle antibodies (ASMA)	Autoimmune hepatitis
Complement (C3/C4)	Elevated in Systemic Lupus Erythematosus
Immunoglobulins (IgA, IgG, IgM)	Elevated IgA in Henoch Schoenlein Purpura
Creatinine Kinase (CK)	Polymyositis Dermatomyositis
Lactate Dehydrogenase (LDH)	Autoimmune haemolytic anaemia Malignancy Myositis Adult Still's disease
Procalcitonin	Bacterial infections Pseudogout Still's disease Vasculitis
Serum Uric Acid	Gout Pseudogout

3.2 – URINALYSIS	
Proteinuria	Systemic Lupus Erythomatosis Vasculitis
Confirmation of a urinary tract infection: Leukocytosis +/- nitrites or positive culture and sensitivity.	Septic arthritis Reactive arthritis
3.3 – RADIOLOGICAL INVESTIGATIONS (X-RAY FINDINGS)	
Bone erosions	Rheumatoid Arthritis Still's disease Scleroderma Gout Psoriatic arthritis Polyarticular Juvenile idiopathic arthritis Bacterial Septic Arthritis Osteoarthritis
Chondrocalcinosis	Acute Calcium Pyrophosphate Crystal Deposition (Pseudogout)
Bone cysts	Sarcoid Gout Osteoarthritis
Sacro-ilitis	Ankylosing spondylitis Psoriatic Arthritis
Osteophytes	Osteoarthritis
Apical lung fibrosis	Spondyloarthropaties Tuberculosis
Hilar lymphadenopathy on Chest X-Ray	Sarcoidosis
3.4 – TISSUE HISTOLOGY	
Temporal arteritis	Giant Cell Arteritis and Polymyalgia Rheumatica
Non-caseating granulomas	Sarcoidosis
Colonoscopy	Inflammatory bowel disease
Eosinophilic Vasculitis affecting small to medium sized vessels	Charge Strauss
Necrotizing granulomatosis with pauci immune vasculitis in small and medium sized vessels	Wegener's granulomatosis

3.5 – SYNOVIAL FLUID ANALYSIS	
Gram stain and culture	Bacterial septic arthritis
Crystals	Negatively birefringent crystals in gout Positively birefringent crystals in pseudogout
White cell count and polymorphonuclear leukocyte count	Moderate raise (2000-50000 per mm^2 and 25-75%): Inflammatory arthritis Significant raise (>50000 per mm^2 and >90%): Septic joint

Management of polyarthritis in the community

At a community level, investigations are often limited to blood tests and plain radiographs. Moreover, access to certain blood investigations is limited to rheumatology or other specialists. For instance, it is important to distinguish between inflammatory and infectious causes of arthritis. Definite diagnosis is achieved by joint aspiration, culture and sensitivity. However, this is not always practical nor feasible to achieve in primary care. Moreover, both conditions will lead to raised CRP and ESR which are more easily accessible. An alternative blood test is the procalcitonin which is a specific serum marker where levels above 0.5 ng/ml were proven to be a reliable indicator for the presence of an acute bacterial infection (Vasishta and Patel, 2019). Consequently, it is often used to differentiate infection from inflammation. However, there were reports of elevated procalcitonin levels associated with inflammatory processes including acute pseudogout attacks, vasculitis and Still's disease (Vasishta and Patel, 2019). In fact, this patient had an elevated procalcitonin level above 0.8 ng/ml, despite the absence of acute bacterial infections. Moreover, Table 3 illustrates that most investigations are not specific to a particular condition but rather can be positive in multiple forms of arthritis. As a result, these need to be used in combination with the clinical picture.

Moreover, in the community setting, it might be more difficult to organise investigations, so results will not be available immediately and treatment might need to be initiated in the interim, especially if the signs are impacting the patient's quality of life. This leads us to the concept of risk assessment and patient centred care in geriatric medicine. For instance, the definite diagnosis of pseudogout is achieved by synovial fluid from joint aspiration showing positively birefringent, rhomboid-shaped crystals (Sidari and Hill, 2018). However, this is an invasive procedure with risk of bleeding and infection. These risks were multiplied in this patient who was on anticoagulation for atrial fibrillation and the risks of stopping the anticoagulation outweighed the benefit of carrying out the investigation. Moreover, colchicine is quite a safe drug when the dose is adjusted for kidney function where the most common side effect is gastrointestinal upset (Abhishek, Roddy and Doherty, 2017). As a result, the benefit of giving a trail of colchicine outweighed the risks in this particular case considering the severe pain, functional impairment and history of gout.

In this particular case, although several investigations were taken, they were not essential to reach a diagnosis of gout. The history was the most helpful part of the assessment for diagnosis. However, conditions other than osteoarthritis, fibromyalgia and gout often require specialised rheumatological treatment, so referral is often indicated. The dilemma lies on the urgency of the referral. There are only few rheumatological conditions that require emergency care as shown in Table 4 and often have extra-articular manifestations (Gutiérrez-González, 2015). Moreover, articular symptoms are often chronic in onset but can be very disabling. In fact, the whole clinical and social picture should be considered when choosing how and where to refer. The impact of the condition on the patient's functionality and coping skills at home should be taken into account. If in doubt, phone consultations with a specialist rheumatology could help in making such a decision or commence any treatment until review at the specialist clinic is arranged.

Table 4: Indications for Referral

ELECTIVE SPECIALIST CARE	EMERGENCY DEPARTMENT
Gout, osteoarthritis and fibromyalgia not responding to conventional treatment. Diagnostic difficulty Connective tissue disorders Vasculitis Spondyloarthropathies	Central nervous system vasculitis Catastrophic antiphospholipid syndrome Septic arthritis Pulmonary renal syndrome Macrophage activation syndrome Always refer acute arthritis associated with fever or hypothermia. Acute Polyarthritis Arthritis associated with acute organ failure Visual or neurological disturbances Coagulation abnormalities Malignancy suspected

CONCLUSION

The objectives of this article were reached since the above case is a clear example of a common aetiology of arthritis which presented atypically in an elderly patient, leading to delayed diagnosis with consequent DGC and hospitalisation. It also highlights the importance of hypoactive delirium as a common cause of DGC in the elderly. Moreover, it emphasises that complex investigations are not always essential to diagnose and treat arthralgia in the elderly, especially if a good history and thorough examination are done.

Joint pains is a common presentation in elderly people where the initial presentation often occurs at a community level. However, the causes can be multiple ranging from benign to sinister pathologies. The initial steps should include establishing the onset (acute, chronic or acute on chronic) and the number of joint involvement (mono, pauci or poly articular). It is also essential to distinguish between inflammatory and non-inflammatory condition to help achieve a diagnosis.

However, clinical diagnosis may be difficult to achieve in elderly people with multimorbidity where the joint pain can be easily misattributed to an established condition. Consequently, it is essential to monitor response to treatment and seek an alternative diagnosis if symptoms persist or worsen. This is especially important if the symptoms are impacting the patient's functionality and quality of life leading to detrimental consequences if adequate treatment is delayed.

Elderly people should not fall victims of time constraints during busy clinics and a comprehensive geriatric assessment is indicated to help reach a diagnosis and form an adequate management plan which should include adequate follow-up and monitoring instructions. Moreover, liaison with other health care professionals will enable a holistic patient centred care.

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Dr Lara CAMILLERI
M.D. (Melit), MRCP (London), Dip. in Geriatric Medicine (London), MRCP Geriatrics, MSc Care of the Elderly (Wales)
Higher Specialist Trainee in Geriatric Medicine, Karin Grech Hospital, Malta
Email: lara.b.camilleri@gov.mt

Dr Mark FARRUGIA
M.D. (Melit)
Foundation Year Doctor, Mater Dei Hospital, Malta
Email: mark.farrugia.2@gov.mt

Patellar dislocation - an algorithm for management within primary care

Dr Nicole M ZERAFA and Dr Kirill MICALLEF STAFRACE

ABSTRACT

Background

Patellar dislocation is a common condition which may present to primary care. The literature available on this condition discusses evaluation, assessment of risk factors for recurrence, and non-surgical versus surgical management. Literature detailing its management specifically within primary care is lacking.

Objectives

The purpose of this review paper is to review and discuss the steps in evaluation and management of this condition and formulate an algorithm summary particular to a primary care setting.

Method

A database search was carried out using specific keywords and terms. The authors' initial selection of 12 articles were subsequently reduced to 8 after review of their relevance to a primary care setting, and these were subjected to in-depth analysis. The information gathered was detailed and discussed, and a subsequent algorithm was formulated.

Results

Patellar dislocation is a common injury, which may have long-lasting consequences to knee stability if not initially managed appropriately. There is inconclusive evidence to favour a surgical versus non-surgical approach. Evaluation of an individual's risk factors and whether referral to secondary care is required are crucial steps in management of this condition.

Conclusion

Primary care physicians may play a key role in appropriate management of an individual's first presentation of patellar dislocation, as well as assessment on the need for secondary care referral. The algorithm proposed by the authors may assist primary care physicians in improving management of patellar dislocation within a primary care context.

Key Words

Patellar dislocation, management, risk factors, algorithm, primary care.

INTRODUCTION

Background

Patellar dislocation is defined as the relocation of the patella from its anatomical position to another position (Smith, et al., 2015; Wolfe, et al., 2018). The most common abnormal movement is in a lateral direction (Tsai, et al., 2012). A primary patellar dislocation is one that occurs in a previously uninjured knee, and a traumatic patellar dislocation is one where the dislocation is secondary to trauma. The mechanism of injury is typically a knee moving in flexion and valgus, and this commonly happens during a sporting activity (Duthon, 2015). This type of injury represents 3% of knee injuries and is more common in young age groups (10-17 years of age) and females (Fithian, et al., 2004; Wolfe, et al., 2018).

Patellar dislocation may cause significant damage to the structures of the knee which provide stability. One of these is the medial patellofemoral ligament, a structure located

between the superomedial edge of the patella, and the medial epicondyle and adductor tubercle of the femur (Duthon, 2015). Numerous studies of patients who underwent surgical intervention comment that damage to this structure is a risk factor for recurrence of patellar dislocation (Bitar, et al., 2012). Therefore, the appropriate management of the first primary patellar dislocation is essential in identifying and preventing any risk factors for the recurrence of patellar dislocation.

There is still some debate on whether primary patellar dislocations should be managed surgically or not. Some studies favour non-surgical management for primary patellar dislocations, if other risk factors have not been identified, while others favour a specialist review to consider surgical management. Most studies however do agree on the identification of risk factors to aid in the decision (Smith, et al., 2015; Wolfe, et al., 2018; Yang, et al., 2019). Long-term consequences of patellar dislocation include recurrent dislocation, chronic pain, joint instability, and cartilaginous injury (Lord, et al., 2020).

Objectives

The purpose of this paper is to review the current literature and general guidelines on the evaluation of a case of patellar dislocation, highlighting:

- those risk factors key in identifying patients who may require secondary referral and those at risk of recurrence,
- initial examination and investigation and
- management, with specific reference to what may be done by a primary care physician.

METHOD

A search was carried out on PubMed and Google Scholar databases for articles using the following keywords and terms: 'patellar dislocation', 'management', 'surgical vs non-surgical', and 'primary care'. The initial search included articles dated between 2016 and 2020, however this only yielded 3 articles which the authors considered relevant for their review based on their applicability to primary care and in-depth discussion of initial assessment and management. The search was therefore extended to include articles published between 2001 and 2020. A total of 12 articles were selected after initial review by the authors for more in-depth analysis, and a final number of 9 were utilised for this review paper, once again considering mainly their relevance to a primary care setting. The information gathered was amalgamated and summarised, in tandem with the formulation of an algorithm which may be followed by any physician.

RESULTS

When patients present with a clear patellar dislocation, the attending physician is advised to follow the steps of history-taking, relevant examination, decision-making supported by imaging studies, and initial management. Long-term management is to be considered at all stages.

History

The history should be taken to ascertain the activity being performed at the time of injury as well as the mechanism of injury. The pre-injury activity level should be determined, accompanied by an inquiry about whether the injury is a first presentation and whether a family history of patellar instability exists (Fithian, et al., 2004; Jain, et al., 2011; Wolfe, et al., 2018). This allows the clinician to determine an individual's predisposition to patellar instability which is relevant in long-term management, especially as a personal history of previous dislocations, and a family history of said injuries, are two of the strongest predictors of recurrence (Jain, et al., 2011; Tsai, et al., 2012).

Examination

Most often the patient will be in pain, even if the patella has relocated spontaneously, and an effusion or hemiarthrosis (large or small) may be noted upon initial inspection (Jain, et al., 2011; Duthon, 2015). Hence it may be advisable to administer some analgesia prior to examination (Duthon, 2015). The position of the patella should be determined: is it still dislocated, or has it relocated spontaneously (Jain, et al., 2011)? The patient may describe a

sensation of the knee "slipping", particularly if they have a large knee effusion. Some traumatic patellar dislocations may produce a significant hemarthrosis; aspiration is to be considered for relief if the patient is significantly in pain or movement is significantly limited (Duthon, 2015; Wolfe, et al., 2018). The examination of the knee should be done with care but in full, to ascertain if any other injuries are present, such as meniscal injuries, ligament injuries or fractures (Jain, et al., 2011). Large hemarthrosis may raise the clinical suspicion of fractures, and so the importance of imaging should be highlighted in further evaluation (Duthon, 2015).

Imaging

All studies recommend initial evaluation with a plain X-ray (Fithian, et al., 2004; Tsai, et al., 2012; Duthon, 2015). Views should include an anterior-posterior view, lateral views, and Merchant views – these allow a superior-inferior projection of the patella. A combination of all these views allows for proper evaluation of the patella position but also of the presence of osteochondral fractures, including fragments. If osteochondral fractures or fragments are seen or suspected, surgical management of the dislocation should be considered. It is therefore recommended that these patients be referred for further imaging. Both Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) scanning have been studied for evaluation of the injury (Fithian, et al., 2004; Tsai, et al., 2012; Duthon, 2015). CT scan allows for quick evaluation of the presence of fractures or fragments. The decision of conservative versus surgical management may therefore be taken more promptly. Despite this, if any complicated injury is suspected, fractures or fragments are difficult to visualise, and if the decision of conservative versus surgical management requires further evaluation of the anatomy / injury to the knee, an MRI is the imaging modality of choice.

Management

When treating patellar discolorations within primary care, the discussion of any case that is not clear-cut with an orthopaedic specialist is highly recommended. If the case is however a first patellar dislocation with no risk factors for future dislocation, and fractures and fragments have been confirmed absent on X-ray imaging, the conservative management may begin within a primary care setting.

The knee should be extended and fixed in an extended position with a knee immobiliser or brace. The flexion of the brace should be limited to 20 degrees (Duthon, 2015). The knee immobiliser should be kept on by the patient for at least 3 weeks (Duthon, 2015), although some studies have recommended an immobiliser up to 6 weeks (Fithian, et al., 2004). From the initiation of treatment, the patient should be referred to physiotherapy and rehabilitation to ensure the patient's maintenance of good balance and range of motion, and to strengthen the quadriceps. A delay in this side of management has demonstrated in some studies an increased recurrence rate of dislocation (Smith, et al., 2015). If a significant effusion or hemarthrosis is noted, prior to application of the brace, this may be aspirated for further relief. A follow-up of the patient's condition is always recommended, particularly if pain or swelling persists after the initial treatment period. Patients with persistence of instability or pain symptoms may eventually require surgical intervention (Fithian, et al., 2004; Tsai, et al., 2012; Duthon, 2015).

An algorithm was created by the authors to assist general practitioners (GPs) in navigating this process (see Figure 1).

DISCUSSION

Physicians working within a primary care setting may carry out all the described steps in the results section, apart from CT and MRI scanning. There are numerous recommendations surrounding imaging and management, but this review paper reveals that most recommendations between different sources are similar. None of the articles specifically denote the procedure of access to imaging such as CT or MRI from a primary care setting, which in a local setting requires referral to emergency specialist services within the public sector of healthcare; the articles simply refer to scenarios when imaging should be considered and what type of imaging to consider (Jain, et al., 2011; Wolfe, et al., 2018).

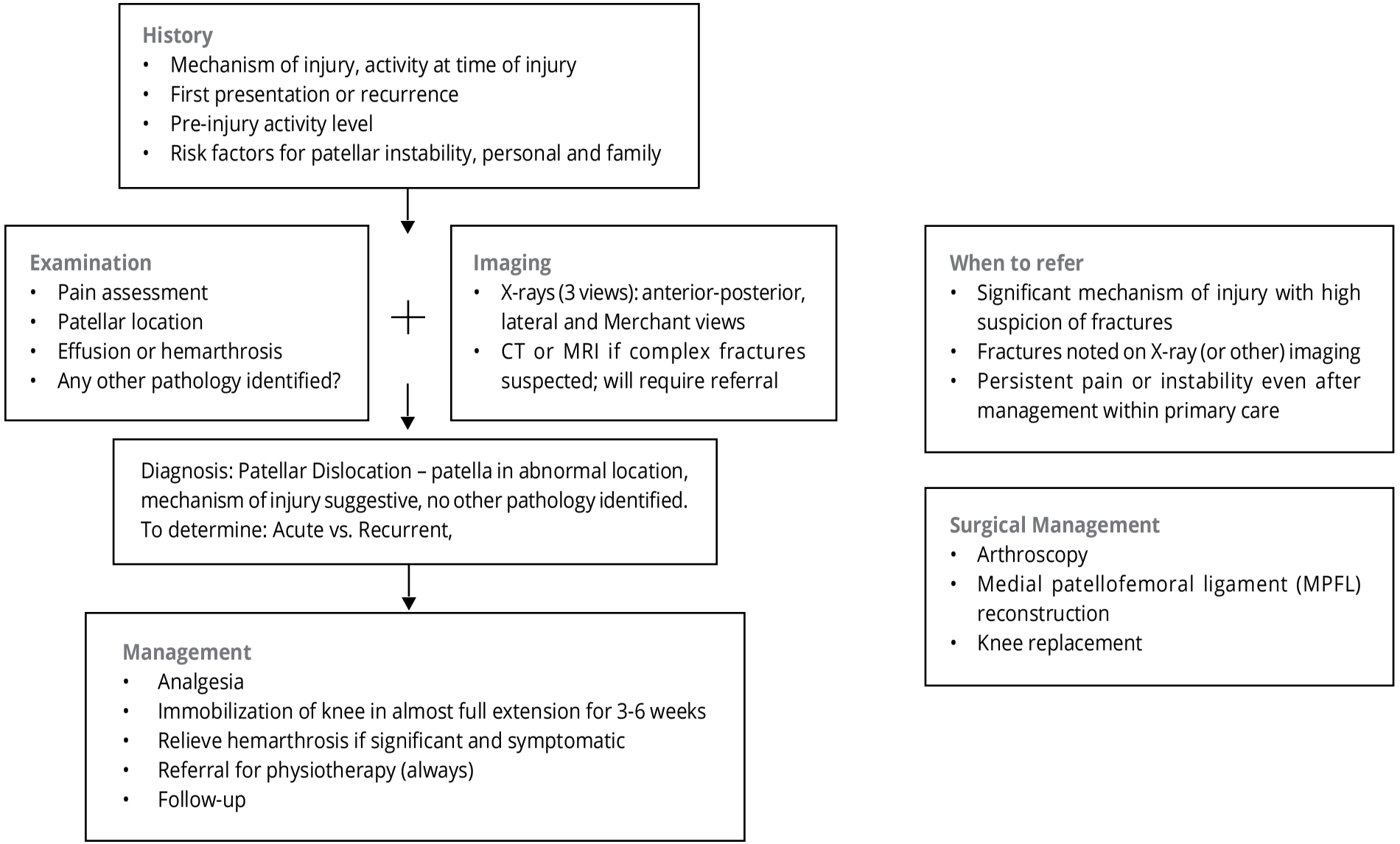

Figure 1: Algorithm for the management of patellar dislocation within primary care.

If patients fall into the category of surgical management, they should be referred to the appropriate specialists, who may decide on an arthroscopy as an initial surgical procedure but may also consider significant repair surgery should this be recurrent or if trauma with fractures and fragments is identified. This could include repair of tendons or ligaments and/or tightening of structures to improve stability (Duthon, 2015).

Limitation

As already highlighted, the sparse availability of review papers targeted toward primary care is a limitation of this article.

CONCLUSION

The above constitutes a review of some of the literature from the past two decades on the management of patellar dislocations. Focus on primary care management of this condition is lacking in literature. The studies included also recommend the continued research into the comparison of surgical and non-surgical management of patellar dislocations.

It is proposed that the primary care role in the management of this condition should include:

- a detailed and specific history of the injury and risk factors for knee instability;
- an examination of the knee to confirm the diagnosis of dislocation and ascertain any other possible pathologies;
- requesting of appropriate X-ray imaging (including all recommended views) for proper evaluation on the state of the knee, and whether other pathologies occur concomitantly;
- decision-making, including discussion with the patient, on whether conservative or surgical management is required (which may include discussion of the case with an orthopaedic specialist);
- appropriate referral if indicated to secondary care; and
- referral of the patient to physiotherapy for early rehabilitation.

An algorithm, created by the authors, is provided (Figure 1) to aid in this process.

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Dr Nicole M ZERAFA
MD, DipFMS, PgDip
GP Trainee, Primary HealthCare, Malta
Email: nicole-marie.zerafa@gov.mt

Dr Kirill MICALLEF STAFRACE
MD(Melit.), MSc SportsMed., FRCP(Edin.), FFSEM(UK), FFSEM(Ireland), MSK Ultrasound(UEL), EFSM(EU), FFIMS(Inter.)
Consultant, Orthopaedics, Trauma and Sport Medicine Department, Mater Dei Hospital, Malta
Email: kirill.micallef-stafrace@gov.mt

RESEARCH ARTICLE

A review of GP trainees' evaluations of placements in hospital and community medicine during 2020-21 within Malta's Specialist Training Programme in Family Medicine

Dr Mario R SAMMUT, Dr Günther ABELA, Dr Sonia ABELA, Dr Glorianne PULLICINO and Dr Anne Marie SCERRI

ABSTRACT

Background

One of the major speciality rotations in Malta's Specialist Training Programme in Family Medicine (STPFM) is in medicine. From 2020, changes were implemented in the logistics of this post regarding sub-speciality assignments and out-of-hours exposure.

Objective

A review of GP trainees' evaluations of their medicine training placements during 2020-21 was carried out to identify how satisfied the GP trainees were with the effectiveness of teaching provided, what major difficulties they experienced and how the educational value of the post could be improved.

Method

After completion of clinical rotations, GP trainees fill in evaluation forms on an ePortfolio. Feedback given for medicine posts during 2020-21 was exported to Microsoft Excel. After the information was anonymised, quantitative and qualitative analyses were carried out.

Results

Nine of out ten GP trainees were satisfied with the effectiveness of teaching provided during medicine posts. While difficulties experienced included the transition from family to hospital medicine, the challenges of night duties and the lack of learning during ward rounds, proposed improvements comprised increased emphasis on outpatient sessions for training, placements in more than just one sub-specialty and close guidance and supervision during duties.

Conclusion

Despite high satisfaction ratings for teaching during medicine rotations during 2020-21, a number of important difficulties were identified and crucial improvements suggested by GP trainees.

Recommendations

Medicine posts during the STPFM can be improved as teaching experiences for GP trainees through enhanced supervision, hands-on outpatient teaching, wider sub-specialty exposure and the introduction of training in telemedicine to complement face-to-face clinical practice.

Key Words
Education, family practice, programme evaluation, medicine, Malta

INTRODUCTION

Background

Following Malta's accession to the European Union in 2004, the Ministry for Health's Specialist Accreditation Committee in 2006 approved the Specialist Training Programme in Family Medicine (STPFM) drawn up by the Malta College of Family Doctors (MCFD) (Sammut, et al., 2006). The STPFM was then launched a year later under the auspices of the Department of Primary HealthCare (PHC) (Sammut and Abela, 2012).

The 3-year training programme is divided equally into placements between family medicine posts and rotations in other specialities, supervised by general practitioner (GP) trainers and consultant specialists respectively. One of the major speciality rotations is in medicine. This lasts 3 months and takes place mainly in Mater Dei Hospital (MDH), Malta's only state general hospital (Zammit, Sammut and Abela, 2017).

During 2007–2019, in agreement with successive chairpersons of the hospital Department of Medicine, GP trainees chose to be placed with 3 consultant supervisors (one every month) in different medical sub-specialities, for example, diabetes & endocrinology, gastroenterology and respiratory medicine. Besides working 8am-1pm from Monday to Saturday, the trainees performed one 8-hour duty per week during 1-9pm on a selected weekday (replaced once a month by a Sunday 8am-4pm duty). Furthermore, they were provided with 4 hours protected study time each week. As recommended by PHC, 2 morning placements a week were held in medical consultant clinics (MCC) within government community health centres (Sammut and Abela, 2009).

However, from January 2020, following an initiative by the Department of Medicine that was endorsed by the Health Division, GP trainees started being assigned to one medical sub-speciality of their choice for the whole 3-month period, with consultant supervisors (involved in education and training) selected for them by the department. Moreover, the working hours were increased from 8am-1pm to 7.45am-2.30pm. In lieu of performing weekly 1-9pm duties on selected days, the department assigned the GP trainees to work full-night duties in the same roster as basic specialist trainees (BSTs) in medicine, with the obligation to work until 2.30pm following such duties. Another change involves the shortening of the time trainees are placed with a consultant physician in PHC on two mornings a week from 5 hours to 3 hours and 45 minutes (i.e. till 11.30am) so that they can then report for work to MDH at noon (Sammut and Abela, 2020).

Objective

During March 2022, after a suggestion by one of the postgraduate training coordinators in medicine, the joint postgraduate training coordinators in family medicine agreed to undertake a review of the GP trainees' placements in medicine following the change in January 2020 to the current system. This was carried out through the collection and analysis of feedback from GP trainees for medicine posts carried out during 2020-21 through an ePortfolio form that they complete after each placement (Sammut, 2022). The review evaluated how satisfied the trainees were with the effectiveness of teaching provided, what major difficulties they experienced and how they felt that the educational value of the post could be improved.

METHOD

After completion of clinical rotations, GP trainees are obliged to fill in evaluation forms on the educational ePortfolio that had been adapted from questionnaires developed by the Yorkshire Deanery Department for NHS Postgraduate Medical and Dental Education (2003). The postgraduate training coordinators in family medicine then evaluate such feedback to identify and correct any training issues (Sammut and Abela, 2012), thus ensuring the quality and success of teaching (Morrison, 2003; Karim, et al., 2013).

In the current study, the feedback given in the evaluation forms (see Table 1) for medicine posts carried out during 2020-21 was exported to spreadsheets using the computer software programme Microsoft Excel. After the information was anonymised, a mixed-method approach was adopted by analysing quantitative and qualitative data. The item-content method was used to analyse the qualitative component (Hsieh and Shannon, 2005).

Table 1 – Information gathered by ePortfolio form entitled 'Trainee's Evaluation of Other-Speciality Posts'

INFORMATION
• Name of Institution • Name of Specialty • Start date • End date • Name of supervising consultant with whom you have been working
EVALUATION

Choose from 1 (very ineffective) to 10 (very effective) on scales provided:
• In your opinion, how effective was the consultant in helping you to understand the specialty in terms of knowledge and skill relevant to general practice?
• How do you rate the amount of formal teaching you received during this post?
• How do you rate the amount of teaching that took place in clinical situations?
  • Ward round (not applicable for accident & emergency post)
  • Out-patients (also applies for accident & emergency post)
• How do you rate the workload of your post during the day?
• How do you rate the workload of your post out-of-hours? (not applicable for minor speciality posts)
• How do you rate the provision made for you to attend the weekly half-day release course?

Open questions: • What major difficulties did you experience in this post? • In what ways can the educational value of the post be improved? • How have you found this post in relation to your preparation for a career in general practice? • Any other comments?

Ethical considerations

Permission for the study to take place was provided by the data protection officer and the clinical chairperson of Primary HealthCare. As this study intends to improve training practice, it falls within the 'zone of accepted practice' that is exempt from formal ethical review (Zeni, 1998). For this reason and since no sensitive personal data were gathered, ethics committee approval was not required.

RESULTS

All 35 GP trainees placed in medicine during 2020-21 provided feedback regarding this post through online evaluation forms, the completion of which is a mandatory requirement of the STPFM.

Quantitative analysis

Nine of out ten GP trainees were satisfied with the effectiveness of teaching provided during the medicine posts, regarding formal teaching and clinical teaching in the ward and at outpatient clinics (see Table 2 for details).

Table 2 - Trainee satisfaction ratings for teaching during medicine placements carried out in 2020-21

Placement venue	Effective training	Formal teaching	Ward teaching	Outpatient teaching
Medicine, MDH	91%	88%	89%	93%
MCC, PHC	92%	91%	Not applicable	91%
Overall	91%	90%	89%	92%

Qualitative analysis

In reply to the question 'how have you found this post in relation to your preparation for a career in general practice?', no less than 34 out

of 35 GP trainees gave positive answers. One trainee noted that the post was "highly beneficial and important - gaining experience in caring for the acutely unwell patient and management of common chronic medical conditions". Another trainee shared that "I am now more confident in the management of such cases and hope that I will be offering patients with such presentations at the health centre with better care".

Replies to question 'What major difficulties did you experience in this post?'

In answer to the above question, 13 from 35 trainees (i.e. 37%) highlighted the **transition between practising medicine in the community and in hospital**. One GP trainee specified that "medicine duties were quite challenging, given the limited knowledge of inpatient care that we have". "My main concern was that of missing something out whilst seeing patients mostly because of lack of experience in handling such patients", added another trainee. A third trainee confessed that s/he "felt uncomfortable dealing with certain clinical encounters which are not related whatsoever to our work as GPs" and shared the experience that "most seniors were very helpful and willing to teach however there were others who became irritated by our questions".

Twelve out of 35 trainees (34%) were **unhappy with the night duties**, which were found to be challenging due to their excessive duration, heavy workload and lack of supervision. One GP trainee shared the opinion that that these duties "are not adding anything to our training program ... since our management in primary care (differs from that) in secondary care". Another trainee revealed that "GP Trainees are attached ... to learn Medicine and not replace BSTs during duties, which is very unsafe and distressing on the GP Trainees".

Eleven per cent of GP trainees (4 from 35) remarked that **ward rounds were not especially useful compared to outpatients** because, as one trainee put it, "the skills we learnt were only for inpatient medicine and not community based practice". Another GP trainee praised "the experience at outpatients (as) very useful - I enjoyed the fact that I was allowed to review patients with discussion of management plans with senior colleagues in the firm".

Another two difficulties raised by the GP trainees were related to their placements with the community physicians. Four trainees (i.e. 11%) lamented that, in view of the COVID-19 pandemic, **most of the consultations were made via telephone**, and hence they could not examine the patients. Two GP trainees (6%) who were placed with the two community specialists in diabetes and endocrinology wished they had been **exposed to the management of different specialities**, not just diabetes.

Replies to question 'In what ways can the educational value of the post be improved?'

Fifteen from 35 trainees (i.e. 42%) recommended an **increased emphasis on outpatient sessions for training**. One trainee explained that "outpatients clinics were of great educational value. Working by myself in the clinic, and asking for guidance or advice from my seniors where necessary, was a very fruitful learning experience. It is also the most similar setting to the GP Clinic and hence I believe overall it is more valuable than ward rounds as an experience".

Another proposal from 31% of GP trainees (11 from 35) was summarised by a trainee who stated that "the educational value can be improved by having **more sessions in different specialties** including gastroenterology, endocrinology, diabetes and infectious diseases".

Five from 35 trainees (14%) suggested that **medicine duties are performed under closer guidance and supervision**. As eloquently put by one GP trainee, "I do believe that we should work duties as they are (an) important aspect of this rotation; however I think that the best and most safe way for this to be done is to work duties with another Medicine BST with more experience".

The GP trainees also made two recommendations for improving their two morning placements a week with consultant physicians in the community. The first was from 6 trainees (17%) for an **increase in number and duration of medical consultant clinic sessions**, with one trainee suggesting that these replace ward rounds in hospital. The second proposal was from another 5 GP trainees (14%) who had to sit in with 3 of the community physicians due to lack of clinic space; the trainees asked for the

facility to **examine patients independently and present a management plan** for discussion with the consultant.

DISCUSSION

The GP trainees' overall satisfaction rating of 91% with the effectiveness of teaching during the medicine placements carried out in 2020-21 (Table 1) is an improvement on similar ratings calculated for 2011-12 and 2007-08 of 85% and 73% respectively (Sammut and Abela, 2013). This may be the result of continuous efforts by the postgraduate training coordinators in family medicine to ensure the quality of the training programme by verifying the areas where it is functioning properly and outlining other areas which need further development (Sammut and Abela, 2019).

The transition between practising medicine in primary care and in hospital identified by 37% of GP trainees as a major difficulty is well-known. Internationally this is tackled by involving hospital specialists in the delivery of GP training together with family physicians, with a consequent benefit to patient care (Wong et al, 2008). Locally, while the STPFM is based in family practice and taught by family doctors, this is supplemented by carefully planned attachments with appropriate hospital specialities; the latter include medicine where 'the trainee will gain experience in different sections of the department in order to develop and achieve … competencies necessary for independent practice' (Zammit, Sammut and Abela, 2017).

It is unfortunate that some senior members of the hospital medical staff were reported as becoming irritated by GP trainees' questions, presumably with a negative effect on the trainer-trainee relationship which is so important to learning. While trainees are expected to face the challenges of clinical work, they do need to be supported clinically, educationally and professionally by their trainers (Wearne, et al., 2012).

Thirty-four per cent of GP trainees were unhappy with night duties but another 14% believed in the importance of performing medicine duties, however recommending that these are carried out under closer guidance and supervision. Malta's STPFM in fact specifies the importance of out-of-hours exposure as a part of training in the specialty's approach, examination and treatment routines (Zammit, Sammut and Abela, 2017). A 'Committee on Optimizing Graduate Medical Trainee (Resident) Hours and Work Schedules to Improve Patient Safety' set up in the USA has identified direct supervision of junior residents during resident training as important to safeguard resident and patient safety, together with adequate sleep, adjustment of workload and adequate time for clinical reflection (Institute of Medicine, 2009). One should note that doctors working in Mater Dei Hospital can make use of a 'Declaration in terms of Regulation 20 of Legal Notice 247-2003' to apply to work on a roster of not more than 48 hours a week (Department of Information, 2003).

While 11% of GP trainees remarked that ward rounds were not especially useful, 42% recommended an increased emphasis on outpatient sessions for training, especially if they could examine patients independently and present a management plan for discussion with the consultant (as pointed out by 14% of trainees in community medicine). It is known that outpatients sessions where quality teaching and supervision are provided can be venues for productive and fulfilling learning experiences (Logan, Rao and Evans, 2021), especially if these experiences are fulfilled in a hands-on rather than an observer role (Spencer, 2003). The MCFD's STPFM (Zammit, Sammut and Abela, 2017) underlines the importance of medical outpatient clinics for GP trainees to learn how to develop an idea of the spectrum of diseases and the standard of referrals, recognise when hospital referral is effective, necessary, mandatory and urgent, and assess common problems and differentiate between routine and serious complaints.

The STPFM document (Zammit, Sammut and Abela, 2017) also emphasises that, besides dealing with general medical problems, the GP trainee should also gain experience in different sections of the Department of Medicine in order to deal with problems related to subspecialties – this is in line with feedback from 31% of GP trainees in hospital medicine. Community medicine practised by consultant physicians

employed by Primary HealthCare is one such subspecialty section, with 17% of trainees in community medicine requesting an increase in number and duration of medical consultant clinic sessions. For postgraduate training to provide improved or increased speciality exposure, such placements need to be of adequate duration (Lennon, et al., 2013).

One of the effects the COVID-19 pandemic had on medical practice and specialist training was the expansion of telephone and online consultations through telemedicine (Lee and Nambudiri, 2019). As bemoaned by 11% of trainees in community medicine, this denied them the experience of examining patients, which may adversely affect their ability to develop skills in managing different diseases (Edigin, et al., 2020). Of course, medical training should always incorporate training in face-to-face skills in clinical settings despite distance-learning solutions being developed due to the pandemic (Michels, et al., 2020). Nevertheless, the growing importance of consultations carried out at a distance merits the introduction of formal training in telemedicine for GP trainees (Sammut, Abela and Abela, 2021).

Study method strengths, limitations and implications for the future

Although the mandatory completion of evaluation forms by GP trainees was a strength of the review, the possibility that some trainees may not have been motivated enough to answer the open questions may have resulted in non-response bias in the qualitative analysis. Participants who did not answer the open questions might have different views to those that did answer them. Other limitations were that demographic data of the repondents such as age and gender was not collected, with the consequent inability to carry out statistical analysis - these steps were considered to be beyond the scope of this project.

This study reviewed the GP trainees' feedback regarding their placements in medicine following the changes in conditions of training introduced in 2020 and provided proposals for future practice, education and policy. Although the method of evaluation of placements by trainees was suitable, future research would benefit by incorporating similar feedback from the medical supervisors.

CONCLUSION

Despite the change in working conditions introduced in January 2020, 9 out of 10 GP trainees were satisfied with the effectiveness of teaching provided during the medicine posts in 2020-21. Notably, 34 out of 35 trainees affirmed that they found the post useful in relation to their preparation for a career in general practice.

However, several major difficulties were experienced, the main ones being the transition between practising family and hospital medicine (reported by 37% of trainees), the challenges presented by night duties (34%) and the lack of learning during ward rounds (11%). GP trainees suggested a number of improvements including an increased emphasis on outpatient sessions for training (from 42% of trainees), placements in more than just one subspecialty (31%) and close guidance and supervision during duties (14%).

Recommendations

Medicine posts during the STPFM can be improved as teaching experiences for GP trainees if the following recommendations are considered and implemented:

- Specialist supervisors are encouraged to support GP trainees educationally and professionally during their clinical work.
- GP trainees' out-of-hours exposure should be directly supervised with provision of adequate rest, adjusted workload and time for reflection in order to safeguard trainee and patient safety.
- An increased emphasis is given to outpatient sessions (instead of ward rounds) where productive teaching and fulfilling learning can take place if hands-on examination by GP trainee is backed up by management discussions with specialist supervisors.
- Opportunities should be provided to GP trainees to gain experience in dealing with problems related to different subspecialties of medicine, one of which being community medicine (with medical consultant clinics replacing hospital ward rounds).
- Formal training in telemedicine for GP trainees should be introduced to tackle the demand and need for distance consultations and complement training in face-to-face skills in clinical settings.

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Dr Mario R SAMMUT
MD, DipHSc, MScH, MScPC&GP(Ulster), FMCFD, MRCGP[INT]
Principal General Practitioner & Postgraduate Training Coordinator in Family Medicine, Specialist Training Programme in Family Medicine, Primary HealthCare, Malta
Email: mrsammut@rocketmail.com

Dr Günther ABELA
MD, MMCFD, MRCEM, FIMC.RCS(Ed), PG Cert Clin Lds (Open), MSc Clinical Leadership (Swansea), LLCM
Principal General Practitioner & Postgraduate Training Coordinator in Family Medicine, Specialist Training Programme in Family Medicine, Primary HealthCare, Malta
Email: gunther-p.abela@gov.mt

Dr Sonia ABELA
MD, MMCFD, PgCAP, FHEA, Dip.Ther (ICGP), Dip. Women's Health (ICGP), E.C.E. Pall. Care, Cert. Diabetes Mgmt, FLCM
Principal General Practitioner & Assistant Postgraduate Training Coordinator in Family Medicine, Specialist Training Programme in Family Medicine, Primary HealthCare, Malta
Email: sonia.abela@gov.mt

Dr Glorianne PULLICINO
MD, PG Dip (Diabetes), MSc (Public Health Medicine), MMCFD, MRCGP (INT)
Senior General Practitioner & Assistant Postgraduate Training Coordinator in Family Medicine, Specialist Training Programme in Family Medicine, Primary HealthCare, Malta
Email: glorianne.pullicino@gov.mt

Dr Anne Marie SCERRI
MD, MSc (Pharmacology), MMCFD, CCST, MRCGPint
Senior General Practitioner & Assistant Postgraduate Training Coordinator in Family Medicine, Specialist Training Programme in Family Medicine, Primary HealthCare, Malta
Email: anne-marie.scerri@gov.mt

A study analysing the new Rapid Access Chest Pain Clinic at Mater Dei Hospital, Malta

Dr George SULTANA and Dr Clarissa SCIBERRAS

ABSTRACT

Background

This study is a service evaluation of the new rapid access chest pain clinic (RACPC), introduced in January 2021 at Mater Dei Hospital, Malta.

Objective

To determine whether the current practices meet the needs of the local population for diagnosis and management of coronary artery disease.

Method

A quantitative methodology using a service evaluation design frame was used. Retrospective descriptive analysis was used to analyse the data.

Results

Results showed that 55.95% of patients were seen in less than fourteen days from time of referral. Fifty-four point six five per cent of patients were classified as having cardiac pain at the end of the initial clinical review. Seventy-six point four seven per cent of exercise stress tests and 92.75% of echocardiograms were performed on the day. Thirteen point seven nine per cent of patients were referred directly for a coronary angiogram having a positive predictive value of 75%.

Conclusion

The RACPC in Malta is effective in identifying coronary artery disease as compared to clinics in the United Kingdom (UK). A more refined referral system is needed for patients to be more adequately triaged. More clinics and further resources are needed to keep within the recommended timeframe for patient review. Subsequent work may assess future outcomes of this patient cohort and further identify the unknown sources of referral to evaluate potential problems in the referral system.

Key Words

Chest pain, coronary artery disease, referral, Malta

INTRODUCTION

Background

The new Rapid Access Chest Pain Clinic (RACPC) in Malta was introduced in January 2021 at Mater Dei Hospital, Malta to help aid diagnosis and management of coronary artery disease (CAD) in the local population. The aim of the RACPC is to provide rapid assessment and treatment of patients with anginal chest pain who are referred from health centres/general practitioners, the emergency department and other in-patient facilities. Patients are seen by a cardiologist and are given a full cardiovascular assessment, appropriate diagnostic investigations, diagnosis and management plan.

Previous similar studies were conducted in the UK to evaluate National Health Service (NHS) funded RACPCs, assessing patient characteristics, the nature of the chest pain, diagnostics, final diagnoses and later outcomes. In areas where

RACPCs were introduced, a high positive predictive value of 74.4% was noted for CAD in patients who were referred for angiogram (Khan-Mahmood, Patel and Scoote, 2017) and lower risk patients were appropriately triaged and reassured (Taylor, et al., 2008).

Objective

The aim of this study is to assess the new RACPC's practices and outcomes and evaluate whether these meet the needs of the local population, compared to similar rapid access chest pain clinics in the UK.

METHOD

A quantitative methodology using a service evaluation design frame was used. Patients were evaluated using records from hospital intranet patient information servers, including CVIS (Cardiovascular Information System), iCM (iSOFT Clinical Manager) and CPAS (Clinical Patient Administration System). A convenience sample of ninety-five patients was taken spanning from January - April 2021. The sampled population were the first ninety-five patients who were referred to the clinic. A retrospective descriptive analysis was performed with the appropriate data protection approval obtained from the Mater Dei Hospital Data Protection Office. As research on human subjects was not involved, approval from a research ethics committee was not required for the purpose of the study.

RESULTS

A total of eighty-six patients attended the RACPC out of a total of ninety-five patients referred (90.52%). Forty-seven of these patients were seen less than fourteen days from documented referral (55.95%). Fifty-six of these patients were male (65%) and twenty-nine were female (34%). The source of referral ranged from Primary Health Care (29.07%), the Accident and Emergency Department (4.65%), Mater Dei Hospital (13.95%) and unknown (52.32%).

The patient characteristics and risk factors of the patients who were included in the study are listed in Table 1.

Table 1: Characteristics and risk factors of patients in study

Sex	Male	56 patients (65.9%)
	Female	29 patients (34.1%)
Age range		24 - 90 years (mean 60.7)
Risk factors	Previous myocardial infarction	7 patients (8.04%)
	Hypertension	50 patients (57.5%)
	Dyslipidaemia	27 patients (31%)
	Diabetes	20 patients (23%)
	Smoker	39 patients (44.8%)

Out of all the attendees, twenty-one (24.42%) had typical chest pain with sixty-five (75.58%) describing atypical chest pain. Patients were noted to have typical versus atypical chest pain according to the characteristics of the pain. The individual characteristics of the pain are noted in Table 2.

Table 2: Characteristics of the chest pain

		Number of Patients	Per cent of patients
Location of the chest pain	Central	54	62.1%
	Left	14	16.1%
	Right	4	4.6%
	No Chest Pain	15	17.2%
Nature of the pain	Compressive	40	46%
	Sharp	14	16.1%
	Burning	10	11.5%
	Other or no chest pain	21	24.4%
Duration	≤5 Minutes	46	52.8%
	5-15 Minutes	9	10.2%
	≥15minutes	12	13.8%
	Unspecified/no chest pain	20	23%
Frequency	Daily	43	48.4%
	Weekly	15	17.3%
	Monthly	4	4.6%
	One episode or no chest pain	25	28.7%

At the end of the clinic review, forty-seven (54.65%) of the patients referred were classified as having cardiac pain and thirty-nine (45.35%) with non-cardiac pain. Most investigations (100% of electrocardiograms, 92.75% of echocardiograms and 76.47% of exercise stress tests) were performed on the day, with others referred to another day. Further investigations included myocardial perfusion scans (MIBI scans) in 2.29%, computer tomography (CT) - coronary (12.64%) and Holter investigation (4.59%). Twelve of the patients were referred directly for a coronary angiogram (13.79%), with nine of these patients found to be positive for coronary artery disease (75%).

After the first visit to the RACPC, fifty-two patients (60.9%) were discharged to community follow up or to other cardiology specialist clinics. A three-month review noted that forty-two patients (48.84%) were discharged from the RACPC, thirty-four patients (39.5%) referred for a follow up appointment and ten patients (11.63%) referred to another specialised cardiology clinic with zero deaths or admissions.

DISCUSSION

Performance statistics when compared to similar clinics

Coronary artery disease (CAD) is the single most common cause of death in the developed world, responsible for about one in every five deaths. The morbidity, mortality, and socioeconomic importance of this disease make timely accurate diagnosis and cost-effective management of CAD of the utmost importance (Cassar et al., 2009). Rapid access chest pain clinics (RACPC) aim to provide quick and early specialist cardiology assessment for patients who present with new onset exertional chest pain or acute deterioration in patients with known ischaemic heart disease. The RACPC aims to provides rapid assessment and treatment of patients with suspected angina

within two weeks of referral as stated by the National Service Framework (NSF) for Coronary Heart Disease that states that 'patients with suspected cardiac chest pain (not requiring hospital admission) must be assessed by a specialist within two weeks' (Department of Health and Social Care, 2000).

From the data collected, 54.65% of the patients referred to the new RACPC in Mater Dei Hospital were classified as having cardiac pain, with 45.35% deemed to have non-cardiac pain. This differs from a nine-year review of similar clinics in the UK (between 2002 and 2011), where a larger amount of patients deemed to have non-cardiac pain were referred (22.5% cardiac chest pain versus 76.2% non-cardiac chest pain in 2010-11, with similar numbers noted in previous years) (Debney and Fox, 2012). A similar service evaluation study performed in the UK on a RACPC noted 51% of referred patients were diagnosed with non-cardiac chest pain (Morgan and Gaskin, 2015).

The collected data from the local RACPC showed that 13.79% of patients reviewed were referred for a coronary angiogram, with nine patients diagnosed as having coronary artery disease (75%). This result is very comparable to a similar UK study, which noted coronary artery disease in 74.4% of patients referred for angiogram (Khan-Mahmood, Patel and Scoote, 2017). This indicates that the clinic is at least as effective at identifying coronary artery disease as other clinics in the UK. On assessing three months outcomes, zero patients were admitted to hospital or deceased, with 48.84% of patients discharged on the first appointment as compared to 49.3% of patients discharged in a UK RACPC audit (Khan-Mahmood, Patel and Scoote, 2017), indicating a favourable short-term outcome for the patients.

Method of referral and impact on clinic

When assessing the sources of referrals from the data, these ranged from Primary Health Care (29.07%), the Accident and Emergency Department (4.65%), Mater Dei Hospital (13.95%), with 52.32% of patients with unknown sources of referral. A UK audit analysing outcomes from a UK RACPC noted 81.4% of referrals were from general practitioners (Khan-Mahmood, Patel and Scoote, 2017). This discrepancy is mainly thought to be secondary to a non-specific referral system, as well as the lack of patient registration noted in primary care practices in Malta as compared to the UK.

The data collected showed that forty-seven of these patients were seen in less than fourteen days from documented referral (55.95%). This differs from the National Service Framework target that aims for all referred patients to be seen within two weeks of referral. This may be due to a number of causes, postulated to mainly be in view of the limited number of clinics as well as the need for a more refined referral system for patients to be adequately triaged to ensure cases that satisfy the requirements for referral are seen within the stipulated timeframe. A dedicated ticket of referral system to the RACPC will help the former and the latter points, better identifying cases from other generic cardiac referrals and helping to identify the sources of referral; such an example is available in Figure 1. This system may be implemented in a paper format; however, a paperless, electronic format may be beneficial to review the patient in the required timeframe. Moreover, as the data noted that 17.4% of patients had no chest pain, a dedicated system may help to filter these cases and will help referral to the appropriate cardiac subspeciality.

RAPID ACCESS CHEST PAIN CLINIC REFERRAL FORM

Name	
Surname	
I.D.	
Age	
Address	
Mobile number	
Telephone number	
N.O.K Name	
N.O.K Relation	
N.O.K Contact number	

History of presenting complaint:

History: ☐ Highly ☐ Moderately ☐ Mildly suspicious for CAD

Risk Factors (circle as appropriate):

History of atherosclerotic disease (including MI, CVA/TIA, PAD)	Yes/No
Hypertension	Yes/No
Hyperlipidaemia	Yes/No
Diabetes	Yes/No
Smoker/past smoker	Yes/No
Family history of IHD (age <65)	Yes/No
Obesity	Yes/No
History of previous coronary intervention	Yes/No

ECG done	Yes/No
ECG findings	

Other PMH/PSH:

Drug History:

Past Cardiac History

- ☐ Is patient with known coronary artery chronic total occlusion (CTO)
- ☐ Is patient currently being investigated by a cardiologist or by the RACPC unless under category 1
- ☐ Has patient been investigated by a Cardiologist and had documented CAD for medical management in the past 12 months (unless under category 1
- ☐ Has patient been investigated for CAD by a Cardiologist in the past 5 years and had normal results (unless under category 1)
- ☐ History of/suspected valvular heart disease
- ☐ Known arrythmia, if so specify _____
- ☐ Symptoms of heart failure present
- ☐ Any documented/noted ECG changes

Examination findings:

☐ Tenderness at site of pain

☐ Presence of systolic heart murmur

☐ Blood pressure: _____

☐ Heart rate: _____

Troponin done: ☐ Yes ☐ No

Troponin level: ☐ < normal limit ☐ 2-3x normal limit ☐ >3x normal limit

Calculated *HEART score*[1] _____

Calculated *Framingham Risk Score for Hard Coronary Heart Disease*[2] (if ECG/Troponin unavailable) _____

Six, A., Cullen, L., Backus, B., Greenslade, J., Parsonage, W., & Aldous, S. et al. (2013). The HEART Score for the Assessment of Patients With Chest Pain in the Emergency Department. Critical Pathways In Cardiology: A Journal Of Evidence-Based Medicine, 12(3), 121-126. doi: 10.1097/hpc.0b013e31828b327e

D'Agostino RB et al.(I). General cardiovascular risk profile for use in primary care. The Framingham Heart Study. Circ 2008;117:743-53.

☐ Kindly attach a copy of a recent ECG below if available

☐ Kindly ensure the patient has the following blood tests from the past 3 months available on iCM

- Lipid profile
- Hba1c
- Liver profile
- Renal profile
- Complete blood count
- NT-proBNP

If not available, please ensure that these are taken as soon as possible, to be available for the appointment

Referral source	☐ Primary care	☐ A+E	☐ MDH
Referring physician name			
Registration number			
Signature			
Date			

Figure 1: Proposed refined referral system to the RACPC

Improvements to the RACPC and possible further research opportunities

As noted from the data, not all the baseline investigations were performed on the day, with 92.75% of echocardiograms and 76.47% of exercise stress tests being done on the day. This highlights the need for further resources to be allocated in order to open up further RACP clinics, with the capability for diagnostic investigations to be ideally performed on the day, in order to better delineate between cardiac and non-cardiac pain. Further economic, ecological and patient satisfaction studies should be performed to assess the viability and impact of such clinics in Malta. Although the data is encouraging, this cohort of patients should be followed up and outcomes should be assessed at twelve months to fully evaluate the service of the RACPC.

Strengths and limitations of the study

The main strength of this study is that it successfully delivers on its aim to show that the RACPC in Malta is as effective as in the UK and thus is an important aspect of outpatient care in the national health care service. These findings should, however, be interpreted with caution in view of the limitations of the study. These mainly include issues with data gathering, with restrictions within the current referral system, a limited period of observed patient follow-ups and a relatively small cohort of patients. The latter limitation lessened the power of the study and the ability to compare to other studies with a larger sample size.

CONCLUSION

This study has confirmed that the RACPC in Malta is an effective and efficient tool in identifying coronary artery disease as compared to similar clinics in the UK and is successful in highlighting patients with CAD requiring intervention. Still, there needs to be a more refined referral system for patients to be more adequately triaged. A draft revised referral form was created, based on the findings from this study and other studies referenced from clinics in the UK, including important data necessary for adequate triaging such as scores and previous investigation findings. The creation of more clinics would be beneficial to cater for the number of patients referred, in order to be able to keep to the recommended timeframe for patient review, with further resources allocated for more diagnostic investigations to be performed on the day as required. Economical, ecological and satisfaction studies could assess this. Subsequent evaluation may assess future outcomes of this patient cohort and further identify the unknown sources of referral, to evaluate potential problems in the referral system.

Dr George SULTANA
MD
Basic Specialist Trainee, Department of Medicine, Mater Dei Hospital, Malta
Email: georgesultana17@gmail.com

Dr Clarissa SCIBERRAS
MD
Basic Specialist Trainee, Department of Child and Adolescent Health, Mater Dei Hospital, Malta
Email: clarissa.sciberras@gmail.com

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An evaluation of the use of paediatric X-ray imaging in public health centres within Primary HealthCare in Malta

Dr Tracy Lee VIDAL, Dr Bernard Paul SPITERI MEILAK, Dr Marilyn HARNEY, Dr Daniela BONELLO and Dr Denise LE BRUN

ABSTRACT

Introduction

Despite the possible harms of ionising radiation, guidelines for the use of X-rays in children are not available locally. International guidelines are also limited.

Aim

The aim of this study was to evaluate all X-rays taken in paediatric patients in Primary HealthCare in Malta over a period of six months.

Method

A list of all X-rays taken in children aged 0-16 years during the period of July 2020 till December 2020 in all publicly funded Primary HealthCare health centres in Malta was compiled using the Radiology Information System (RIS), Picture Archiving and Communication System (PACS) and iSOFT Clinical Manager (iCM). A form was designed using Microsoft Excel® to facilitate collection of data. Patient demographics were collected, and data was evaluated for the type of X-ray ordered, reason for request and source of referral, as well as the result of the X-rays and any subsequent follow-up organised.

Results

Over the six-month period studied, 1176 children were referred for X-ray imaging with 1324 X-rays being taken. These were mostly 13-16 years of age, with the majority being male. Most patients were referred by general practitioners working in health centres, with X-rays of the upper limb being the most ordered radiographs. The commonest reason for requesting an X-ray was a history of trauma. In total, 75.8% of X-rays ordered were reported as normal. Only 4.3% of all requests referred to existing guidelines. With reference to lower limb X-rays, Ottawa rules were referred to in 11.4% of X-ray requests, with 78.6% of these being reported as normal. Follow-up visits were planned for 34% of children referred for X-ray.

Conclusion

The results of this evaluation show that most X-rays in the paediatric population were taken in view of trauma, and approximately 75% of all X-rays taken were normal. Educating doctors about the use of judicial x-ray imaging and development of local guidelines might help to reduce unnecessary investigations.

Keywords

Paediatrics, radiography, guidelines, primary care, Malta

INTRODUCTION

Background

When it comes to referring a child with a physical injury for an X-ray, there can be no one-size-fits-

all answer. Children are different and should not be considered as just small adults (The Royal College of Radiologists, 2014).

Unfortunately, there are no readily available local guidelines for imaging in children which can be used in primary care. Guidelines and criteria would help in the recognition of the different physiological and anatomical considerations of the growing child and to highlight the different approaches needed for imaging (The Royal College of Radiologists, 2014).

Frush (2012) has highlighted the fact that there is no safe lower level of radiation exposure. A number of factors contribute to the increased risk from ionising radiation in children. Developing and maturing tissues in the growing child are more radiosensitive, there is a cumulative radiation risk over a lifetime, and children have a longer lifetime in which to express the increased relative risk. These factors emphasise the need to adhere to the "as low as reasonably achievable" (ALARA) principle (The Royal College of Radiologists, 2014; Centre for Disease Control and Prevention, 2015; European Society of Radiology, 2019).

The European Society of Radiology (ESR) has adapted the criteria from the American College of Radiology (ACR) for use in the European Clinical Decision Support (CDS) platform ESR iGuide (European Society of Radiology, 2019). Such guidelines and criteria have been set up to ensure appropriate utilisation of medical imaging for patients and justification of radiological procedures (Graham and Yox, 2018; American College of Radiology, 2021).

Aim

The aim of this study was to evaluate all X-rays taken in paediatric patients in primary care in Malta over a period of six months.

Objectives

The objectives of this study were to evaluate the use of X-ray imaging in the paediatric population in primary care in Malta by:

- Quantifying the number of X-rays taken in paediatric patients between July and December 2020 in all Primary HealthCare centres in Malta.
- Describing the patients' demographics, type of X-ray, reason for X-ray request and source of referral.
- Analyzing the results of the X-rays performed in primary care (normal/abnormal) and any subsequent follow-up organized.

The results will then be used to suggest possible improvements that can be implemented in practice when it comes to the use of x-rays in the paediatric population.

METHOD

Data collection

This was a retrospective cross-sectional observational study. A list was compiled of all X-rays taken at Mosta, Qormi, Floriana and Paola Health Centres in children aged 0-16 years during the period of 1st July 2020 till 31st December 2020. This data covered all X-rays taken in the primary care setting within the public health sector in Malta (that is in all public-funded health centres). The list was compiled using the Radiology Information System (RIS) and Picture Archiving and Communication System (PACS). Furthermore, follow-up appointments were collected and analysed using the iSOFT Clinical Manager (iCM).

Subsequently, a form was designed using Microsoft Excel® to facilitate collection of data. Data collected from systems mentioned above included the following:

- The day (weekday/weekend) and month when imaging was performed.
- The age and gender of the patient.
- The source of referral for the X-ray.
- The type of X-ray.
- The reason for the X-ray request, and whether specific guidelines were followed when requesting the X-ray.
- Whether the X-ray result was normal or abnormal.
- Whether there was any registered follow-up, and if yes, the type of follow-up.

Data analysis

Data input and analysis was carried out using Microsoft Excel®2016.

Study approval

Approval was obtained from the Department of Primary HealthCare and the Data Protection Officer of the same department prior to the commencement of the study. Ethical clearance was also obtained from the Faculty Research Ethics Committee (FREC) of the Faculty of Medicine and Surgery. Data was accessed by all listed authors. Parent/patient permission was not deemed necessary since data was anonymised for use in this research.

RESULTS

Total number of children referred for imaging and x-rays taken

Over the 6-month period studied in this evaluation (July to December 2020), a total of 1176 children were referred for X-ray imaging, and the total number of X-rays taken was 1324. This discrepancy is explained by the fact that some children were referred for more than one X-ray during a single visit.

Demographic details

The majority of children referred for imaging during the 6-month study period were males (72.4%), and 27.6% were females. The most frequent age group was 13-16 years. The age/gender distribution of these patients is reproduced in Figure 1.

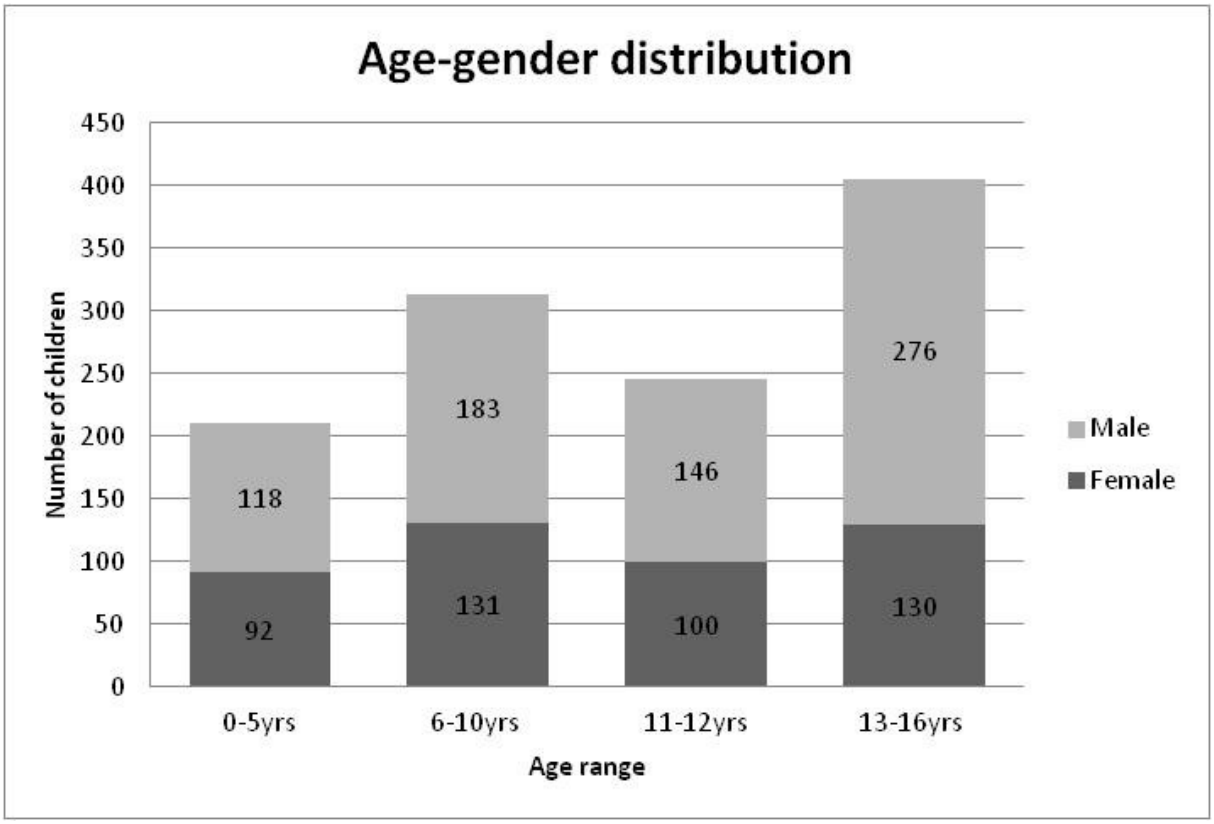

Figure 1: Age-gender distribution of children referred for X-rays

Day and month

Most of the X-rays were performed during weekdays (73%), with the rest being taken on Saturday (16%) and Sunday (11%). The highest number of X-rays were found to be taken during the months of November (20.5%) and December (18.7%). This was followed closely by July (17.6%). Figure 2 gives a detailed representation of these findings.

Source of referral

The majority of X-rays were ordered by general practitioners (GPs) working in the health centres (40%), followed by general practitioner trainees (29%) and foundation doctors (19%). Foundation doctors are doctors who are in their first two years of non-specialised training. Only 7% of X-rays were ordered by GPs working in the private sector and 5% by consultants.

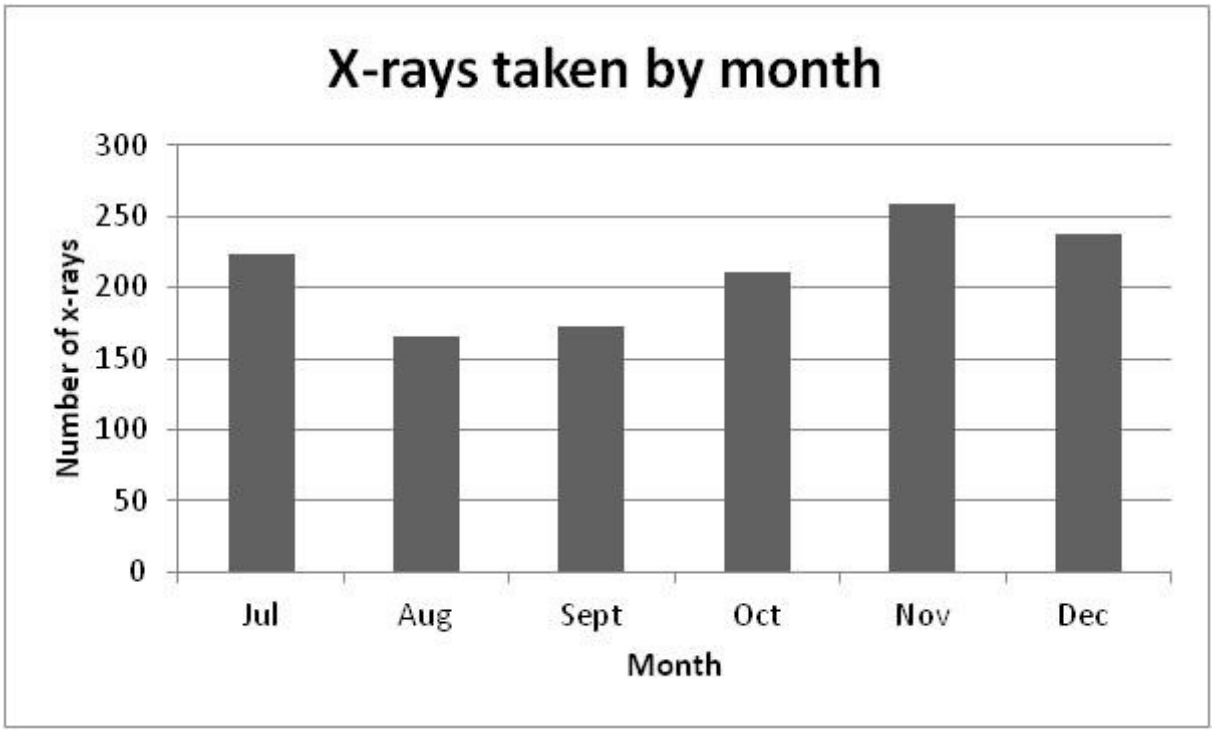

Figure 2: Number of x-rays taken by month of the year

Imaging procedures performed

Most imaging investigations were taken to examine the upper limb (53.1%) and lower limb (37.1%), followed by chest X-rays (5.8%). Figure 3 summarizes these findings.

Reason for X-ray request

The highest number of X-rays (36.3%) were requested for trauma, the type of which was not specified by the doctor on the electronic request. This was followed by trauma secondary to a fall (32%), trauma secondary to sports injury (12.2%) and pain or tenderness (5.2%). Trauma was therefore the indication for the majority of imaging performed. Chest clinic requests for chest X-rays for tuberculosis (TB) screening made up 4% of referrals. Other reasons for referral included, amongst others, 'investigations for cardiomegaly', 'assessment of response to treatment', 'broken plaster' and follow-ups of fractures (3.6%). No clinical details were provided in 2.6% of cases. A graphic representation of these results can be seen in Figure 4.

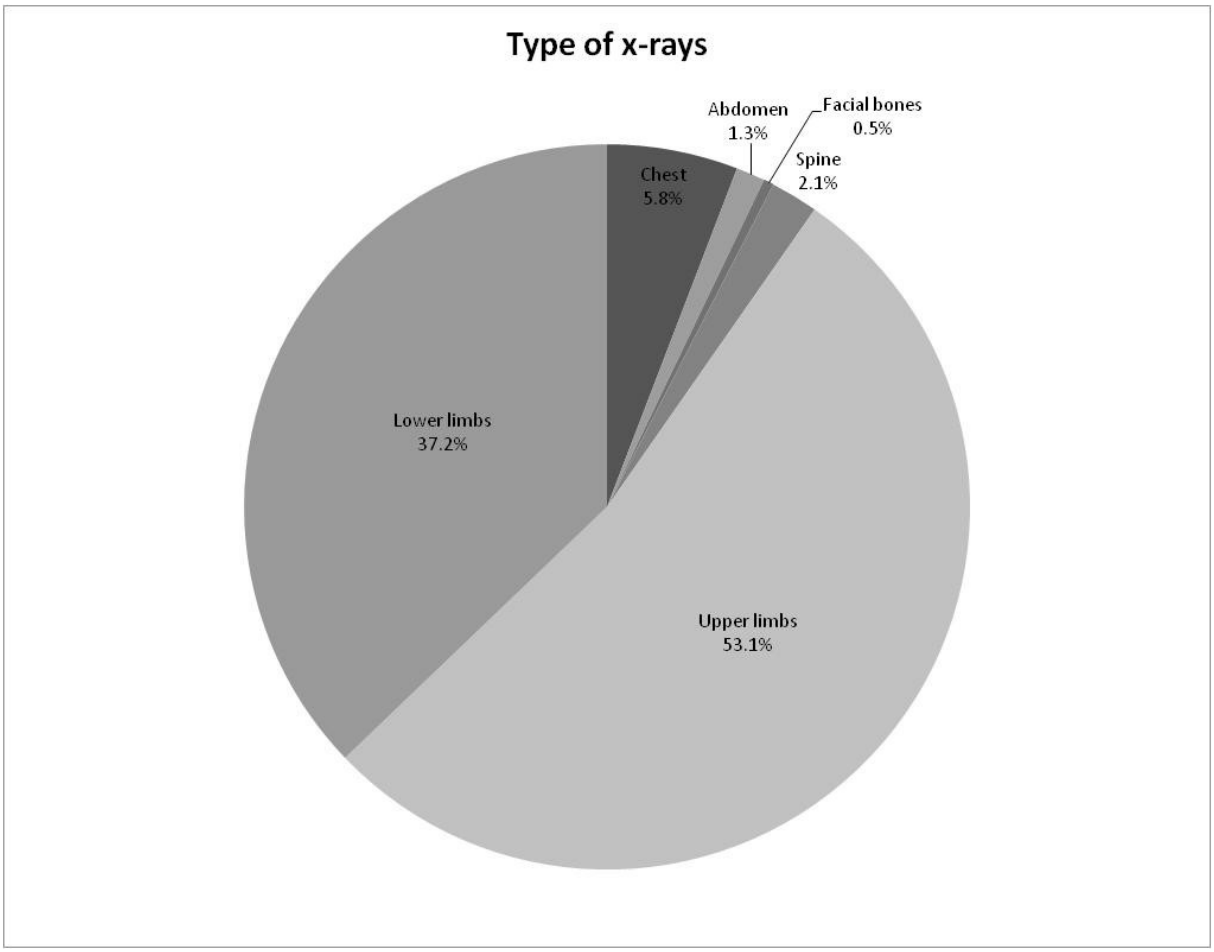

Figure 3: Type of X-rays ordered

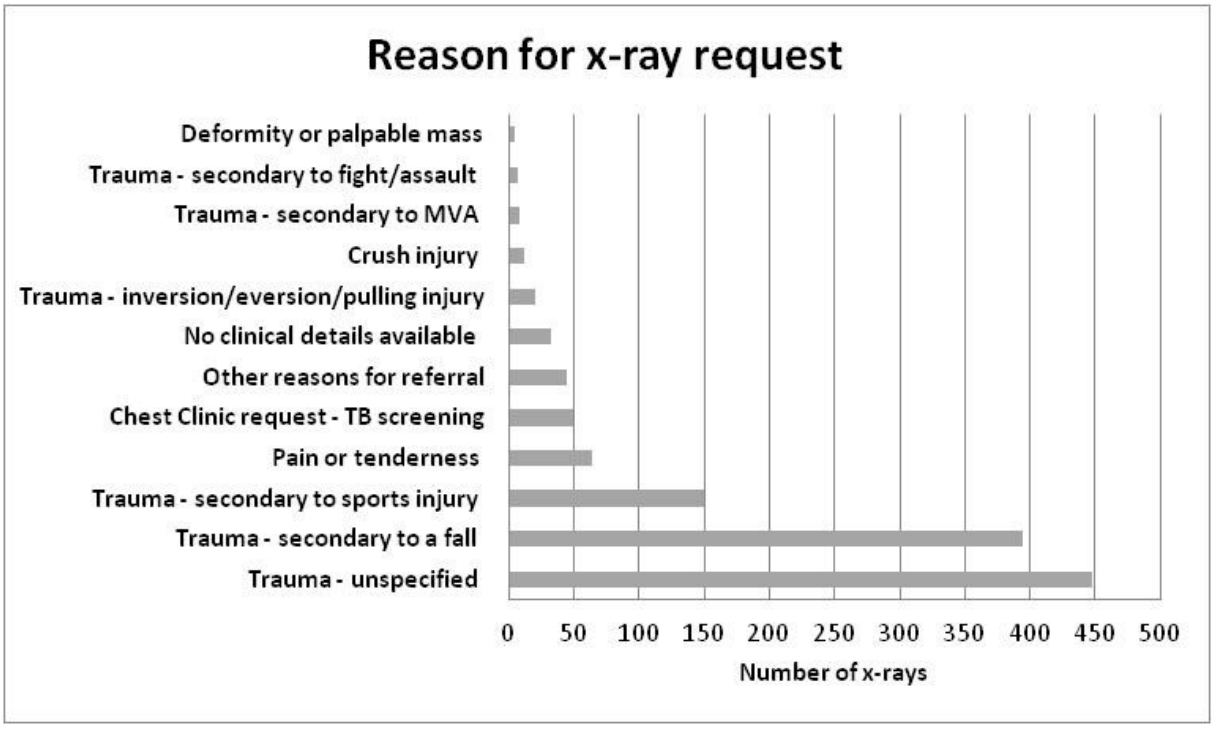

Figure 4: Reason for X-ray request

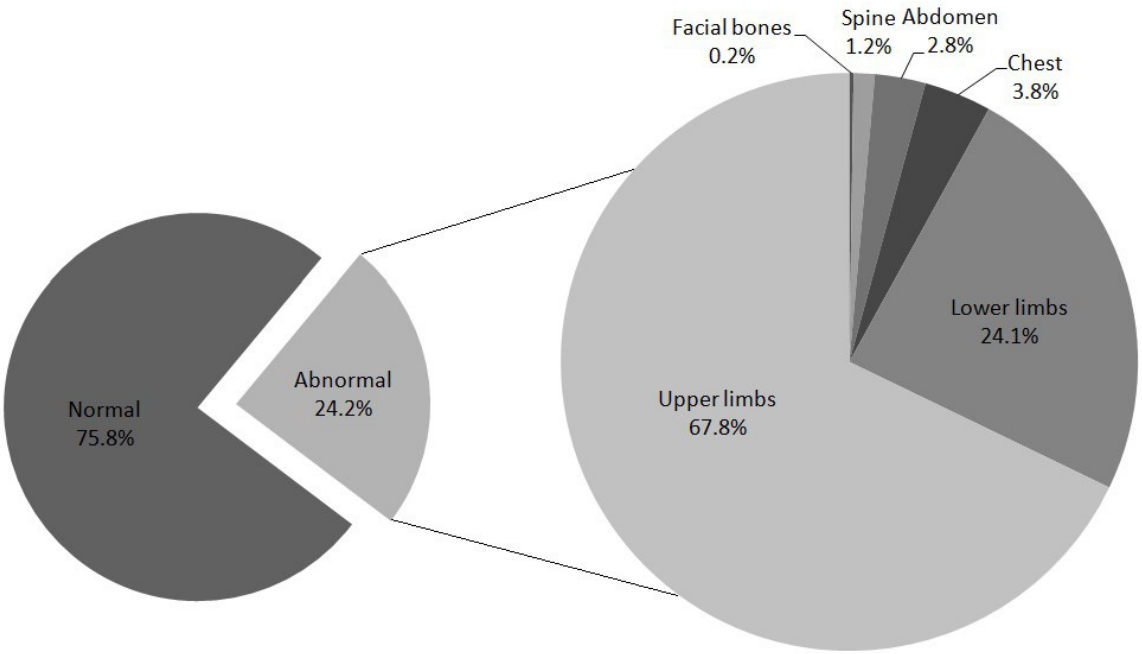

Figure 5: Types of X-rays with an abnormal result

Guidelines

From the details provided by the referring doctors on the request form, 4.3% of requests were seen to follow specific guidelines. These were namely the Ottawa rules of the ankle (45.6%), foot (38.6%) and knee (15.8%).

X-ray findings

The majority (75.8%) of X-rays taken were reported as normal, with the remaining 24.2% reporting a fracture or abnormality. Figures 5 and 6 provide more detail about those X-rays which were reported as abnormal, namely the type of X-rays and the reason for referral for X-ray. From all the trauma X-rays, 66% were reported as normal, and 34% were abnormal.

Lower limb x-ray requests and Ottawa rules

A total of 490 lower limb x-rays were taken, with 20.8% of these being reported as abnormal, and 79.2% reported as normal. From the total number of lower limb x-rays taken, 369 (75%) were requested in view of trauma. Of these, 20% were reported as abnormal. Figure 7 summarizes the result of all lower limb X-rays taken in relation to whether any specific guidelines were used to guide the request of the X-ray.

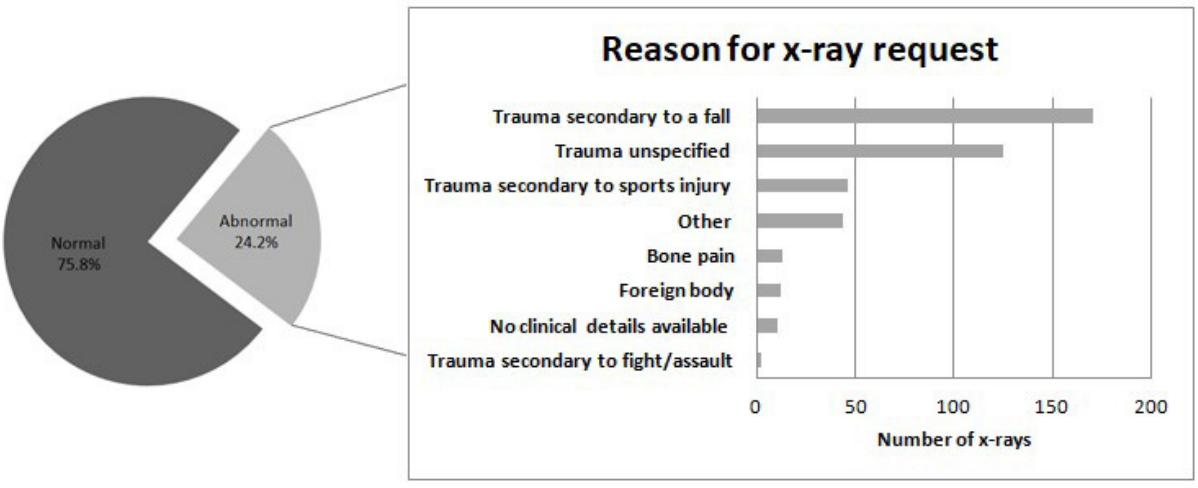

Figure 6: Reason for request in X-rays with an abnormal result

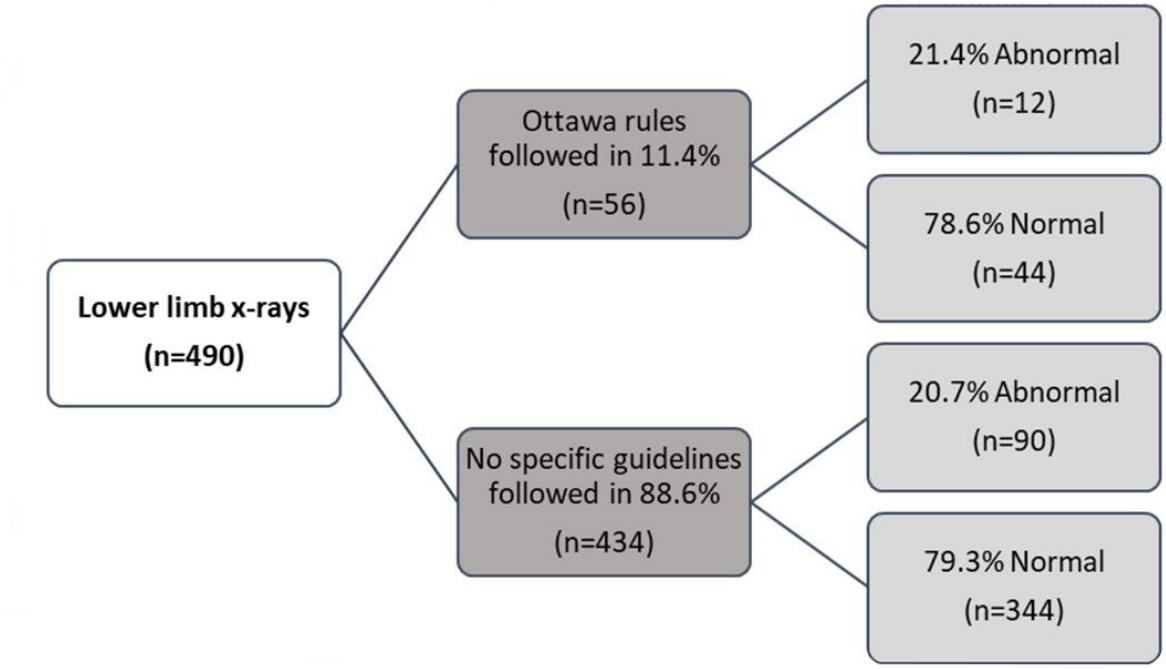

Figure 7: Lower limb x-ray requests

Patient follow-up

From the children referred for x-ray, 34% had a registered follow-up in the days or weeks after the imaging was done. The majority of children had a Fresh Trauma Clinic appointment (49.8%), and 33.9% had a registered visit at the Accident and Emergency (A&E) department. Other types of follow-up amounted to 16.3%, and these included appointments for further imaging, such as Magnetic Resonance Imaging (MRI), physiotherapy appointments and admission to hospital for surgery. Figure 8 summarizes these findings.

The majority (86%) of children who had a registered follow-up had an abnormal x-ray result. The other 14% who were referred had a normal X-ray result. The reasons why this subset of patients was referred were not identified in this study. The most common follow-ups were A&E visits and outpatient appointments.

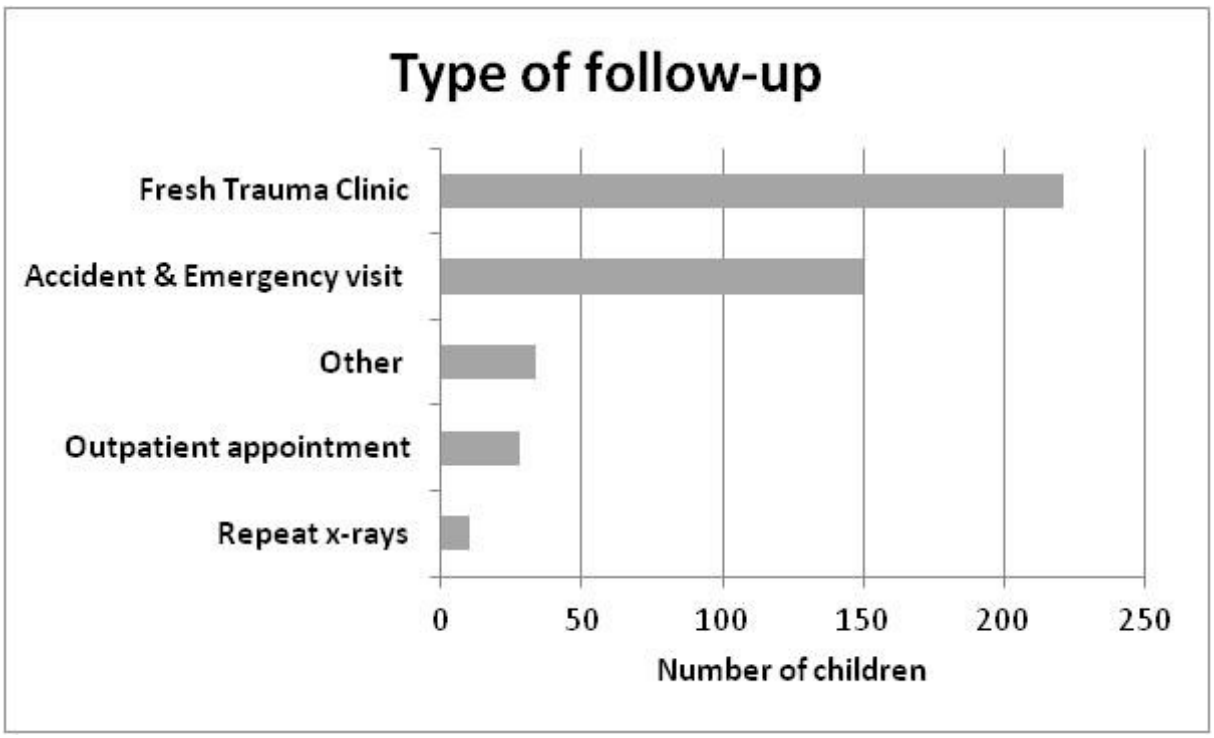

Figure 8: Type of follow-up

DISCUSSION

Children may be at a higher risk of sustaining trauma in view of their more active lifestyles. Injuries are one of the most common complaints for the paediatric population to present at a primary care level or emergency department (Larsen et al., 2020). Consequently, post-traumatic imaging will be performed to confirm or exclude a fracture. This evaluation confirms that the majority of imaging performed in children in the primary care setting is secondary to some form of trauma, with a predominance of male children. The main issue lies in the clinical decision regarding whether imaging is warranted or not, depending on the specific case.

Considering that X-rays form part of the electromagnetic spectrum, concern about their use is warranted, even though they are not at any extreme end. In low doses, such as in diagnostic X-rays, it is considered safe across all ages (Oakley and Harrison, 2020). Oakley and Harrison (2020) point out evidence that shows that low dose X-rays, when separated by at least 24 hours, do not lead to an accumulation of radiation in the body. The lag period of 24 hours or more allows the body to heal itself and remove any radiation-induced DNA damage. This also applies to children and adolescents, where Tubiana, et al. (2011) determined that children who were exposed to low dose radiation had no excess cancers detected in those parts of the body which were imaged.

In total, 75.8% of images reviewed in this study resulted as normal, and 66% of all trauma X-rays were normal. This might suggest that most of the images ordered at primary care level could have been avoided; however one must take into consideration the difficulty in obtaining a history from a child and significant signs that might not be present upon presentation.

Guidelines may be useful in reducing the number of unnecessary imaging procedures. The Ottawa rules of the knee, ankle and foot are possibly the guidelines that are referred to most commonly in cases of trauma. Interestingly, the results in the evaluation showed very similar numbers between those lower limb x-rays which used and did not use any of the Ottawa rules. Plint, et al. (1999) and Emparanza & Aginaga (2001) comment that the Ottawa rules of the knee and ankle are 100% sensitive, even in children. Bachmann, et al. (2003) comment that the Ottawa ankle rules have almost 100% sensitivity with a modest specificity. The similarity in numbers seen in Figure 7, were the numbers of abnormal x-rays identified were similar between using Ottawa rules or not, could be related to a lack of clinical details provided in some electronic requests. In this scenario, it was assumed that the rules were not used, even though they might have been used to guide the clinician's decision about requesting the X-ray.

Although trauma guidelines could assist the clinician in further reducing the number of unnecessary imaging using evidence-based decision making, the final decision is always based on the doctor's clinical judgement. Guidelines cannot be tailored to all specific situations. The ESR iGuide tries to help in this area, where it provides several possible scenarios to meet the requirements of the patients who present for a consultation with a possibility of requiring an X-ray.

The other reasons enlisted which required imaging were considerably less common than trauma. Ingestion of foreign bodies is a relatively common scenario in children, and therefore the Royal Children's Hospital, Melbourne provides a structured and detailed guideline on which scenarios merit imaging, and those which require further management with regards to such cases (The Royal Children's Hospital Melbourne, 2020).

Adapting international guidelines to local requirements, both at primary and secondary levels of care could benefit patients and clinical staff alike, providing a structured care pathway and avoiding unnecessary radiation where possible.

Study strengths

This study has covered the whole paediatric population who required X-rays at a primary care level in the public sector, over a 6-month period. Thus, the data collected is extensive, providing a clear scenario of the incidence of X-rays requested within this setting. Several

factors were identified in order to evaluate the reasons for X-ray referral and the outcome of the radiological interventions performed.

Study limitations

The above data was collected during the first wave of the COVID-19 pandemic where restrictions to social gatherings may have contributed to decreased cases of trauma. Only X-rays taken at health centres were included in this study, therefore excluding patients presenting to the Emergency Department or in the private sector. Clinical details upon requesting the X-rays were sometimes limited or unable to be accessed as in the case of X-rays referred from the private sector.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The objectives of this evaluation were reached. The results show that the majority of X-rays taken during this study in the paediatric population were referred following trauma. Approximately 75% of all X-rays taken were normal.

Recommendations

Educating doctors about the use of judicial x-ray imaging and development of local guidelines might help to reduce unnecessary investigations. The available international guidelines might be used to guide development of local guidelines. Scoring systems associated with such guidance might also be included in X-ray requests where it would serve as a reminder for the requesting clinician. It is planned to repeat this evaluation after implementing the recommendations, to assess for any significant change in the outcome of the study.

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Dr Tracy Lee VIDAL
MD, MRCGPInt, MMCFD, MSc
Senior General Practitioner, Active Ageing and Community Care, Malta
Email: tracy-lee.vidal@gov.mt

Dr Bernard Paul SPITERI MEILAK
MD, ATCL
GP Trainee, Primary HealthCare, Malta

Dr Marilyn HARNEY
MD, MRCGPInt, MMCFD
Senior General Practitioner, Primary HealthCare, Malta

Dr Daniela BONELLO
MD
GP Trainee, Primary HealthCare, Malta

Dr Denise LE BRUN
MD
GP Trainee, Primary HealthCare, Malta