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Index

BJMP March 2018 Volume 11 Issue 1

Research Articles

Post-Traumatic Stress Disorder Symptoms and Associated Risk Factors: A cross-sectional study among Syrian refugees 4
Antoine Aoun, Janine Joundi & Najwa El Gerges

Review Articles

Acanthosis Nigricans in Pre-diabetic states 11
James Paul Pandarakalam

Case Reports/Series

Adult Onset Still's Disease: A Case Report 19
Yasmeen Ajaz, Ravinder Bhatt, Rabah Elbahnasawy, Asif khan, Ali Ganai & Sameem Matto.

It takes all sorts – a curious case of pseudohyperaldosteronism, hypertension and liquorice tea. 22
Peter Allan, Michael Newman & Tareq Husein

Clinical Practice

Ovarian masses in pregnancy: a single centre retrospective study 25
Tanja Eichenberger-Gautschi, Alison Smith & Ahmad Sayasneh

Education and Training

Training student doctors to become educators 29
Aimee Charnell, Laura Stephenson & Michael Scales

Viewpoint

Physicians Involved Assisted Suicide 32
Dr James Paul Pandarakalam

Letters to the Editor

Prevention and management of accidental carotid artery cannulation; Novel use of a double male Luer lock connector 37
Asif Mahmood, Dumisani Ncomanzi, Asquad Sultan & Sandeep Sharma

Miscellaneous

Resuscitation 39
Jennifer Wolkin

Research Article

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Post-Traumatic Stress Disorder Symptoms and Associated Risk Factors: A cross-sectional study among Syrian refugees

Antoine Aoun, Janine Joundi & Najwa El Gerges

Abstract

Aims: The Syrian conflict has generated a large flow of refugees, more than one million of them located in Lebanon. Very few studies were conducted on mental health of Syrian refugees. The objective of this study was to examine post-traumatic stress disorder (PTSD) symptoms and to determine the associated risk factors in a sample of Syrian refugees living in North Lebanon.

Methods: An observational cross-sectional study was conducted, during February and March 2016, on a random sample of 450 (84.67% women and 15.33% men) Syrian refugees, aged between 14 and 45 years, living in North Lebanon. Each participant was interviewed individually using the Primary Care-PTSD (PC-PTSD) screening tool, translated into Arabic, with a back-translation to the original language to verify its accuracy. Reporting three or more PTSD symptoms was defined as a positive screen. Descriptive statistics and multiple regression analyses were used to examine the prevalence of a positive PTSD screen and associations with socio-demographic and health-related characteristics.

Results: The prevalence of positive PTSD screen in our sample of Syrian refugees was 47.3%. There were statistically significant associations between a positive PTSD screen and being a woman (P=0.011), married (P<0.001), older than 18 years (P=0.006), having chronic medical conditions (P<0.001) and reporting more than 2 stressful life events (P<0.001).

Conclusion: The results of this survey are alarming, with high proportions of refugees at risk for PTSD. Early screening may help identify individuals who would benefit from interventions to improve mental health.

Keywords: post-traumatic stress disorder, refugees, war, mental health, Middle-East, screening.

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Abbreviations: BMI - Body Mass Index; CS - Collective Shelters; DSM-4 - Diagnostic and Statistical Manual of Mental Disorders Version 4; DSM-5 - Diagnostic and Statistical Manual of Mental Disorders Version 5; IRB - Institutional Review Board; ITSs - Individual Tented Settlements; kg - kilograms; m - meters; NDU - Notre Dame University; PC-PTSD - Primary Care Post-Traumatic Stress Disorder; PHCs - Primary Health Care Centres; PTSD - Post-Traumatic Stress Disorder; SLE - Stressful Life Events; SPSS - Statistical Package for Social Science; UNHCR - United Nations High Commissioner for Refugees

INTRODUCTION

Several studies found that refugees develop post-traumatic stress disorder (PTSD) after having endured war trauma[1], or certain circumstances related to migration like moving to a new country, being unemployed and poor housing[2]. PTSD is described as distress and disability due to a traumatic event that occurred in the past[3]. In 2013, the American Psychiatric Association revised the PTSD diagnostic criteria in the fifth edition of its *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)* and PTSD was included in a new category, Trauma- and Stressor-Related Disorders[4]. All of the conditions included in this category required exposure to a traumatic or stressful event as a diagnostic criterion[4]. The person with PTSD often avoids trauma-related thoughts and emotions, and discussion of the traumatic event[4]. PTSD patients are invariably anxious about re-experiencing the same trauma. The trauma is usually re-lived by the person through disturbing, repeated recollections, flashbacks, and nightmares[4]. Symptoms of PTSD generally begin within the first 3 months after the provocative traumatic event, but may not begin until several years later[4]. A large number of children (10-40%), 16 or younger, who have experienced a traumatic event in their life, tend to develop PTSD later on[5]. Moreover, many families with children growing in war zones and then moving to safer places, experience trauma, stress and reduced functioning[6]. These families have different resilience rates in their survival mechanisms, coping strategies and adaptation levels[7].

The latest war in Syria has led to the migration of large parts of the Syrian population to neighboring countries such as Lebanon, Jordan and Turkey[8].The United Nations High Commissioner for Refugees (UNHCR) estimates that approximately 1.5 million refugees are located in Lebanon[9]. These refugees have been exposed to several types of traumatic events that may increase the incidence of mental health problems[10].

We hypothesize that the proportion of positive PTSD screens would be high among Syrian refugees with the presence of some

specific related risk factors. Thus, the objective of our study was to examine PTSD symptoms and to determine the associated risk factors in a sample of Syrian refugees living in North Lebanon.

METHODS

1. Study design and population

This was a cross-sectional study that aimed to assess the proportion of Syrian refugees in North Lebanon who were at high risk of developing PTSD, and to examine the association of PTSD high risk with other factors. The survey was carried out during February and March 2016. A convenient sample of Syrian refugees of both gender, aged between 14 and 45 years, living in North Lebanon, was selected out of a population of 262,151[11].

The estimated minimum sample size, calculated using Raosoft sample size calculator, with a margin of error of 5% and a confidence interval of 95%, was 384 refugees. A total number of 450 Syrian refugees, residing in individual tented settlements (ITSs), collective shelters (CS) or Primary Health Care Centers (PHCs) located in North Lebanon, was selected according to inclusion and exclusion set criteria.

The inclusion criteria were: Syrian refugees, aged (14-45 years), physically and mentally independent. Hence, all subjects that were younger than 14 or older than 45, speechless, deaf, physically and mentally dependent, or have undergone recent moderate or severe surgery (less than one week earlier), were excluded from the study.

2. Ethical considerations

The study protocol received approval from the Notre Dame University (NDU) Institutional Review Board (IRB). The approval comprised details about the procedure of the study and the rights of the participants. Informed consent was obtained from each participant. The questionnaires were answered anonymously, ensuring confidentiality of collected data.

3. The Interview questionnaire

The interview questionnaire was divided into six sections consisting of a total of 46 questions. The questions were dichotomous, close-ended and open-ended. A cover page described the purpose of the study, ensuring the anonymity and confidentiality, and soliciting the consent of participants. The questionnaire collected data on the demographic and socio-economic characteristics of the participants. Information about health status and stressful life events (SLE) were also obtained. The PC-PTSD (Primary Care Post-Traumatic Stress Disorder) tool was used to screen PTSD.

For the purposes of the study, subjects were classified as having/not having positive PC-PTSD. The results were used to calculate the proportion of Syrian refugees who are at high risk of developing PTSD.

PC-PTSD questionnaire: The PC-PTSD was initially developed in a Veteran Affairs primary care setting and is currently used to screen for PTSD, based on the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-4) diagnostic criteria[12]. The screen consisted of 4 questions related to a traumatic life event: In the past month you (1) Have had nightmares about it or thought about it when you did not want to?; (2) Tried hard not to think about it or went out of your way to avoid situations that reminded you of it?; (3) Were constantly on guard, watchful, or easily startled?; (4) Felt numb or detached from others, activities, or your surroundings? The answers to these questions were dichotomous (Yes/No) and the total screen was considered "positive" when a patient answered "yes" to three out of four questions. PC-PTSD showed a high sensitivity (86%) and moderate specificity (57%) when using a cutoff score of 2[13].

In order to validate the Arabic version of the PC-PTSD questionnaire, it was translated into Arabic and translated back into English. The original version of the Arabic questionnaire was pilot-tested on 10 Syrian refugees to ensure the validity of the answers, and to guarantee its reliability.

Anthropometric measurements: The main anthropometric measurements were weight and height. Participants were dressed in light clothes and barefooted, and standing height was measured to the nearest 0.1 cm using a stadiometer. Body weight was measured to the nearest 100g using an electronic scale. Body Mass Index (BMI) is a measure of weight adjusted to height (kg/m^2), calculated by dividing weight (in kilograms) by the square of height (in metres). For the purposes of the study, BMI was recoded into four categories: underweight, normal, overweight and obese.

4. Data entry and statistical analysis

The Statistical Package for Social Science (SPSS) for Windows (version 22) was used for data entry and analysis.

First, bivariate analyses of categorical variables were performed using the Fisher exact tests, Chi-squared tests and Student's t-test. The dependent variable was the high risk of PTSD, using the PC-PTSD tool. Thus, the PC-PTSD score was considered the dependent variable: a dichotomous variable of PC-PTSD (-) and PC-PTSD (+), and all variables that might be a risk factor or might lead to PTSD were set as the independent variables. Two main independent variables were: age and gender. Other variables included: marital status, place of residence, number of people and families living in the same household (crowding index), income, education status, profession, work status, lifestyle habits, medical or psychological problems, medication taken and SLE. Frequencies and percentages were calculated for qualitative variables, and mean and standard deviations for quantitative variables (BMI, crowding index). A p-value of 0.05 or less was considered to be statistically significant.

RESULTS

Table 1: Socio-demographic characteristics of the 450 Syrian refugees

Variables	Frequency (n) or Mean	Percentage (%) or Standard Deviation
Gender		
· Male	69	15.3
· Female	381	84.7
Age (years)	**27.9**	**8.1**
Crowding index (co-residents/room)	4	2.4
Crowding index		
· ≤ 2.5	135	30
· 2.51-3.5	108	24
· > 3.5	207	46
Current place of residence		
· Tented settlements	62	13.8
· Collective shelters	92	20.4
· Building	296	65.8
Educational level		
· Don't know how to read and write	33	7.3
· Know how to read and write/Elementary	216	48
· Complementary/Secondary/Technical	178	39.6
· College degree	23	5.1
Marital status		
· Single	54	12
· Married	378	84
· Divorced	5	1.1
· Widowed	13	2.9
Current employment status		
· No	379	84.2
· Full-time job	40	8.9
· Part-time job	31	6.9
Presence of income		
· No	379	84.2
· Yes	71	15.8
Perceived income (n=71)		
· Satisfactory	25	35.2
· Non-Satisfactory	46	64.8

Table 2: Health characteristics and migration factors of the 450 Syrian refugees

Variables	Frequency (n)	Percentage (%)
BMI category (kg/m2)		
· <18.5	11	2.4
· 18.5-24.9	176	39.1
· ≥ 25	263	58.5
Tobacco consumption		
· Yes	97	21.6
· No	353	78.4
Presence of medical conditions		
· No	337	74.9
· Yes	113	25.1
Migration status		
· Before 2011	15	3.3
· 2011-2013	339	75.3
· After 2013	96	21.4
Seeking professional help for psychological disorders		
· No	439	97.6
· Yes	11	2.4
Number of stressful life events		
· None	22	4.9
· [1-2]	181	40.2
· [3-4]	235	52.2
· [5-6]	12	2.7
PC-PTSD		
· Negative	237	52.7
· Positive	213	47.3

Table 3: Socio-demographic characteristics associated with positive screen for PTSD among the 450 Syrian refugees (bivariate analyses)

Variables	Positive PC-PTSD n(%) or mean±SD	Negative PC-PTSD n(%) or mean±SD	p-value
Gender			**0.011***
· Male	23 (33.3)	46 (66.7)	
· Female	190 (49.9)	191 (50.1)	
Age (years)	**28.9 ± 7.6**	**26.9 ± 8.5**	**0.009***
Crowding index (co-residents/room)	**4.2 ± 2.7**	**3.8 ± 2.2**	**0.069**
Crowding index			**0.294**
· ≤ 2.5	58 (43.0)	77 (57.0)	
· 2.51-3.5	49 (45.4)	59 (54.6)	
· > 3.5	106 (51.2)	101 (48.8)	
Current place of residence			**0.137**
· Tented settlements	27 (43.5)	35 (56.5)	
· Collective shelters	52 (56.5)	40 (43.5)	
· Building	134 (45.3)	162 (54.7)	
Educational level			**0.479**
· Don't know how to read and write	16 (48.5)	17 (51.5)	
· Know how to read and write/Elementary	95 (44.0)	121 (56.0)	
· Complementary/Secondary/Technical			
· University level	92 (51.7)	86 (48.3)	
	10 (43.5)	13 (56.5)	
Marital status			**0.000***
· Single	9 (16.7)	45 (83.3)	
· Married	191 (50.5)	187 (49.5)	
· Divorced	4 (80.0)	1 (20.0)	
· Widowed	9 (69.2)	4 (30.8)	
Current employment status			**0.205**
· No	184 (48.5)	195 (51.5)	
· Full-time job	14 (35.0)	26 (65.0)	
· Part-time job	15 (48.4)	16 (51.6)	
Presence of income			**0.233**
· No	184 (48.5)	195 (51.5)	
· Yes	29 (40.8)	42 (59.2)	
Perceived income (n=71)			**0.264**
· Satisfactory	8 (32.0)	17 (68.0)	
· Non-Satisfactory	21 (45.7)	25 (54.3)	

**Significant with p-value < 0.05*

Table 4: Health characteristics and migration factors associated with positive screen for PTSD among the 450 Syrian refugees (bivariate analyses)

Variables	Positive PC-PTSD n (%)	Negative PC-PTSD n (%)	p-value
BMI category (kg/m2)			**0.183**
· *<18.5*	7 (63.6)	4 (36.4)	
· *18.5-24.9*	75 (42.6)	101 (57.4)	
· *≥ 25*	131 (49.8)	132 (50.2)	
Tobacco consumption			**0.369**
· *Yes*	42 (43.3)	55 (56.7)	
· *No*	171 (48.4)	182 (51.6)	
Presence of medical conditions			**0.000***
· *No*	143 (42.4)	194 (57.6)	
· *Yes*	70 (61.9)	43 (38.1)	
Migration status			**0.094**
· *Before 2011*	5 (33.3)	10 (66.7)	
· *2011-2013*	154 (45.4)	185 (54.6)	
· *After 2013*	54 (56.2)	42 (43.8)	
Seeking professional help for psychological disorders			**0.003***
· *No*			
· *Yes*	203 (46.2)	236 (53.8)	
	10 (90.9)	1 (9.1)	
Number of stressful life events			**0.000***
· *None*	0 (0.0)	22 (100.0)	
· *[1-2]*	66 (36.5)	115 (63.5)	
· *[3-4]*	138 (58.7)	97 (41.3)	
· *[5-6]*	9 (75.0)	3 (25.0)	

** Significant with p-value < 0.05*

All the socio-demographic, health and migration characteristics of our sample of Syrian refugees were described in Tables 1 and 2. Out of the 450 participants, 47.3% had positive PC-PTSD. In order to study the association between the socio-demographic characteristics among the Syrian refugeesand PTSD screening, abivariate association was explored as shown in Table 3. The results indicate a significant difference between gender groups, as almost half of the women (49.9%) had a positive screen for PTSD compared to 33.3% of the men (p=0.011). Mean age was significantly higher in refugees with positive PC-PTSD (28.9 ± 7.6 years) versus those with negative PC-PTSD (26.9 ± 8.5 years) (p=0.009). PTSD screening was shown to be significantly associated with marital status. In fact, positive PC-PTSD was mostly perceived in divorced participants (80%) compared to 69.2% of widowed, 50.5% of married, and 16.7% of single subjects (p=0.000). Yet, crowding index, current place of residence, educational level, employment status, and income were not significantly associated with positive PC-PTSD (p>0.05).

The association of health characteristics and migration factors among the Syrian refugees with PTSD screening was displayed in Table 4. A significant association was observed between the presence of medical condition and positive screen for PTSD, as 61.9% of subjects suffering from a medical condition had a positive PC-PTSD, compared to 42.4% of participants without medical conditions (p=0.000). However, BMI and tobacco consumption were not significantly associated with PTSD screening (p>0.05). PTSD screening was significantly associated with the presence of psychological disorders. Thus, 90.9% of refugees who sought professional help for psychological disorders had positive PC-PTSD, versus 46.2% of those who did not (p=0.003). Positive PC-PTSD was significantly associated with the increase in the number of SLE. In fact, none of the participants without any stressful event had a positive PC-PTSD, compared to 36.5% of participants with 1-2 SLE, 58.7% of participants with 3-4 SLE and 75% of participants with 5-6 SLE (p=0.000). On the other hand, no significant association was observed between PC-PTSD and migration status (p>0.05).

DISCUSSION AND CONCLUSION

PTSD represents the most frequently occurring mental disorder occurring among refugees[14]. PTSD prevalence rates ranging between 15% and 80% have been reported in refugees. A study of Cambodian refugees living in the Thailand-Cambodia border camp indicated that 15% had PTSD[15]. A cohort study aimed to show the prevalence of PTSD among Iranian, Afghani and Somalian refugees that have moved to the Netherlands at a 7-year interval [(T1=2003) - (T2=2010)]. Results displayed a high prevalence at both T1 (16.3%) and T2 (15.2%). The reason for this high unchanged prevalence may be due to the late onset of the PTSD symptoms, and the low use of mental health care centers[16]. De Jong and colleagues reported that 50% of the refugees in Rwandan and Burundese camps had serious mental health problems, mainly PTSD[17]. While Teodorescu and colleagues aimed to illustrate the prevalence of PTSD among refugees in Norway; results showed that 80% of the refugees had PTSD[18]. In our study, the high proportion of positive screen for PTSD among Syrian refugees was estimated at 47.3%. In 2006, a mental health assessment demonstrated that Lebanese citizens exposed to war were more likely to develop psychiatric problems such as PTSD[19]. Subsequently, a cross-sectional study was done in South Lebanon on 681 citizens in 2007 (1-year after the 2006 war in Lebanon). The aim of the study was to examine the prevalence of PTSD 12 months after 2006 war cessation. Results showed that the prevalence of PTSD was 17.8%[19]. A recent cross sectional study, aimed to show the prevalence of PTSD and explore its relationship with various variables. The study included 352 Syrian refugees settled in camps in Turkey. An experienced psychiatrist evaluated the participants, and results demonstrated that 33.5% of study participants had PTSD, mainly female refugees, people who experienced 2 or more SLE, or those who had a family history of psychiatric disorder[20].

PTSD has been associated with a wide range of traumatic events: emotional or physical abuse[21], sexual abuse[22], parental break-up[23], death of a loved one[24], domestic violence[25], kidnapping[26], military services[27], war trauma[28], natural disasters[29] and medical conditions including cancer[30], heart attack[31], stroke[32], intensive-care unit hospitalization[33], and miscarriage[34].

Our findings should be interpreted taking into account several limitations. The first limitation is the use of screening tools, instead of the more accurate diagnosis of the clinician, in order to detect PTSD. Given that a standardized screening tool for PTSD was used, our rates are likely an overestimate of the true prevalence rates. Secondly, this study was conducted with a limited sample of Syrian refugees and therefore should not be generalized to all refugees of other eras or from other countries. The third limitation is represented by the lack of information on the presence of other Axis I psychiatric comorbidities such as anxiety or mood disorder that could facilitate the development of PTSD or influence its manifestations[35-36].

Refugees are an important group to examine, given the high prevalence of mental health disorders. Although refugees are evaluated for health problems, currently there are no standardized screening and clinical practice guidelines for assessing PTSD in all refugees. Therefore, we may be missing opportunities to detect and treat these harmful and potentially fatal conditions. Our findings suggest the need to consider a standardized screening tool for PTSD in this population. In addition, a far greater percentage of patients may have "PTSD symptoms," that are abnormal but do not meet full criteria of the DSM5 for PTSD diagnosis, but still cause functional impairment and may later develop into a diagnosable PTSD. Given the overall high prevalence, one possible model for evaluation would be a stepped screening approach: Positive screens for PTSD could trigger a standardized clinical diagnosis for PTSD with more comprehensive assessment and early

intervention. Considering the high cost of treating individuals with PTSD, screening and intervention strategies should be addressed. Greater awareness among providers and increased targeted assessment and treatment efforts may increase early detection of a wide range of PTSD, preventing more serious future health problems and functional impairment among refugees.

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Competing Interests

None declared

Author Details

ANTOINE AOUN, MD PhD, Notre Dame University, Zouk Mosbeh, Lebanon. JANINE JOUNDI, MS, Notre Dame University, Zouk Mosbeh, Lebanon. NAJWA EL GERGES, RN MPH, Notre Dame University, Zouk Mosbeh, Lebanon. CORRESPONDENCE: Antoine Aoun, MD PhD, Notre Dame University, Zouk Mosbeh, Lebanon.
Email: aaoun@ndu.edu.lb

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Review Article

Acanthosis Nigricans in Pre-diabetic states

James Paul Pandarakalam

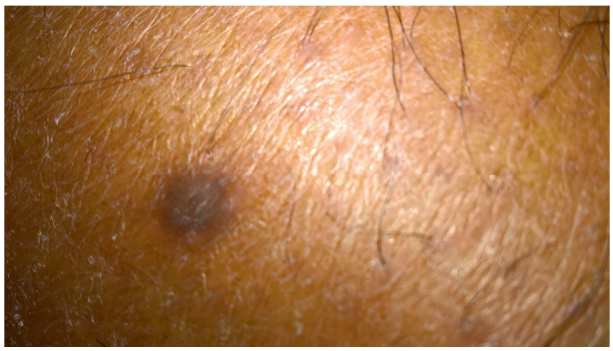
Abstract

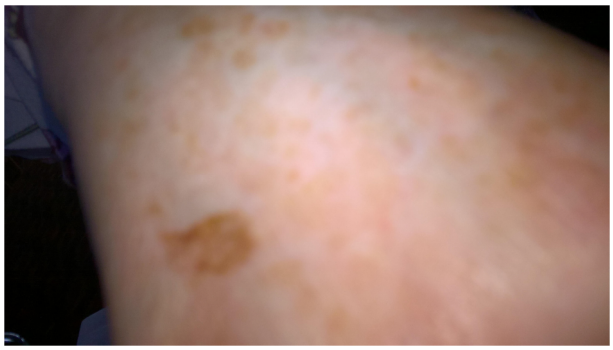
Abstract: The high incidence of type 2 diabetes mellitus has become for many a heavy penance for enjoying the luxuries of modern living. Today's western life style is characterised by sedentary habits and high-calorie food intake, which are contributory factors for this condition. If the prediabetic stage if identified early, it may be prevented from progressing into full diabetes. A significant percentage of occurrences of type 2 diabetes may be reversed if loss of weight and maintenance of a healthy body mass index (BMI) is achieved. At the same time as the life-style changes, the use of atypical antipsychotic medication is resulting in an increase in a specific metabolic syndrome among the psychiatric population. Along with other symptoms that herald this disease, darkened patches on the skin may be a warning signal to alert potential sufferers from diabetes to take precautionary measures. If acanthosis nigricans is proven to have autoimmune components, the same could be true of Diabetes Mellitus Type-ii.

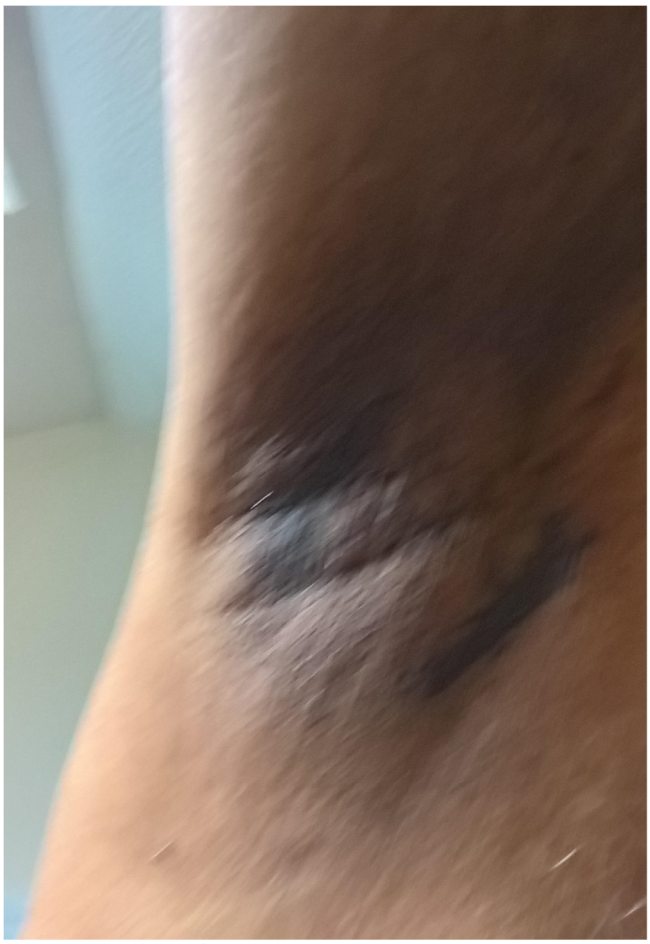
Keywords: Key words: overweight, Acanthosis nigricans, insulin resistance, autoimmunity, risk factors.

The identification of dark patches on the skin may be the first indication of type 2 diabetes mellitus (DM type 2). DM type 2 is a complex heterogeneous group of metabolic conditions characterised by elevated levels of serum glucose. Causative factors are impairment in both insulin action and insulin secretion. The darkening of the skin is usually evident on the hands and feet, in folds of skin, along the neck, and in the patient's groin and armpits.[1] The affected skin differs from that which surrounds it, and it feels velvety and also thicker. That skin may have hanging from it the small, soft, skin-coloured growths known as tags, and the area affected may be pruritic. This condition is a nonspecific dermatological disorder termed acanthosis nigricans (AN), which often occurs in patients with high insulin levels. Hud et al. (1992) found that 74% of the obese population exhibits AN.[2]The association of AN, skin tags, and diabetes mellitus due to insulin resistance – along with obesity in adolescents and young adults – is a well-defined syndrome.[3,4,5]

High-insulin levels in the blood may increase the body's production of skin cells, many of which have increased pigmentation that gives the skin a darkened appearance – dark patches appear on the skin. These are often the outcome of insulin receptors in the skin being triggered, causing mutations of normal tissue that are dark in colour and/or irregular in shape. The condition may be an indication that the blood sugar is persistently high. The term 'acanthosis nigricans' was originally proposed by Unna et al. in 1891, but the first descriptions of it were made a year earlier by two researchers working independently of each other: Pollitzer and Janovsk.[6] Kahn and colleagues tried to clarify the link between AN and insulin resistance in 1976.[7] Eventually, its presence became established as an indicator of insulin resistance or diabetes mellitus in obese patients.[8] In 2000, the American Diabetes Association formally accepted AN as such.[9] It should be borne in mind that AN must not be considered a characteristic feature of DM type 2; it is not a condition that is developed by all those who suffer from the disease.







Figures 1,2,3 - Acanthosis Nigrans

Pathogenesis

Although the pancreas produces insulin in DM type 2, the body cannot make use of it efficiently. The outcome is a build-up of glucose in the bloodstream, which may lead to high levels of blood glucose and insulin. At low concentrations, insulin regulates the metabolism of carbohydrates, lipids, and protein and may promote growth by binding to 'classic' insulin receptors. High concentrations of insulin may stimulate keratinocyte and fibroblast proliferation through high-affinity binding to the insulin-like growth factor 1 (IGF-1) receptors.[10] In obese patients elevated IGF-1 levels may contribute to keratinocyte and fibroblast proliferation;[11] the binding stimulates the proliferation of keratinocytes and fibroblasts, which leads to AN.

To put this simply, AN is the outcome of a toxic effect of hyperinsulinemia. Excess insulin causes the normal skin cells to reproduce rapidly rate, and it has been demonstrated to cross the dermo-epidermal junction and reach keratinocytes. In those who have dark skin, these new cells have increased melanin. The higher level of melanin results in the creation of a patch of skin that is noticeably darker than the skin surrounding it. The presence of AN is therefore a strong indicator of increased insulin production and, therefore, it is also a predictor for future DM type 2.

When the occurrence of AN is recognised, a prediabetic person has the opportunity to become more alert to their symptoms and to take precautions in the form of diet restrictions and weight loss. This is because overweight people tend to develop resistance to insulin over time. If too much insulin is the cause of AN, it is relatively easy for the patient to counter it by changing to a healthier diet, taking exercise, and controlling their blood sugar. Obesity-associated AN may be a marker for higher insulin needs in obese women with gestational diabetes,[12]andAN has been shown to be a dependable early indicator for metabolic syndrome in paediatric patients.[13]

Autoimmunity?

Unknown autoantibodies other than insulin receptors have been implicated in AN, which may explain the effectiveness of cyclosporine treatment. Kondo and colleagues identified a very rare occurrence – without type B insulin resistance – of generalised AN with Sjögren's syndrome and systemic lupus erythematosus-like features.[14]Theirs was the first report of generalised AN involving an area from the mucosa of the larynx to the esophagogastric junction, accompanied by autoimmune disorder (AD) responding to systemic immunosuppressive therapy. AN skin lesions and mucosal papillomatosis were medicated with oral cyclosporine A and were accompanied by lower autoantibody titres. That was an outcome of the development of antibodies to insulin receptors in AD such as systemic lupus erythematosus.[15]

Raymond et al. have reported on the association of AN with disordered immunoreactivity.[16] The onset of AN may precede a variety of classic ADs, and different categories of ADs may be present at the same time. If AN is an AD, DM type 2 may also represent a slow and subtle autoimmune process. AN and DM type 2 then become two different expressions of the same disease process, but the former is apparently benign and the latter is ultimately potentially fatal. Autoimmunity is a well-known pathogenic component in DM type 2. The assumption that its pathogenesis encompasses autoimmune aspects is increasingly recognised. That is based on the presence of circulating autoantibodies against ⊠ cells, self-reactive T cells, and also on the glucose-lowering efficacy in DM type 2of some immunomodulatory therapies.[17] The autoimmune hypothesis of AN has the potential to modify the direction of DM type 2 research.

The symptoms of ADs are inconstant and this is in divergence to the mechanisms of antigen recognition and effector function that are alike in the response to pathogens.[18] The symptoms basically depend on the triggering autoantigen and the target tissue. In certain conditions, autoantibodies function as receptor antagonists and in other situations, they function as receptor agonist. Autoantibodies of both types can be made against insulin receptor. When they serve as antagonists as in DM Type 2, the cells of patients are unable to take up glucose, the consequence is hyperglycaemia whereas in patients with agonistic antibodies, cells deplete blood glucose resulting in hypoglycaemia.[18] One wonders whether AN may be an early by-product of such an autoimmune process.

Vitiligo which is the result of depigmentation of the skin is in fact an opposite disorder to AN. Vitiligo is recognised as an AD.[19]Thyroid disorders, particularly Hashimoto thyroiditis and Graves' disease, other endocrinopathies, such as Addison disease, diabetes mellitus, alopecia areata, pernicious anaemia, inflammatory bowel disease, psoriasis, and autoimmune poly-glandular syndrome are all associated with vitiligo. [20] Kakourou et al identify that Hashimoto's thyroiditis is 2.5 times more frequent among children and adolescents with vitiligo than in a healthy age- and sex-matched population and it usually follows the onset of vitiligo. [21]

As in the case of other ADs, vitiligo susceptibility may involve both target organ-specific genes and immune response genes. [22] The autoimmune theory suggests alteration in humoral and cellular immunity in the destruction of melanocytes of vitiligo.[23]. Vitiligo lesions have an infiltrate of inflammatory cells, particularly cytotoxic and helper T-cells and macrophages;histological evidences further back up an autoimmune aetiology. [24] Like AN, Vitiligo is thus gene linked; immunity derangements may be providing the matrix and genes are the craftsmen in both conditions.

Vitiligo occurs more commonly in DM Type 1. A few recent studies have revealed its increased incidence in DM Type 2. [25]These may be isolated case studies, but offer new insight into the pathogenesis of DM Type 2. There is a logical thread running between the autoimmune assertion of AN and its depigmentation counterpart (vitiligo) which is recognised as an AD. If AN is proven as an AD, the AD hypothesis of DM Type 2 becomes more binding. The autoimmune process of AN warrants further consideration and further study is needed to confirm or falsify the hypothesis of an autoimmune spectrum disorder between AN, vitiligo and DM Type 2.

Even though the common assumption that bacteria flora occupying human body outnumber the body cells has been proven wrong, their revised ratio of 1:1 is still astounding.[26] The exact role of the resident microbial colony in human body is unclear. There are less ADs observed among the hunters' tribal population of Tanzania whose faecal matter contain more varieties of microbes than people in developed countries. [27,28] This is an observation that need further verification. It is possible that the occupied microbial army may be maintaining the harmony among the human body cells from attacking each other and serving as moderators. Now that anti-autoimmune activity in molecules produced by parasites have been confirmed in haematology lab, these findings may have clinical significance. The aetiology of ADs is multifactorial. Genetic, environmental, hormonal, psychological stress and immunological factors are all considered important in their development. I content that the clue to the mechanism of development of certain ADs and ways of counteracting them may be embedded in the bacterial colony and their interaction with human cells.

International studies

A pilot study by Bhagyanathan and colleagues demonstrated that children with AN have a high incidence of insulin resistance.[29] They posit that the detection of insulin resistance in children may present an opportunity to prevent the onset of microvascular changes before the development of DM type 2. Once DM type 2 by hyperglycemia is diagnosed it may be too late for that. Insulin resistance is one of the mechanisms involved in the pathogenesis of DM type 2; therefore, early recognition of insulin resistance is paramount in the prevention or delay of the onset of diabetes. Their study was of 62% of children who had AN alongside high insulin resistance. In children with AN and a high BMI, the incidence of insulin resistance was about 80%. This is evidence that the easily detectable symptoms are of value in the screening of children who are at high risk of developing DM type 2. Bhagyanathan et al. conclude that AN has potential as a screening method because those who have high insulin resistance as well as AN are at high of future DM type 2.

An earlier US study, by Brickman and colleagues, had yielded somewhat similar results.[30] This involved 618 youths from different ethnic groups at nine paediatric practices. They were aged from 7 to 17 years. A survey was made of their demographics and their family history with regard to DM type 2, and their weight and height were also measured. AN was scored and digital photographs of their necks were taken. AN was identified in 19%, 23%, and 4% of the African American, Hispanic, and Caucasian youth respectively. It was also found in 62% of those studied who had a BMI greater than the 98th percentile. Using multiple logistic regression, the researchers found that the level of BMI, the presence of maternal gestational diabetes, female gender, and not being Caucasian, were all independently associated with AN. AN was common among the overweight young people and was associated with risk factors for glucose homeostasis abnormality. Brickman et al. concluded that identification of AN offers an opportunity to advise families about the causes and consequences of the condition. [30] That has the potential to motivate those with responsibility for the young people to encourage and effect healthy lifestyle changes that decrease the risk of the development of DM type 2 and cardiovascular disease.

In their research in India, Vijayan et al. determined that BMI, waist circumference and AN are three physical markers for the recognition of insulin resistance in children.[31] They conducted a cross-sectional school-based study in a semi-rural environment in the state of Kerala, which has become known as the diabetic capital of the country. Their study encompassed 283 children between the ages of 10 to 17. The prevalence of insulin resistance was 35%; this estimate was arrived at by using a homeostasis model assessment of insulin resistance (HOMA-IR). Of the children studied, 30% had a waist circumference above the 75th percentile and 18.7% had a BMI above 85th percentile. AN was diagnosed in 39.6% of the population studied. A significantly high prevalence of insulin resistance was

observed among the children with a waist circumference exceeding the 75th percentile, a BMI above the 85th percentile, or a diagnosis of AN. The most sensitive physical marker of insulin resistance was AN (90%) and the most specific was BMI (91%). By combining these parameters their sensitivity may be increased to 94% and their negative predictive value to 96%. Vijayan et al. conclude that these easily recognisable physical markers are an efficient warning of insulin resistance among children.

Acanthosis nigricans in different conditions

AN is not a disease, but a symptom of disease. A high prevalence has been observed recently, and there are a number of varieties. These include benign, obesity associated, syndromic, malignant, acral, unilateral, medication-induced, and mixed AN.[32,33] It has been established that AN may occur in a number of conditions, and a brief discussion of these is appropriate for this paper. Different types of AN are listed in Table 1. It often appears gradually in the prediabetic state, but abruptly in malignancy.

AN may be triggered by a plethora of medications, such as birth control pills, human growth hormones, thyroid medications, and even some bodybuilding supplements. All these medications may cause changes in insulin levels. Medications used to ease the side effects of chemotherapy have also been linked to AN. In most cases, the condition clears up when the medications are discontinued. In rare cases, AN may be caused by gastric cancer (especially gastric adenocarcinoma) or an adrenal gland disorder such as Addison's disease. Hypothyroidism, Cushing's disease, and polycystic ovarian disease are also common causes of AN. [34,35]

When AN is present without any identifiable cause in middle-aged and older patients with extensive skin findings, internal malignancy needs to be ruled out. AN has been reported in association with many kinds of cancer, by far the most common being an adenocarcinoma of gastrointestinal origin. In these patients it is a rapid-growing dermatological pigmentation disorder. The skin changes are typically more extensive and severe than those seen in benign AN. Findings may include thickening, unusual roughness and dryness, and/or potentially severe itching (pruritus) and irritation of the skin regions affected. Pigmentary changes may be more pronounced than those observed in benign AN and they are not restricted to areas of hyperkeratosis. Malignant AN is frequently associated with the mucous membranes and with distinctive abnormalities of the oral (mouth) region. For example, reports indicate that the lips and the back and sides of the tongue may have an unusually 'shaggy' appearance, sometimes with elevated, wart-like, non-pigmented tissue growths (papillomatous elevations). Malignant AN is also commonly characterised by wart-like thickening around the eyes, unusual ridging or brittleness of the nails, thickening of the skin on the palms of the hands, hair loss, and sometimes other symptoms. Investigators have reported that the development of malignant AN may occur as much as five years before the onset of other symptoms, although the time span before malignancy is typically of shorter duration.

Table 1. Different types of acanthosis nigricans

1. Obesity-associated acanthosis nigricans. Obesity-associated acanthosis nigricans, once labelled pseudo-acanthosis nigricans, is the most common type. Lesions may appear at any age but are most common in adulthood. The dermatosis is weight dependent, and lesions may completely regress with weight reduction. Insulin resistance is often present in these patients. It is slow growing.
2. Acral acanthosis nigricans. Acralacanthosis nigricans (acral acanthotic anomaly) occurs in patients who are otherwise in good health. Acral acanthosis nigricans is most common in dark-skinned individuals, especially those of African-American or sub-Saharan-African descent. The hyperkeratotic velvety lesions are most prominent over the dorsal aspects of the hands and feet, with knuckle hyperpigmentation often most prominent.
3. Unilateral acanthosis nigricans. Unilateral acanthosis nigricans, sometimes referred to as nevoid acanthosis nigricans, is believed to be inherited as an autosomal dominant trait. Lesions are unilateral in distribution and may become evident during infancy, childhood, or adulthood. Lesions tend to enlarge gradually before stabilising or regressing.
4. Generalised acanthosis nigricans. Generalised acanthosis nigricans is rare and has been reported in paediatric patients without underlying systemic disease or malignancy.
5. Syndromic acanthosis nigricans. Syndromic acanthosis nigricans is the name given to acanthosis nigricans that is associated with a syndrome. The type A syndrome and type B syndrome are special examples.
6. Hereditary acanthosis nigricans. Familial acanthosis nigricans is a rare genodermatosis that seems to be transmitted in an autosomal dominant fashion with variable phenotypic penetrance. The lesions typically begin during early childhood but may manifest at any age.
7. Drug-induced acanthosis nigricans. Drug-induced acanthosis nigricans, although uncommon, may be induced by several medications, including nicotinic acid, insulin, pituitary extract, systemic corticosteroids, and diethylstilbestrol. Rarely, triazinate, oral contraceptives, fusidic acid, and methyltestosterone have also been associated with it.
8. Malignant acanthosis nigricans. Malignant acanthosis nigricans, which is associated with internal malignancy, is the most concerning variant of acanthosis nigricans because the underlying neoplasm is often an aggressive cancer.
9. Mixed-type acanthosis nigricans. Mixed-type acanthosis nigricans refers to those situations in which a patient with one of the above types develops new lesions of a different ethology.

Genetic links

It is worth noting that certain types of AN may be genetically linked.[36] The interaction of genes and the environment is not clearly understood and the different variables of DM type 2 are not established. It is a heterogenous disorder and there is a general consensus that diabetic comorbidities may be the outcome of genetic and environmental susceptibilities.[37,38,39,40,41] Such factors may have an influence independently or in combination with one another that brings about hyperglycaemic conditions.It would be interesting to explore the possibility of a link between the diabetic genes and

the AN gene. DM type 2 may be potentiated by poor quality of insulin or decreased production of insulin, and the distinction between those manifestations is not well recognised. The controversy concerning the relative roles of insulin deficiency and insulin resistance in DM type 2 continues to be unresolved.[42] Despite the early demonstration that obese people have elevated plasma insulin concentrations, many studies over the years have failed to control satisfactorily for the influence of obesity.[43] Another difficulty with the interpretation of plasma insulin concentrations is that sustained hyperglycaemia may have detrimental effects on insulin secretion.[44] Diabetes mellitus affects every cell of the body, and therefore it affects the beta cells of the pancreas in turn. The spiralling effect of hyperglycaemia adds to the malfunctioning of beta cells, and that results in impaired quantity and quality of insulin. Only a subset of diabetic patients shows AN, and other groups of obese diabetic patients do not develop AN. AN is linked with higher insulin production and obesity, whereas AN may not be present in diabetes with a reduced quantity of insulin. The presence of AN may serve as one of the biological markers to determine subtypes of DM type 2.

The incidence of AN varies in different races, which is evidence that AN may have a genetic contribution – indeed, it has been regarded by some as being strongly influenced by genetic factors. It is thought to be autosomal in nature. AN is common among African-Americans, Hispanics, and American Indians, but it is rare among white people.[45,46] A study from the USA reports the prevalence of AN as 3% among Caucasians, 19% in Hispanics, and 28% in American Indians.[47] More recently, studies from Sri Lanka and south India show the prevalence of AN as high as 17.4% and 16.1% respectively in the adult population in general.[48,49]

Type 2 diabetes mellitus and schizophrenia

DM type 2 is relatively common among people who have mental health issues. Increased risk for cardiovascular disease and other serious illnesses related to insulin resistance – for example, certain epithelial cell carcinomas, AN, and polycystic ovary syndrome – are long-term concerns associated with the cluster of metabolic abnormalities stemming from insulin resistance. These are often referred to as the metabolic syndrome.[50] Impaired action of insulin in patients with schizophrenia was reported over fifty-five years ago and later confirmed in Australia.[51] The prevalence of DM type 2 in patients with schizophrenia was found to be higher than it was in the general population, even before antipsychotic medication was in widespread use.

The mechanisms underlying the relationship between schizophrenia and diabetes remain unexplained. The present author has argued in favour of the autoimmune hypothesis of a subset of schizophrenia.[52,53] The proposal is that if AN is an AD, it may be co-existing with DM type 2, or the DM type 2 itself may even be an extension of the same autoimmune process. In other words, there may be a continuum of pathological process between AN and DM type 2. It follows that schizophrenia sufferers may have a predisposition to develop DM type 2; schizophrenia may even be considered as a clinical surrogate of DM type 2.

When AN occurs in a schizophrenic patient, they sometimes develop a delusional misinterpretation of the condition, such as that it is a result of skin cancer or even a manifestation of an external agency. Such situations may result in severe anxiety. Schizophrenia is frequently associated with poor lifestyle choices on the part of the patient, such as a diet high in fat, reduced levels of physical activity, and high rates of smoking-all of these may contribute to the development of a metabolic syndrome and insulin resistance.[54,55] It is worth considering investigation into the early warning signs for DM type 2 – including the AN – before commencing a patient on antipsychotic drugs that lead to a metabolic syndrome.

It is now well recognised that patients treated with clozapine or olanzapine are more often classified as having DM type 2 or impaired glucose tolerance in comparison with patients treated with other second-generation antipsychotics. Clozapine increases the risk of diabetes if there is a history of pre-existing diabetes or a family history of diabetes. According to a US study, the risk is higher if the patient is African-American or of Hispanic origin. Such patients may need close blood sugar monitoring during the initiation of clozapine treatment. I contend that if a patient already has AN, weight-increasing antipsychotics should be avoided. Even though aripiprazole is the most metabolic-sparing agent among the second-generation antipsychotics, Manu et al. report a case of AN in a patient treated with it. That patient did have a family history of DM type 2, which adds to the interest of the case.[56]

Diagnosis and treatment

There is no specific treatment for AN. Treatment is directed towards the specific symptoms that are apparent in each individual. It should be borne in mind that such treatment may require the coordinated efforts of a team of medical professionals. Correcting the underlying disease improves the skin symptoms. Steps that may be taken, depending on what the disease is, include correcting hyperinsulinemia through diet and medication, encouraging the loss of weight in those with obesity-associated AN, removing or treating a tumour, and discontinuing a medication that causes AN. The control of obesity contributes significantly to reversing the whole process, essentially by reducing both insulin resistance and compensatory hyperinsulinemia. However, the pigmentary changes may persist. In drug-induced AN, offending medicines should be stopped. In hereditary AN, lesions tend to enlarge gradually before stabilising and/or regressing on their own.

For those with AN, the recommended treatment may include the use of certain synthetic, vitamin A-like compounds (retinoids). For individuals with malignant AN, disease management requires treatment by oncologists. Reports indicate that AN has improved with therapy used to treat

underlying malignancies and has reappeared with tumour recurrences. Other treatment for this disorder is symptomatic and supportive. The treatments considered are used primarily to improve appearance, and include topical retinoids, dermabrasion, and laser therapy. The final outcome of AN varies depending on the cause of the condition. Benign conditions, either on their own or through lifestyle changes and/or treatment, have good outcomes. The prognosis for patients with malignant AN is often poor as the associated cancer is often advanced.

AN may be diagnosed on the basis of thorough clinical evaluation, identification of characteristic physical findings, a complete patient history including medication history, a thorough family history, and various specialised tests.[57] The age at detection will vary, depending upon the form of AN present and on other factors. For example, benign forms of AN often become evident during childhood or puberty. It is less common for benign AN to be apparent at birth or to develop in adulthood. The latter cases most typically involve AN in association with obesity.

In individuals with skin changes that suggest AN, diagnostic assessment may include various laboratory tests. Examples are the glucose tolerance test and the glycated haemoglobin (*HbA1c) test.* Additional laboratory studies or other specialised tests may also be utilised in diagnosis in order to help detect or rule out certain other underlying disorders – including a number of endocrine and autoimmune conditions – that may be associated with AN. In addition, in some instances, particularly where the patient presents with signs suggestive of malignant AN, testing may include biopsy and microscopic evaluation of small samples of skin tissue affected.

The onset of malignant AN usually occurs after the patient reaches 40 years of age. Various factors may be indicative of malignant AN in association with an underlying cancer. These include symptom onset in adulthood that is not associated with the use of particular medications, obesity, a positive family history, and certain underlying disorders known to be associated with AN. It is rare for malignant AN to develop during childhood. In such instances, warning signs may include skin changes that progress rapidly and also involvement of the mucous membranes.[58]

AN may be metaphorically linked to the dark pigmentation that appears on the skin of the ripe Sharon fruit. Sharon fruit is the trade name for a variety of persimmon that is grown in Israel. In the fruit the dark patches on the ripe and sugary fruits are the result of condensed tannins. Insulin-resistant AN may be referred to as the Sharon fruit sign in order to emphasise the diagnostic value of the condition. It has been suggested that the official terminology for AN is inappropriate for a significant warning of an increasingly common disease for which early diagnosis is imperative. Because the complex name may have a negative impact on its identification by both clinicians and patients, a less formal term is in use among some of those who are concerned with patient care. It must be borne in mind that AN, otherwise Sharon fruit sign, manifests only in those with the insulin-resistant condition and should not be considered a characteristic feature of DM Type 2. Identification of the Sharon fruit sign may be helpful in the early diagnosis of DM type 2.

Discussion

Diabetes puts an enormous burden on patients, their families, and the health-care system. Detection of the disease at an early state using physical markers and instituting preventive measures will reduce the economic strain on society to a great extent. According to the latest global data from the World Health Organization (2016), an estimated 422 million adults are living with DM type 2 and diabetes prevalence is increasing rapidly.[59] In 2013 the International Diabetes Federation estimated that 381 million people were living with diabetes.[60] That number is anticipated to almost double by 2030.[61] About 3.8 million people in the UK have DM type 2, and the charity Diabetes UK has made predictions that it may become as high as 6.2 million by 2035/36.

Most often a diagnosis of DM type 2 is made only when such symptoms as loss of weight, polydipsia, and polyurea have become manifest. By that time the damage to the body may have already come about. Complications arising from diabetes cover the entire area of medical science, so early detection is crucial. Intervention at the prediabetic stage helps to arrest the progress of this condition. AN may herald DM type 2, endocrinopathies, and malignancies. This cutaneous disorder is easily detectable and highly useful in the early detection of the disorders associated with it. Early screening for AN in preadolescent and adolescent people would provide a relatively simple, inexpensive, and non-invasive tool for identifying those young people who have hyperinsulinemia and could benefit from early intervention. That would prevent the development of DM type 2. Young people tend to be reluctant to undergo traditional screening measures and definitive diagnostic tests as they find them invasive and unpleasant.

A sedentary life style and unhealthy dietary habits – as well as the side effects of antipsychotics – make chronically ill psychotic patients more vulnerable to DM type 2 than the general population. Long-standing detained patients in particular are restricted in their mobility and may become more prone to obesity and insulin resistance. It is not clear whether the pathogenesis of psychosis itself has a diabetogenic effect. It is evident that because of the high incidence of DM type 2 among mental health service users, psychiatrists need to become more alert in the diagnosis, management, and prevention of the complications of DM type 2.

Competing Interests
None declared
Author Details
Dr James Paul Pandarakalam, Consultant Psychiatrist,

Northwest Boroughs Health Care NHS Foundation Trust, Warrington WA2 8WN, UK
CORRESPONDENCE: Dr James Paul Pandarakalam, Consultant Psychiatrist, Northwest Boroughs Health Care NHS Foundation Trust, Hollins Park Hospital & AFG Rehab Hospitals, Winnick Lane, Warrington WA2 8WN, UK
Email: jpandarak@hotmail.co.uk

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Case Report

Adult Onset Still's Disease: A Case Report

Yasmeen Ajaz, Ravinder Bhatt, Rabah Elbahnasawy, Asif khan, Ali Ganai & Sameem Matto

Abstract

Adult Onset Still's disease (AOSD) is an inflammatory disorder characterized by quotidian (daily) fevers, arthritis, and an evanescent rash. It is a rare inflammatory disorder of unknown etiology. Due to lack of definitive diagnostic test, the diagnosis of AOSD can only be made after exclusion of other causes. We report a 46 year old male Indian patient who was admitted in our hospital with intermittent high grade fever, rash and polyarthritis for one month. History, examination and laboratory investigations fulfilled the Yamaguchi criteria for AOSD. The patient was treated with steroids and nonsteriodal anti-inflammatory drugs to which he responded and is completely free of symptoms. The authors here present a case of adult onset Still's disease, and highlights the utility of high serum ferritin in identifying this febrile exanthema.

Keywords: Adult onset Stills disease, skin rash, fever, polyarthritis.

Abbreviations: AOSD -Adult Onset Still's disease; AFB -Acid fast bacilli; CMV - Cytomegalovirus; EBV- Epistein bar virus; HIV - Human immunodeficiency virus; LDH- lactate dehydrogenase; WBC: White blood cell; ANA: Antinuclear antibody; RF: Rheumatoid factor; PMN: Polymorphonuclea; TNF -Tumor necrosis factoralpha .

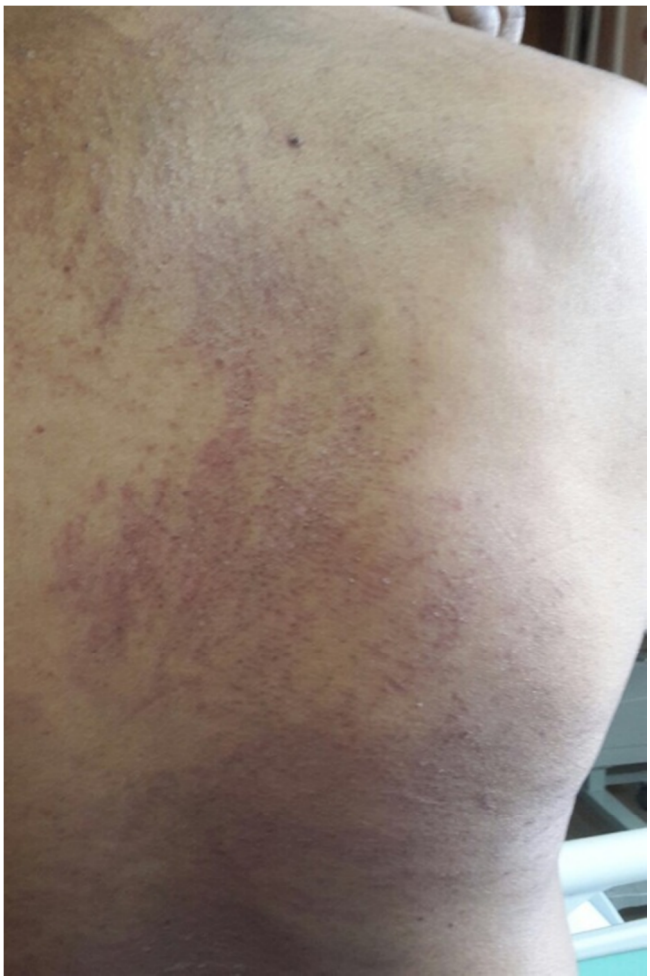
INTRODUCTION

Adult Still's disease (AOSD) is an inflammatory disorder of unknown etiology characterized by quotidian (daily) fevers, arthritis, and an evanescent rash and multi-organ involvement [1].First described in children by George Still in 1896, subsequently in 1971 Bywaters described 14 patients with similar presentation [2]. The clinical course of adult Still's disease (AOSD) can be divided into three main patterns: monophasic (or monocyclic), intermittent, and chronic. Patients with monophasic AOSD have a disease course that typically lasts only weeks to months, completely resolving within less than a year in most patients [3]. Systemic features, including fever, rash, serositis, and hepatosplenomegaly, predominate in this group. The patient we diagnosed as AOSD, with monophasic course, went into remission after proper treatment and is symptom free even after stopping the treatment.

CASE REPORT

46 year old Indian male, non-smoker, married, nondiabetic, normotensive admitted at department of internal medicine in our hospital with history of high grade fever, polyarthritis, and skin rash for the last 4 weeks. The fever was high grade, with maximum temperature reaching 39.2°C. The patient also complained of joint pains involving the knee, ankle, wrist and proximal interphalangeal joints. There was no history of oral ulcers, morning stiffness, ocular symptoms, or contact with infected persons. In the hospital, during the febrile period, he developed macular rash mainly on chest and back [Figure 1]. On examination, the patient was sick looking, febrile-39.2°C. Chest on auscultation was normal, cardiovascular examination was unremarkable. Examination of abdomen revealed mild spleenomegaly. Neurological examination was unremarkable. Investigations revealed hemoglobin 12.7g/dl, erythrocyte sedimentation rate (ESR) 120 mm in 1st hour. Total leukocyte count-12.7 x10 9/L. Liver function showed elevated liver enzymes with Aspartate transaminase-125U/L, Alaninie aminotransferase 60 U/L, low albumin 2.3gms/dl. He was worked on lines of pyrexia of unknown origin and his blood, urine and sputum culture showed no growth. Procalcitonin level was less than 0.5ng/ml. Sputum for AFB was negative for three samples; qunatiferon gold test for tuberculosis was negative. IgM CMV, EBV, HIV, hepatitis B and C were negative malarial parasite, Widal and Brucella serology was negative. CT-chest and abdomen were normal, except for mild spleenomegaly. Echocardiogram was normal. ANA, rheumatoid factor was negative. Lactate dehydrogenase (LDH) 978 U/L, His CRP showed a progressive increase from 82mg/L to 284 mg/L, which decreased after starting steroids. His ferritin levels were 40, 000 (normal range 21.8 -274.6 ng/ml), which were reconfirmed by second sample and he had normal transferrin saturation. On the basis of his history, clinical examination and review of his laboratory investigations, diagnosis of AOSD was made. We started him on prednisolone 60 mgs daily along with Diclofenac potassium 50 mg twice daily, to which he responded and become afebrile. He was discharged with a tapering dose of steroids 5mgs weekly. He is doing well and is completely symptom free.

Figure 1: Skin Rash on the back



DISCUSSION

First described in children by George Still in 1896, "Still's disease" has become the eponymous term for systemic juvenile idiopathic arthritis [4]. In 1971, the term "adult Still's disease" was used to describe a series of adult patients who had features similar to the children with systemic juvenile idiopathic arthritis and did not fulfill criteria for classic rheumatoid arthritis.

The etiology of adult Still's disease (ASD) is unknown; both genetic factors and a variety of infectious triggers have been suggested as important, but there has been no proof of an infectious etiology, and the evidence supporting a role for genetic factors has been mixed. It is uncertain whether all patients with AOSD share the same etiopathogenic factors. Proposed pathogens have included numerous viruses; suspected bacterial pathogens include *Yersinia enterocolitica* and *Mycoplasma pneumoniae* [5]. As an example of studies of the immunogenetics of ASD, in a series of 62 French patients, human leukocyte antigen (HLA)-B17, -B18, -B35, and -DR2 were associated with AOSD. However, other studies have not confirmed these findings [6].

Adult Still's disease is very uncommon. Prevalence of AOSD is estimated to be 1.5 cases per 100, 000-1, 000, 000 people, with an equal distribution between the sexes [6]. There is a bimodal age distribution, with one peak between the ages of 15 and 25 and the second between the ages of 36 and 46. The diagnosis of AOSD is possible only by recognizing the striking constellations of clinical and laboratory abnormalities. It is also to be to remember that AOSD is a diagnosis of exclusion. AOSD has been associated with markedly elevated serum ferritin concentrations in as much as 70 percent of patients. Serum ferritin values above 3000 ng/mL in a patient with compatible symptoms should lead to suspicion of AOSD in the absence of a bacterial or viral infection. Abnormally high serum ferritin values were reported in some case reports and it was suggested that high ferritin levels may be a diagnostic marker of Still's disease [7]. Our patient showed almost all features as laid down in Yamaguchi criteria[Table 1] for the diagnosis of AOSD [8] along with a markedly high ferritin levels.

Table 1 : Diagnostic criteria for AOSD (Yamaguchi)[8]

Major criteria	Minor criteria
Fever > 39ºC, > 1 week	Sore throat
Arthralgia/ arthritis > 2 weeks or splenomegaly	Lymphadenopathy
Typical rash	Abnormal LFT
WBC > 10, 000 with > 80% PMNs and RF	Negative ANA

Exclusions: Infections, malignancy, rheumatological diseases. Five criteria with at least two major criteria. ASOD: Adult onset still's disease. WBC: White blood cell, ANA: Antinuclear antibody, RF: Rheumatoid factor, PMN: Polymorphonuclea

Non-steroidal anti-inflammatory drugs (NSAIDs), such as aspirin, ibuprofen or naproxen, help to reduce inflammation [9]. Patients with high-fever spikes, severe joint glucocorticoids, such as prednisone (0.5- 1mg/kg/day)Methotrexate has been used successfully in a small series of people to treat adult Still's disease [10]. Some patients are refractory to these conventional therapies. Tumor necrosis factoralpha (TNF) blockers include infliximab, adalimumab, etanercept, anti-interleukin-1, antiinterleukin-6 agents, and most recently anti CD20-expressing B-cell antibodies are also effective in some cases. Other experimental drugs, including cyclosporine and anakinra, have also been successful in small groups of people [9]. Interleukin 6 inhibitors like tocilzumab showed a good result in patients with AOSD resistant to other immunosuppressive agents such as methotrexate, TNF inhibitors and anakinara [11]. Even with treatment, it's difficult to predict the course of adult Still's disease. Some people might only experience a single episode, while for others adult Still's disease may develop occasional flair up or a chronic condition. About one-third of people with the disorder may fall into each of the above groups.

CONCLUSION

A diagnosis of AOSD should be kept in mind in case of pyrexia of unknown origin particularly in a patient who presents with high-grade intermittent fever, polyarthritis and skin rash of more than two weeks duration. However, the patient should be extensively evaluated to rule out other differentials of AOSD like acute or chronic infections, autoimmune disorders, vasculitis and malignant disorders. Serum ferritin values can be powerful adjuncts in making the diagnosis of AOSD [12],

where they are usually higher than other inflammatory diseases. Indeed, extreme elevation of serum ferritin up to 75, 500ng/mL has been reported in AOSD[12]. Several investigators agree that ferritin levels above l, 000 ng/mL are suggestive of AOSD while levels greater than 4, 000ng/mL are very specific for this diagnosis when accompanied by a compatible clinical picture.

Competing Interests
None declared

Author Details
YASMEEN AJAZ, MD, FACE, Belhoul Speciality Hospital, Internal Medicine , Dubai, United Arab Emirates. RAVINDER BHATT , MD, Belhoul Speciality Hospital, Internal Medicine , Dubai, United Arab Emirates. ASIF KHAN, MRCP, Aster Medical Center, Sharjah, United Arab Emirates. ALI GANAI, MD, Mediclinic Welcare Hospital, Dubai, United Arab Emirates RABAH ELBAHNASAWY, MD, Belhoul Speciality Hospital, Internal Medicine , Dubai, United Arab Emirates. SAMEEM MATTO, MD, FACE, Canadian Specialist Hospital, Dubai, United Arab Emirates.
CORRESPONDENCE: YASMEEN AJAZ, MD, FACE, Head Dept Of Internal Medicine, Belhoul Speciality Hospital, Internal Medicine , Dubai, United Arab Emirates.
Email: ajazyasmin@yahoo.co.in

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Case Report

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It takes all sorts – a curious case of pseudohyperaldosteronism, hypertension and liquorice tea

Peter Allan, Michael Newman & Tareq Husein

Abstract

Patient X is usually fit and well, slim 49-year old woman was admitted with a collapse in association with a 3-week history of headache, nausea and paraesthesia of the hands. She was found to be hypertensive, and investigations demonstrated a hypokalaemia, hypophosphataemic metabolic alkalosis. Upon further questioning, she stated she usually consumes 6 liquorice tea infusions per day, and a diagnosis of pseudohyperaldosteronism was made. She underwent intravenous phosphate and potassium replacement as an inpatient, and was initiated on 5mg of Amlodipine with oral potassium supplementation on discharge with a 3-month follow up. She was advised to stop consuming liquorice products. Upon follow up, she was normotensive and normokalaemic, and her Amlodipine and potassium supplementation were subsequently ceased.

Abbreviations: Na-Sodium, K-Potassium.

Background

This case highlights a rare and interesting medical condition bought about by liquorice ingestion. While there have been many previous reports of liquorice toxicity secondary to eating confectionary, I have only found one case report of liquorice toxicity secondary to liquorice tea ingestion and the patient there had only a mild case of hypokalaemia and did not require hospital admission unlike patient X.[1]

Case presentation

Patient X is a usually fit and well 49-year-old woman who was admitted following a collapse. Prior to this collapse she had experienced a 3-week history of gradual onset, slowly worsening dull headache and a feeling of tingling in her hands which increased over this timeframe. On the day of admission, she experienced nausea. Her past medical history included migraines, for which she self-medicated with paracetamol, ibuprofen and codeine as necessary. She was also using Cerazette. She was in full time work, was a lifelong non-smoker and used alcohol very rarely. She had no family history of note.

On examination, Patient X was a slim individual who was hypertensive with a blood pressure of 170/100 mmHg. Her other observations were normal. Her general and neurological examinations were unremarkable.

While initially the medical team felt that Conn's syndrome was a likely cause of the abnormalities, this was reconsidered on a ward round where, following research on the internet into her abnormalities, patient X brought it to the attention of the team that she had been consuming between six and eight liquorice tea infusions per day for the past two months and had been consuming around three a day for a significant period time prior to this (roughly 18 months). The diagnosis was made based on her history.

Investigations

A venous gas demonstrated a metabolic alkalosis with a pH of 7.57.

Blood tests revealed hypokalaemia (K+ = 2.2 mmol/L) and hypophosphataemia (PO4 = 0.35mmol/L). No other abnormalities were detected.

More specialist assays were undertaken, and demonstrated that her plasma renin was 2.3 ng/mL/hour (normal range 0.2 – 3.3 ng/mL/hour). Her morning supine plasma aldosterone level was 29 pg/mL (normal range 30 – 160 pg/mL). Her morning plasma cortisol level was 612 nmol/L (normal range 138-635 nmol/L).

In addition, the patient also underwent a CT head and a CT renal angiogram, both of which were normal.

DIFFERENTIAL DIAGNOSIS

- Apparent mineralocorticoid excess
- Exogenous mineralocorticoid excess
- Liddle's syndrome
- Congenital adrenal hyperplasia
- Cushing syndrome
- Liquorice

Treatment

Intravenous potassium and phosphate replacement, cessation of liquorice intake and amlodipine 5mg OD.

Outcome and follow-up

The patient was discharged with a blood pressure of 132/66 mmHg on amlodipine, a potassium level of 2.9, and a phosphate level of 1.16. She was given oral potassium supplementation to be taken 3 times per day. After two weeks, the amlodipine was stopped as she became mildly hypotensive. Her blood pressure was 120/60 following cessation of amlodipine. Three months later her plasma potassium level was 4.6 without supplementation. Mrs X required no follow up although she reports an ongoing feeling of tingling in her hands.

Discussion

Liquorice is an extract of the roots of the Glycyrrhiza glabra plant and has been used as both a confectionary flavouring agent and a herbal remedy. It is also commonly used as a laxative, and as a flavouring agent in chewing gums, sweets, and food products.

The active ingredient in liquorice is glycyrrhetinic acid which inhibits the enzyme 11- -hydroxysteroid dehydrogenase. This enzyme converts cortisol into inactive cortisone within the distal tubule of the kidney and so in liquorice toxicity there is a build-up of cortisol in distal tubular cells.[2] This results in increased mineralocorticoid like activity as there are structural similarities between cortisol and aldosterone, with increased Na+ and water retention in conjunction with increased H+ and K+ excretion.[3] Here hyperaldosteronism occurs, but with a low or low-normal plasma aldosterone and renin level. Serum glycyrrhetinic acid levels can be measured with enzyme-linked immunosorbent assay (ELISA) and high-performance liquid chromatography (HPLC). Urinary glycrrhetinic acid levels can be measured with gas chromatography-mass spectrometry (GC-MS).[4]

Pseudoaldosteronism secondary to liquorice consumption is a relatively rare occurrence. Case reports demonstrate a range of clinical manifestations from an asymptomatic patient fortuitously diagnosed to those with more severe presentations such as rhabdomyolysis, hypertensive encephalopathy, asthenia, paralysis, heart failure, and cardiac arrhythmias such as polymorphic ventricular tachycardia and ventricular fibrillation secondary to hypokalaemia. For these reasons, it has been suggested that the public should be made aware of the potential dangers associated with liquorice consumption. [5-13]

The combination of alkalosis hypokalaemia and hypertension suggests increased mineralocorticoid activity leading to increased renal tubular Na+ reabsorption along with increased k+ and H+ excretion. Both primary and secondary hyperaldosteronism cause these abnormalities, the former via an appropriate response (renin release) to decreased renal perfusion pressure or decreased sodium concentration in the ultra filtrate, the latter an inappropriate release of aldosterone from the adrenal cortex, often a result of an adrenal adenoma.

Other genetic syndromes, such as Bartter's or Gitelman's, cause hypokalaemia with alkalosis but without hypertension.[14]

Features of low potassium include generalised weakness and lethargy, ascending paralysis, and rhabdomyolysis.[15-17] Decreased intake is rarely a cause of low potassium as the western diet usually contains significantly more potassium than is needed and because the renal tubular reabsorption mechanism can be extremely effective in limiting potassium excretion.[17]

The maximum recommended dose of liquorice is 100mg/day although cases of liquorice toxicity have been reported in association with doses as low as 80mg/day. Each liquorice tea bag contains approximately 500mg of glycyrrhetic acid, of which approximately 20mg is ingested per infusion.

This is a relatively rare occurrence and it has been suggested that certain groups are more susceptible to toxicity than others – for example those with 11- -hydroxysteroid dehydrogenase deficiency.[18] It is also thought that those with essential hypertension are also more at risk.[19]

LEARNING POINTS/TAKE HOME MESSAGES

- Consumption of liquorice can cause pseudoaldosteronism.
- The clinical picture is similar to that of primary aldosteronism, but is characterised by low levels of both aldosterone and renin.
- While liquorice toxicity can be asymptomatic, clinical manifestations are wide ranging and include cardiac arrhythmias, rhabdomyolysis, weakness and paralysis.
- Pseudohyperaldosteronism caused by liquorice consumption is reversible and generally resolves upon cessation of liquorice consumption. Prior to resolution, potassium supplements are usually necessary.

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Dr Paul Johnston, Consultant Nephrologist, Royal Cornwall Hospital.
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Author Details
PETER ALLAN, MBChB(hons) and M(Biol), Royal Perth Hospital, Australia. MICHAEL NEWMAN, MBChB and MSc AND BSc(Hons), Queen Alexandra Hospital, Portsmouth, Uk. TAREQ HUSEIN, MBBS, Morriston Hospital, Swansea, Uk. CORRESPONDENCE: TAREQ HUSEIN, 43 Glan Yr Afon Gardens, Swansea, SA2 9HX.
Email: tareqhusein@yahoo.co.uk

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Ovarian masses in pregnancy: a single centre retrospective study

Tanja Eichenberger-Gautschi, Alison Smith & Ahmad Sayasneh

Abstract

Objectives: Ultrasound is proposed as being the first-choice modality to evaluate ovarian masses in pregnancy. The majority of cases are managed expectantly, unless suspicious features of malignancy or any complications, such as ovarian torsion, occur. The aim of this study was to evaluate the outcome of ovarian masses in pregnancy at a tertiary University Hospital in central London.

Methods: In a retrospective cohort study in a tertiary referral centre in central London between 12/01/2014 and 14/11/2016 we have analysed the characteristics, size and subsequent management of cases of adnexal masses in early pregnancy. We included pregnant women who underwent a transvaginal ultrasound scan before 15 weeks of gestation and were found to have an adnexal mass. Exclusion criteria were women with corpus luteum or women who had recent induction of ovulation as part of their assisted conception.

Results: 41 women were included in the study. Six cases were excluded. The mean diameter of ovarian cysts was 47.7mm (95%CI: 39.9-55.4). In 37/41 women, Ultrasound alone was performed to reach diagnosis with no other imaging or biomarker diagnostic modality. The most common diagnosis was mature teratoma in 20/41 women. One borderline tumour was found. 33/41 women (80.5%) did not require any surgical intervention. 8/41 women (19.5%) underwent surgical intervention in pregnancy. There was a significant difference in the mean diameter of ovarian cysts in the expectant management group (41.2mm; 95%CI: 34.7-47.7) and the mean diameter of cysts in the surgically managed group (74.5mm; 95%CI: 49.2-99.8).

Conclusions: Invasive cancer in pregnancy is rare. The results show a significant relation between the size of adnexal mass and the probability of surgery.

Introduction

With the increasing use of ultrasound as a standard examination in the first trimester, more incidental adnexal masses are detected. The reported incidence of adnexal masses in pregnancy varies, depending on the criteria used to define the mass. A literature review by Goh W. et al., found that 1% of all pregnancies are diagnosed with an adnexal mass [1]. A more recent article has suggested adnexal masses are diagnosed in 5% of all pregnancies [2]. Simple and functional cysts are very common, and they usually resolve after the first trimester [3]. Mature teratomas are by far the most common persistent adnexal masses found in pregnancy [8]. It has been estimated that up to 5% of adnexal masses in pregnancy are malignant [4].

Ovarian cysts are typically asymptomatic, but they can cause pain due to pressure on adjacent organs, rupture, bleeding or torsion. The latter case is a significant health condition which mainly requires emergency surgical intervention. During pregnancy, surgical management of ovarian cyst complications is more difficult and more challenging. This is mainly because of other differential diagnosis causing similar symptoms related to pregnancy such as ectopic pregnancy and miscarriage. In case of surgical intervention, the second trimester of pregnancy is supposed to be the safest window for surgery as the risk for drug-induced teratogenicity is smaller than in the first trimester, most functional cysts have disappeared by then and it is technically less difficult than operating during the third trimester [13].

Antenatally, ultrasound is considered to be the best first-line imaging to evaluate adnexal masses [5]. Ovarian mass characterization into benign, malignant or borderline can be challenging in pregnancy. This is mainly due to the effect of high levels of gestational hormones which can cause decidualisation of the cystic or solid parts of the ovaries. Benign masses can mimic malignant masses due to this pregnancy related phenomena [12]. One of the largest data in literature on ovarian mass characterization is published by the International Ovarian Tumor Analysis group (IOTA). All IOTA studies excluded pregnant women when they developed and validated the rules and models to characterize ovarian masses [14-17]. This limits our knowledge and ability to use these models in pregnant women. It is known that tumour markers may be raised in pregnancy and should therefore not routinely been done [7]. An alternative diagnostic tool is Magnetic Resonance Imaging (MRI) which is considered to be safe in pregnancy and can be helpful if the ultrasound imaging is inconclusive in evaluating whether a mass is benign or malignant [6; 10]. The American College of Gynecology and Obstetrics recommends that pregnant patients should be reviewed on a case-to-case

basis and stated that there are no known biological effects of MRI on fetuses. However, Gadolinium, which help in characterizing ovarian masses, should be avoided when examining a pregnant patient [11].

The aim of this retrospective study was to look into characteristics, size and subsequent management of cases of adnexal masses in early pregnancy.

Methods

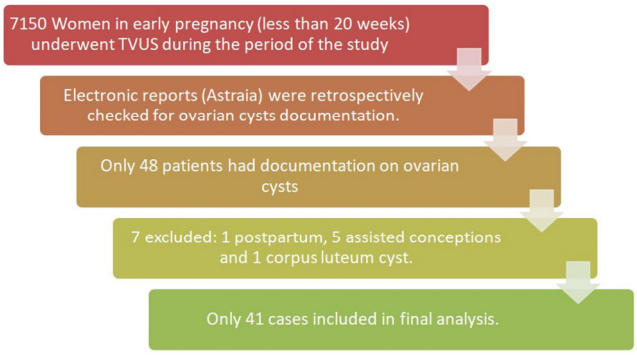
This was a retrospective study of data collected between 12/01/2014 and 14/11/2016 in the Early Pregnancy and Gynaecology Unit (EPAGU) of a tertiary referral centre (Guy's and St Thomas' NHS Trust, GSTT) in central London. The Ultrasound reporting system (Astraia Software Gmbh, Version 1.24.10, Munich, Germany, 2016) was searched for data. Cases included were consecutive. The study was approved as a service evaluation audit by the Clinical Governance team at Guy's and St Thomas' NHS Trust. The study included women who were diagnosed with an adnexal mass while having a transvaginal ultrasound scan TVS at or before 15 weeks of gestation. Pregnancy was confirmed by a positive pregnancy test and an intrauterine gestation on transvaginal ultrasound scan. Women who had the first gestational TVS after 15 weeks of gestation, pregnancies of unknown location, ectopic or trophoblastic pregnancies and patients who had ovarian stimulation treatment were all excluded.

Repeat ultrasound scan reports were retrieved from the Astraia system. Further procedures, tests and imaging results were retrieved using the Electronic Patient Reporting system at GSTT (EPR application, iSOFT Group plc., USA, 2004), PACS (GE Medical Systems, Wisconsin, USA, 2006), Badgernet (Clevermed, Client version 2.9.1.0, Edinburgh, UK). We have used the subjective impression of the examiner as the index test. If surgery was performed the final outcome to identify benignity or malignancy was considered to be the histological diagnosis if any removed tissue. Cytology was used for a reference test in two cases when ovarian cysts were aspirated only. Borderline tumours were classified as malignant for statistical analysis. Tumours were classified using the criteria recommended by the World Health Organisation (WHO) [9; 10]. All ultrasound scan images were available and reviewed by author TEG to confirm the US finding. For statistical analysis, the SPSS software package was used (version 24 for Windows, Chicago, IL, USA). A two tailed student's t test was used to compare means in ovarian masses diameters and a p value of less than 0.05 was considered statistically significant.

Results

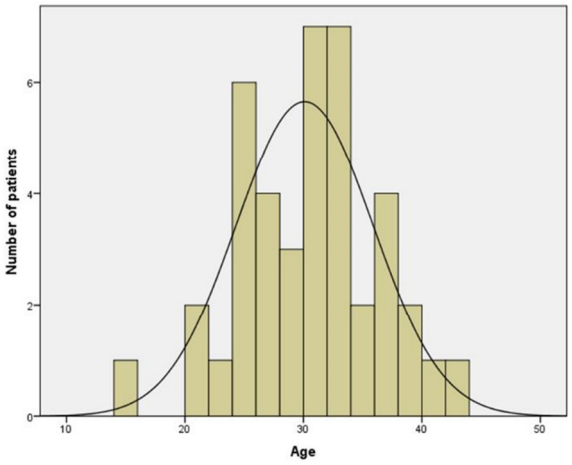
7150 patients underwent transvaginal scans for early pregnancy in that period. In total 48 cases of women with adnexal masses in pregnancy and completed data were analysed. Seven women have been excluded; one woman being postpartum at the time of the finding of a large endometrioma, five pregnancies due to assisted conception and one woman was found to have a corpus luteum cyst (Figure 1).

Figure 1: Study flow chart.



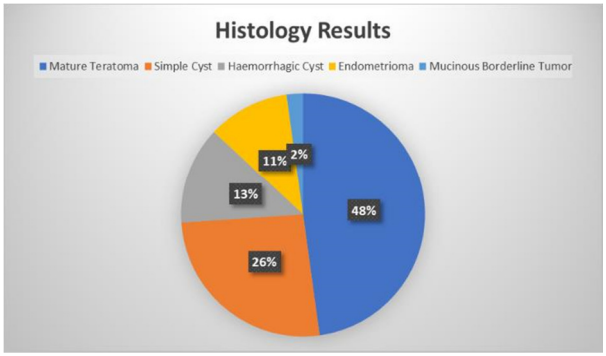
41 women with 46 ovarian cysts could be included in the study. Two women had bilateral ovarian cysts, one had two ipsilateral cysts and one woman had three ipsilateral cysts. The mean age at the time of detection of the ovarian mass was 30 (95%CI:28-32) (Fig.2).

Figure 2: Age distribution in the study group.



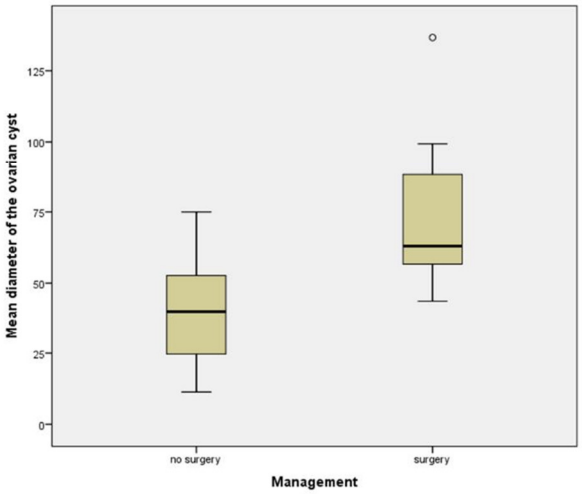
The mean gestation at the time of first ultrasound was 7.4 weeks (95%CI:6.6-8.3). The mean diameter of ovarian cysts measured 47.7mm (95%CI:39.9-55.4). In 36 women ultrasound alone was performed to reach diagnosis, one woman had an extra MRI scan, two women had tumour markers on top of the TVUS and in two women an MRI scan and tumour markers were performed after the TVUS. The ovarian cyst(s) was on the right ovary in 16/41 women, on the left in 22/41, bilateral in 2/41 and in one case the side of the cyst was not reported. The most common ultrasound subjective impression was mature teratoma (22/46 cysts), followed by simple cysts (12/46 cysts), haemorrhagic cysts (6/46 cysts), endometriomas (5/46 cysts) and one possible mucinous Borderline tumour. The latter was confirmed later on histology as the stage FIGO 1A intestinal type mucinous Borderline tumour (Fig.3).

Figure 3: Distribution of origin of cysts by histology.



In total 8/41 women (19.5%) underwent surgical intervention; of these eight cases six underwent major surgery under GA and two had a cyst aspiration under local anaesthesia. Seven out of these eight masses were classified as benign on USS and were subsequently confirmed to be benign by histology or cytology. In only one case a complex adnexal mass was found on USS examination at 9 weeks of gestation and the MRI scan reported possible malignancy. Tumour markers in this 23-year-old woman were normal and a laparotomy was performed at 17 weeks of gestation to remove the mass. Histology showed the mass to be a mucinous borderline tumour, FIGO stage IA. In another patient, an oophorectomy had to be performed at the time of the Caesarean section at term for fetal distress as the ovary was found to be necrotic. In this patient an ultrasound at 10 weeks of pregnancy had demonstrated a 6cm diameter haemorrhagic cyst, which had presumably torted during the pregnancy without any symptoms to prompt the patient to refer herself. Histology in this case had shown an infarcted cyst with fibrosis and calcification. In four of the major surgery cases performed under GA uncomplicated laparoscopies were performed to remove the adnexal mass; in one case a laparoscopic salpingoophorectomy was performed as an emergency for a suspected ovarian torsion at 16/40 weeks. In three cases a laparoscopic procedure for cystectomy was performed electively for ongoing pain. In the first case a cyst was diagnosed in early pregnancy subsequently there was a miscarriage and the cyst was removed 4 months after the diagnosis. In the second case a cyst was found in early pregnancy the woman had a termination at 11 weeks of pregnancy and a cystectomy 5 months later. In the third case a laparoscopic cystectomy was performed 8 weeks after the diagnosis, however the woman suffered a miscarriage at 12 weeks of gestation. Histology confirmed dermoid cysts in all four of these cases. The two cyst aspirations performed under local anaesthesia and ultrasound guidance were both symptomatic for torsion, one at nine weeks and one at ten weeks of pregnancy. In both patients the procedure has been successful. 33/41 (80.5%) with no indication for surgical intervention. There was a significant difference in the mean diameter of ovarian cysts in the expectant management group (41.2mm; 95%CI:34.7-47.7) compared with the mean diameter of cysts in the surgically managed group (74.5mm; 95%CI: 49.2-99.8) (Fig.4).

Figure 4: Mean diameter of the ovarian cysts.



In 33/41 patients no surgical intervention was needed during pregnancy. 13/33 patients had no follow up of their ovarian cyst arranged and no further mentioning of the cysts on routine growth and anomaly scans during pregnancy was found. In 20/33 patients at least one routine follow-up scan was performed 1-2 weeks after the diagnosis and in 12 of these 20 patients a second follow-up had taken place at least 1 month after the diagnosis. In one of the 20 patients with recorded follow-up's an MRI scan had been arranged 2 months after the initial USS finding of a dermoid cyst.

Discussion

The results of our study confirm findings from previous studies: The vast majority of ovarian masses in pregnancy are benign and invasive cancer in pregnancy is rare; The results show a significant relation between size of adnexal mass and probability for surgery; Ultrasound examination of adnexal masses has been proven to be accurate and safe in pregnancy; Managing ovarian cysts in pregnancy can be challenging. Goh et al. have reported similar outcomes, namely that ovarian torsion is still reported as a rare event in pregnancy and that the management of most adnexal masses in pregnancy can be conservatively managed if asymptomatic and if there are no ultrasound findings suspicious for malignancy [8]. If a surgical intervention is needed for persistent masses with complications such as torsion Goh et al. have found that laparoscopy during 1st and 2nd trimester can be safely performed [1]. In our cohort two out of six women underwent successful major surgery during the 2nd trimester of pregnancy. One had an emergency laparoscopy for a torsion at 16 weeks of pregnancy and the other had a laparotomy at 17 weeks of pregnancy for a mucinous borderline tumour.

However, to our knowledge currently no evident guidelines exist on how to manage and follow-up ovarian masses during pregnancy. The characteristics and presentation of ovarian mass complications in pregnancy can be mimicked by similar symptoms related to pregnancy, such as ectopic pregnancy. In one of our cases a woman with a known ovarian cyst was found to have a necrotic ovary at the time of Caesarean section, despite no signs of torsion at any time during pregnancy. This

only highlights how challenging and difficult the assessment of ovarian masses during pregnancy can be. Additional diagnostic examinations such as tumour markers in suspicious ovarian masses have been found difficult to interpret in pregnancy. However, there has been literature suggesting that if a mass is strongly suspicious for malignancy, it is likely that CA-125 will be severely elevated (1000-10 000) [7].

The strength of this study is that the data has been collected using the expertise and facilities of a tertiary referral centre in London (GSTT). The limitations of this study include retrospective data collection, small numbers of cases and loss of follow-up. Although, our study shows the benign nature of most ovarian masses in pregnancy and the ability of ultrasound to safely characterize ovarian masses, a prospective study is required to validate our results. As it is difficult to interpret ovarian cancer tumour markers in pregnancy [7,] other models, such as the IOTA Simple Rules[14,16] or the ADNEX model[17]may play a role for further characterisation of ovarian masses. A prospective trial is required to validate these models in pregnancy.

Competing Interests
None declared

Author Details
TANIA EICHENBERGER-GAUTSCHI Dr Med, Specialist Registrar in Obstetrics and Gynaecology, Guy's and St Thomas' NHS Foundation Trust, London UK. ALISON SMITH MSc, DMU Tutor Sonographer, Guy's and St Thomas' NHS Foundation Trust, London, UK. AHMAD SAYASNEH MBChB MD(Res) MRCOG, Consultant Gynaecological Oncology Surgeon, Honorary Senior Clinical Lecturer, Guy's and St Thomas' NHS Foundation Trust, London UK. CORRESPONDENCE: Dr Tania Eichenberger-Gautschi Dr Med, Specialist Registrar in Obstetrics and Gynaecology, Guy's and St Thomas' NHS Foundation Trust, London UK email: eichenberger.tt@gmail.com
Email: eichenberger.tt@gmail.com

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Education

Training student doctors to become educators

Aimee Charnell, Laura Stephenson & Michael Scales

Abstract

Introduction: Doctors are expected to teach from a very early stage in their foundation training, often without prior formal instruction in clinical teaching skills. We provided a course with an aim of providing newly qualified doctors with the skills to teach students and peers.

Methods: We developed two, half day courses which ran over subsequent years, addressing feedback from the first course to allow improvement. Sessions included Teaching Theory, Teaching Your Peers and Teaching for Your Learning and Portfolio, with small group discussions also incorporated into the second course.

Results: Results from the second course showed 100% of delegates rated each individual session either 'Good' or 'Very Good'. 70% felt that this day should be compulsory for all new doctors. Delegates were contacted six months into their foundation posts for further, reflective feedback. Of 14 responses, 100% felt this course should be delivered again and all respondents felt more confident in teaching compared to their peers.

Conclusions: We propose that formal education in Clinical teaching should be provided to students at undergraduate level. We suggest this could be made a compulsory part of the curriculum or during hospital inductions or at least offered as student selected components.

Keywords: education, training, teaching, simulation

Introduction

Within the United Kingdom, all doctors are expected to teach.[1] It is assessed throughout their professional career, during annual appraisals for doctors in training and during consultant revalidation. But how are those just embarking on their medical career expected to develop the necessary teaching skills? As three educators at various stages in our clinical careers, we developed and delivered a small course with the aim of addressing this issue.

The General Medical Council within the United Kingdom, suggest that a basic comprehension of teaching should be gained during the undergraduate and postgraduate training of doctors.[2] Dandavino *et al.* further suggest that early development of these teaching skills may have additional benefits for the clinician; such as improving communication and assisting undergraduates to develop their own ability to learn.[3] Our local training region, Yorkshire and the Humber Deanery (HEYH), have a mandatory post-graduate training day in teaching skills which focuses on generic and clinical teaching skills. This is delivered towards the end of the first foundation year. It is delivered by doctors who have various roles in medical education. Whilst useful in its content, for many it comes late. Doctors have often already been involved in providing teaching to medical students on placement at this time.

AMC recalls from her first postgraduate (foundation) year. One peer was thrilled to have 'shaken-off' a final year medical student who was supposed to accompany them on a shift as a learning experience; stating that they were now able to 'do some work'. She couldn't understand the desperation to escape one-to-one teaching. On reflection, it was probable that her colleague found it overwhelming to incorporate the additional responsibility of teaching alongside an already stressful clinical workload. Many share these feelings, with new doctors finding time pressures along with competing clinical demands a challenge to implementing clinical teaching.[4]

We thought that giving our graduates simple tools to understand and overcome these challenges may empower them as teachers. It may also improve their confidence in other areas, such as in their own learning and presentation skills.[5-6] This paper proposes a solution; after creating a short course to be delivered immediately following graduation, to empower new doctors as teachers by providing some basic training in clinical teaching. These doctors are then able to use this training as soon as they begin their foundation training, which is ultimately the beginning of their teaching career.

Methods

Two versions of a half-day course, titled 'Teach the Medic' were developed in HEYH which ran in successive years. The original course was designed by a surgical trainee (AMC) and a general practitioner running the undergraduate education curriculum (MS). Initial topics were chosen based on experiences of the authors and colleagues. The optional course (see figure 1), was offered to the cohort of Leeds medical students who were in the transition period between finishing their final examinations and commencing their first post as a doctor.

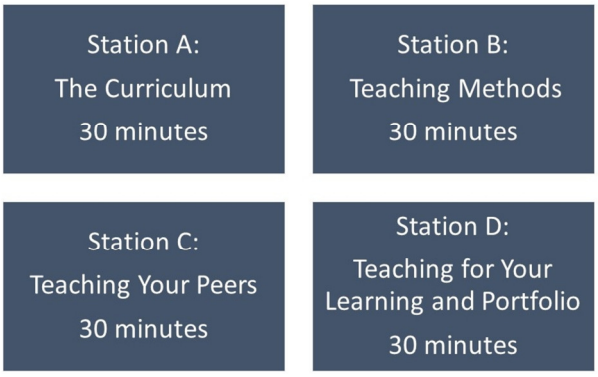

Figure 1: A representation of the initial course structure. Stations were developed as interactive lectures and delivered to participants by doctors of various training levels.

The initial course received encouraging verbal and written feedback from the participants, which was collected on the day of the course. Further feedback was collected a few months into foundation training, allowing enough time to pass for delegates to use this knowledge. This feedback, whilst encouraging, included that delegates were keen for additional workshop style sessions. Subsequently, a modified half-day course ran the following year, with the recruitment of additional postgraduate teachers (including LES). A further 17 newly qualified doctors from various medical schools completed the course, prior to commencing their HEYH foundation post. This modified course (see figure 2) included scenario based sessions around potentially difficult situations for the clinical teacher, and also explored alternative styles of teaching that could be adopted successfully in the workplace.

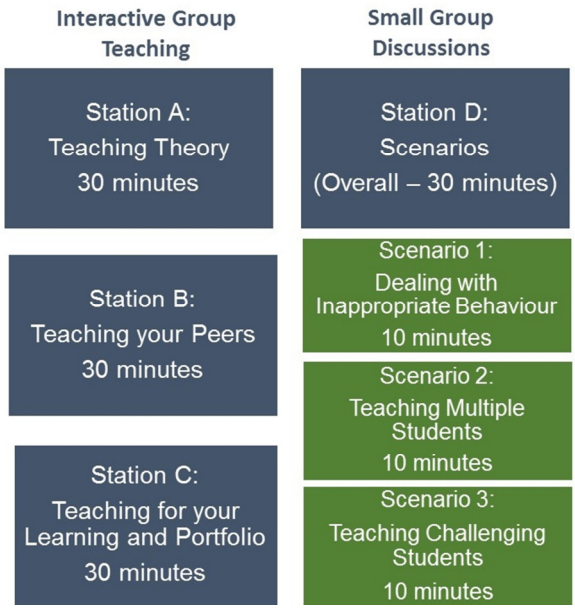

Figure 2: A representation of the modified course structure. Building on feedback from the initial course, the three co-authors incorporated new small group scenario based discussions, alongside the interactive lectures.

Results

Initial feedback received from evaluation of the day was positive for both courses. For the second course, initial feedback found that all participants found every session very good (71%) or good (29%) overall. 12/17 (71%) thought that the course should be made compulsory to medical students. We also sent a follow-up survey, distributed six months after the course which generated 14 responses. All respondents felt that the course should be run again. All participants either strongly agreed (n=2, 14%) or agreed (n=12, 86%) that they felt more confident in teaching compared with their peers. Regarding individual sessions, 10 participants (71%) had directly incorporated learning from the 'Teaching Theory' session, 12 (86%) from the 'Teaching for your Learning and Portfolio' session, 11 (79%) from the 'Teaching your Peers' session, and 10 (71%) from the 'Scenarios' workshop. All participants stated they would still recommend this course to colleagues. They also reported directly incorporating their learning from the sessions into their teaching practice. The responses gathered from the second course implied that participants felt more confident in teaching when compared to their peers.

Discussion

We feel the course content in 'Teach the Medic' complements other courses available later in one's career, such as the Royal College of Surgeons' 'Train the Trainer' course. We propose this course could be run by a junior doctor who has a strong interest in clinical teaching with involvement of a senior colleague with extensive medical education experience. We felt the course was especially beneficial as participants had continued to find it useful long after its delivery.

To expand this project to include a whole year group as a compulsory course is ambitious. It would require development and the use of more resources, but initial feedback suggested participants will find it extremely useful. Bing-You *et al.*[6]agree, having found that undergraduate students would be willing to undertake formal instruction in clinical teaching prior to graduation.

As our short course gains momentum within HEYH, this prospect becomes more achievable. When considering a wider delivered course, one must remember that attendance to 'Teach the Medic' was optional; suggesting that those who attended had already identified an interest in teaching. This has the potential to bias our data to some degree. However, we still believe that making the session compulsory would allow skill development and empowerment for those who may not consider themselves aspiring medical educators, but who are still in positions to deliver teaching.

Conclusion

Our evolving teaching skills course suggests that close work with both local medical schools and deaneries is important to allow this course to be incorporated into the training of newly qualified doctors. This may be included as a compulsory part of

the final year medical school curriculum, an option for a SSC, or as an integrated part of the new starter induction programme delivered by individual hospitals.

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Author Details
AIMEE CHARNELL, BSC, MBCHB, MRCS (ENG), PG CERT., University of Leeds, School of Medicine. UK. LAURA STEPHENSON, BSC, MBCHB, PG CERT. University of Leeds, School of Medicine. UK. MICHAEL SCALES. MBCHB, PG CERT, Clinical Lecturer. University of Leeds, School of Medicine. UK.
CORRESPONDENCE: AIMEE CHARNELL, Via Learning and Teaching Office, Level 7, School of Medicine, University of Leeds, LS2 9JT
Email: aimee.charnell@doctors.org.uk

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Viewpoint

Physicians Involved Assisted Suicide

James Paul Pandarakalam

Abstract

Irrespective of the UK parliamentary verdict against the Marris Bill in 2015, the debate on assisted dying will inevitably continue for an unforeseeable time. This is quite evident in the recent editorial of BMJ on 10th February, 2018 suggesting that it is time to poll doctors for a healthy debate on assisted suicide. The different views intrinsic to the deliberations will persist as a concern throughout the world – though very often discreetly embellished with euphemistic terms – because the human life span is inexorably increasing. California has recently passed the assisted suicide bill. The other four US states are Oregon, Montana, Vermont and Washington and around half of all US states are looking at passing a similar legislation. Also, assisted suicide is already being practiced in certain other parts of the world and such a situation justifies a medical discussion on the subject. After-death existence is not an apparent factor in the public discussion of this issue even though it is one of its most significant philosophical aspects. Just as Newtonian and Darwinian world views emanating in previous centuries influenced cultural beliefs and attitudes, neuro science has contributed to the spiritual shallowness of the twentieth and twenty-first centuries. The existential despair of the second half of the twentieth century has been particularly instrumental in promulgating a voluntary death imperative. The moral and ethical dilemmas associated with assisted suicide are interwoven with spiritual concepts because human beings are spiritual personalities and survive after physical extinction.

Keywords: Assisted suicide, discarnate existence, ethics, thanatology

Introduction

Medical scientists who espouse a strict biological model of the mind tend to care less about the prolongation of life than do those who have faith in higher authority.[1] The prevailing reductionist model of mind has recently been challenged effectively.[2,3,4,5.] That has led to a position in which there is some justification for claiming that there is scientific evidence to enable a suspension of disbelief in life after death. [6] Medical profession should respect the theology veiled in thanatology and should be careful not to become instrumental in creating a culture of death; alleviating suffering is not by eliminating the patient.

In the absence of spiritual conviction, human suffering lacks deep meaning and death is regarded as the ultimate tranquilliser. Prolonging life at any cost may be perceived as a worthless endeavour. To counter that, without suffering evolution would not take place and human consciousness would fail to expand. Without stress and struggle the spirit buds to which we may be likened would not mature and grow leaves and fruit, and our characters would not develop; we would lead the lives of lotus-eating sybarites. [7]

Evidence for discarnate survival

According to those who are sceptical about after-death survival, there is only as much evidence to justify belief in life after death as there is for the historical existence of dinosaurs. Some scientific researchers however argue that there are compelling reasons to support those who are proponents of belief in life after death. Dr Vernon Neppe, a neuropsychiatrist turned parapsychologist, has declared that the combined body of evidence for discarnate survival is overwhelming – so great that it may be regarded as scientifically cogent.[8] This emerging scientific view, coupled with the wisdom of the faith traditions, challenges the rationality of supporting assisted suicide. The following are examples of evidence for discarnate existence that are commonly cited:

- clinical death experiences
- pre-death visions
- shared death experiences
- collective apparitions
- some forms of mediumistic incidents, particularly ones that involve cross-correspondence, drop-in communications and physical phenomena
- children's memories of previous lives
- electronic voice phenomena
- instrumental trans-communications
- transplant cases
- Scientifically studied Marian apparitions

The list is becoming longer as survival research progresses. Encouraged by the success of afterlife experiments with mediums,[9] the multi-specialist professor Gary Schwartz of Arizona University claims to have invented a device to communicate with discarnate spirits; the holy grail of survival research that could possibly offer a fool proof scientific evidence of afterlife existence,[10] but also takes account of all the potential negative consequences. He claims to have worked with black boxes in his laboratory, using a software programme that has

generated proof that there is a spirit world by measuring light. [11]It appears that he has developed a technique whereby faint light can be detected in a totally dark box. Measurements are taken at the beginning of an experimental session, and then a specific "hypothesized spirit collaborator" is asked to show a "spirit light" in the box and a second reading is taken. The finding is that instruction for specific spirits to enter a light sensing system was associated with reliable increase in the apparent measurement of photons. Such a curious result means that these communicating spirits are able to hear, respond and produce light in an otherwise dark enclosure. [12,13] The conclusion is that survival research opens up new vistas which seem much more important than cosmology or quantum electrodynamics.

Scientifically examined Marian apparitions are a recent addition to the evidences for discarnate existence. [14] Mainstream scientists seem never to have attempted to develop the conceptual tools and vocabulary needed to investigate the possibility of post-mortem existence. It may be that science will not accept the possibility of discarnate survival without a new theory of physical reality. In the early part of the twentieth century the prevailing view of scientists was that there was no possibility whatsoever of proving the existence of life after death. Over the years that have passed since then attitudes have evolved, and in the world, we are now in it is asserted by some researchers that there is scientific evidence for the existence of life after death. Some of the evidence relating to discarnate existence may not however satisfy the criteria of the physical sciences since the latter are based on speculative science and court room logic.

Paradigmatic shift

Demonstrating post-mortem existence as an irrefutable phenomenon is a route to establishing empirically that humans have a higher consciousness. Unfortunately, in survival research there are many phenomena that have multiple possible explanations, and these augments add to the complexity of this immensely significant area of scientific enquiry. All the types of evidence postulated as supporting discarnate survival are simultaneously a form of evidence of a non-biological component that operates in association with the brain. The existence of a non-biological component indirectly proves the possibility of survival after physical extinction. A huge paradigmatic shift towards non-reductionism is now taking place in the cognitive sciences – consciousness is no longer considered an epiphenomenon of brain activity, but as the designer and prime mover of the material body. Nowadays, some mainstream scientists are themselves paradoxically trying to debunk mainstream science.

Suicide victims

Through suicide, a person is simply changing the location of their suffering. While wrapped in the physical planet by space and time, we are in an advantageous position for inducing personality changes swiftly, whereas in the timeless state of discarnate existence changes are sluggish and personality development is much slower. Contemporary data for survival research may be congruent with the wisdom of the faith tradition. [15] To use a simple analogy for this, carrying out assisted suicide is like destroying the shell of a pupa and forcefully freeing it in a premature state. Such a pupa will not be able to fly about like a butterfly. It is arguable that a person subjected to violent death – as in the case of suicide – may not be able to enjoy the beauty of God's grand other-worldly dimensions until they have become spiritually compatible with them. They have to navigate through the physical plane like wingless birds. [10] To look at this way, if fruit that is unripe drops from a tree, it will be sour. Suicide breaks a solemn law because it deprives the conscious self of the natural growth that life in a physical body can best provide.[7]The Chinese saying "One day of earthly existence is not equivalent to a thousand days of ghostly existence" is a statement of the sanctity of terrestrial life.

Lord Alton has campaigned against the Assisted Suicide Bill of 2014 since its inception. Referring to his dying father's account of how he had seen his own brother, a member of the Royal Air Force who had died in the Second World War, Lord Alton argued that a forced death, as opposed to a natural one, may deprive a person of their "healing moment." [16] A graceful and natural death may be supposed to be accompanied by benign caretaker spirits with exuberant love who assist those who are dying by making them comfortable for the big transition.[17,18] A person who terminates their own life prematurely may not be so fortunate as to get such benevolent assistance from the spiritual realm. Most hospice workers are very familiar with departing and death-bed visions such as that described by Lord Alton. Furthermore, it has been suggested that beings from the imperceptible spiritual sphere who assist in delivery from the terrestrial plane have a role in such matters as the timing of death, and it is arguable that their part in what happens should not be impeded by intervention.

It appears that human brain is designed to have some doubts about discarnate survival for some reason and a fool proof evidence of post-mortem existence may have its down side in that somebody who is fed up of life might use it to justify ending his earthly life voluntarily. [19]An ultra-optimistic view of discarnate life is spiritually counterproductive and such an over optimism could be seen as a justification by the patient and carers in the decision making of assisted suicide. In a weak moment of extreme psychological or physical sufferings, such a belief can also become the final rationalization for ending one's own life voluntarily. In my own clinical practice, I have come across suicidal patients telling me, "It will be always better on the other suicide." A belief in discarnate existence based on parapsychological proof alone did not deter one such patient making a serious suicidal attempt

End-of-life concerns

The evening of life was considered as a great opportunity for spiritual, emotional and psychological growth and a celebration

of one's life journey. These are also times to harvest the wisdom of yesteryears and share them with the succeeding generation. Spiritually enlightened people consider this to be the time to conquer the fear of death. Fear of death is not the fear of the physical pain of death, but the fear of truthful self-judgement after death. Recent observations in thanatology favour a belief in post-mortem self-assessment and appraisal. For some, it would be voluntary or assisted, whereas for others it could turn out to be forced upon them. The final phase of life is the time to settle the errors committed against fellow beings that have not been remedied in life. Fortunately, modern medicine has prolonged this period, which grants an opportunity for most people to experience conscious ageing. Sadly, traditional attitudes towards the evening of life have changed in today's youth-obsessed culture. For some, medical procedures have extended life and made dying a lingering process rather than a sudden event, and have contributed their own problems. For several reasons, terminally ill people who are in crisis may wish to die rather than being kept alive longer (Table 1).

From an evolutionary point of view, there can be only a survival instinct – no Freudian death instinct. Avoiding death rather than seeking it is a natural human urge and the fear of death may affect every individual action. The very concept of euthanasia is totally against the human make-up and is entirely artificial. Assisted dying and assisted suicide are the same thing when a member of the medical professional gives a lethal drug to a person so that they can take their own life. Euthanasia is different; it happens when, for example, someone injects a lethal substance into a patient. Involuntary euthanasia refers to a situation in which the patient has the capacity to give consent, but has not done so; and in non-involuntary euthanasia a person is unable to give consent, for example because of dementia or being in a coma. Mercy killing is claimed to be a compassionate act to end the life of a patient.

Table 1: End of Life Concerns

- Losing autonomy
- Less able to engage in activities making life enjoyable
- Loss of dignity
- Burden on family, friends/caregivers
- Losing control of bodily functions
- Inadequate pain control or concern about it
- Financial implications of treatment

Moral and ethical issues

It has been observed that the risk of suicide is higher among people with a family history of suicide. Family culture and genetics may account for the increased incidence of suicide in such situations. Assisted suicide would create a trail in the culture of more families and more succeeding generations would perhaps be at increased risk of considering suicide as a serious option at a time of crisis. Kevil Yull (2013) comments that changes in the law of assisted suicide would have an additional impact on those left behind, because of their effect on the moral connections, assumptions and accepted responses to situations on which we base our relationships with fellow human beings and establish ourselves in the world.[20] He argues that the legalisation of assisted suicide would undermine freedom instead of promoting freedom of choice, and also that the proposed safeguards and regulations would breach the privacy of the death-bed.

Assisting someone to kill themselves is assisting them in murder. According to all the major faith traditions, life is a gift from God and ending it is like throwing a precious object back to the giver. All spiritual traditions teach and believe that bringing the human heart to a standstill is God's business (Table 2). There are patients who assert that even if all their limbs were amputated, they would still want to hold on to the treasured gift of life. It is very difficult to define what unbearable suffering is; extreme suffering is a subjective matter that it is not possible to separate from an individual's outlook on life. A fundamental question is that of who would be the one to pronounce a verdict on when suffering is intolerable – the patient or medical personnel?

Laws are not precision-guided arrows and they may become perverted. In a world full of violence and crime, assisted suicide is unsafe and could be exploited. There would be many unintended consequences. For reasons of public safety alone, some people oppose assisted dying. Financial abuse by relatives of the elderly seems to be becoming more common; those with a vested interest could be tempted to put an inheritance before life.

The regulation of assisted dying has been modified in recent times in some countries, an example being the Netherlands in 2014. There it is now lawful to kill a patient without their consent, and euthanasia and assisted suicide may be offered to people with mental health problems (consensus with the family is required in all these situations). In both Belgium and the Netherlands the euthanasia of children is legal with family consent (in Belgium there is no age limit; in the Netherlands the child must be 12 or above and must give consent). In Belgium blind adults who were developing further problems were granted euthanasia at their own instigation a few years ago. There is public concern about collaboration between euthanasia teams and transplant surgeons in Belgium.

Table 2: Medical dilemmas

- Assisted suicide promotes a human right to commit suicide and gives wrong messages to suicidal patients in psychiatry.
- It undermines the Universal Declaration of Human rights and strikes at the foundations of all spiritual values.
- It is hard to define unbearable sufferings.
- Assisted suicide has many unintended consequences.
- Death with dignity could deteriorate as death with indignity.
- It might permit the unlawful killing of innocent people in certain circumstances.

- It is founded on unethical principles-survival of the fittest.

In 2013, 1.7% of all deaths in Belgium were hastened without the explicit request of the patients. [21] Professor Cohen Almagor, the author of 2015 report on euthanasia in Belgium stated that the decision as to which is no longer worth-living is not in the hands of the patient but in the hands of the medical personal. [22] More than 500 people in the Netherlands are subjected to euthanasia without their consent.[23] Data from Oregon where assisted suicide was legalised in 1977 shows that the top five reasons people choose assisted suicide are not because they are suffering from a terminal illness and 49% stated that feeling like a burden and a fear of loss of control are among the main reasons for choosing assisted suicide Oregon .[24] In Washington state in 2013, 61% of people who were killed in assisted dying said that being a burden was a key factor for their choice of death. [25]

Medical Dilemmas

Majority of British medical practitioners are against assisted suicide. [26] A 2013 survey showed that 77% hold the view that they would oppose a change in the current law to allow assisted dying, 18% favoured the RCGP moving to a neutral position, and only 5% favoured a change in the current law. They opined that a change in the law would make patients afraid of their doctor and would alter doctor –patient relationship, and would make vulnerable patients most at risk from assisted dying. According to Marris bill, some people should be given help to die meaning that some lives are worth less than others. Vulnerable people would feel pressurised to choose death and could be killed without their explicit consent. GPs feel that it is their privilege to protect the disadvantaged and vulnerable people of the society.

Assisted dying would lead to less focus on investment in palliative care. The RCGPs also cautioned in the survey that a change in the position of the law makers would become like abortion legislation, which started as something for extreme circumstances and is now effectively on demand. They are also anxious for the fact that legalisation of assisted dying would make it impossible to tell the real reason why patients decided to die, because illness can cause people to become depressed and frightened. As debate on assisted suicide has become hotter, in clinical practice suicidal patients have already started enquiring about the prospects of assisted death.

Thanatology

Medical sciences have not advanced enough in matters of death to offer details to make informed choice for those who want to die voluntarily and thanatology is only a fledgling science. Thanatology is the scientific study of death and investigates the mechanisms and forensic aspects of death, such as bodily changes that accompany death and the post-mortem period, as well as wider psychological, parapsychological and social aspects related to death. They are not particularly interested in the meaning of life and related philosophical issues, but this is an area where science and philosophy not be separate. In recent years, studies of parting visions by Elizabeth Kubler Ross and Raymond Moody's NDE studies. [27,28,29,30,31,32] have given a spiritual dimension to thanatology. Theology and Thanatology are two major corpuses of human wisdom that cannot but overlap. Assisted dying would probably become also an issue of forensic sciences.

It is the job of the doctor to keep the patient alive whereas it is the job of the psychotherapist to have a sense of a bigger picture. [33] People wanting to hasten death should also have the choice of receiving pastoral and psychotherapeutic assistances to distract themselves from their preoccupations of death and allow nature take its own natural course. New generation psychotherapists will have to be well versed in all aspects of death related sciences. Thanatology has a rightful place in medical studies, but I content that medical professionals need not to be unduly concerned about the different forms of afterlife existences, the borderland between religion and thanatology. Medical professionals are expected to be above religion and politics. Thanatologists now fear that if assisted suicide is legalised, they might be pressurised to slip from the original goal of acquiring more knowledge of human dying to serve the dying into the pursuit of death.

Concluding Remarks

Assisted suicide or euthanasia is incongruous with the theological view that it is the weakest and the vulnerable who can teach us the values of life and the concepts of euthanasia or assisted suicide have an indirect message of discarding them. The right to die would soon deteriorate as duty to die to prepare room for fittest ones. Instead of looking for reasons to live, people will be looking for reasons to die. What is need is better understanding of death process and advancements in the palliative care of the terminally ill, rather than doing away with them. Until we know more about the death process, assisted dying debate should be kept on hold. More research in palliative care and allowing people to die naturally with dignity should be the concern of medical profession.

Evolution may be taking place in biological and spiritual streams and they are interconnected: biological sufferings maybe aiding spiritual evolution. [34]. From a philosophical perspective, the rationale of terminal sufferings is to help the individual to disengage from the "pleasant illusions" of earthly life. The debate of assisted suicide raises the question whether human beings are mere electrical animals, quantum beings or fundamentally spiritual personalities-humans maybe all the three. The sanctity of human sufferings need to be brought into the equation of assisted suicide discussion. Assisted suicide would only add to the growing violence in the present world that could do with reintroduction of principles of non-violence.

USA may have better legal infrastructure to negate the unwanted and unintended errors of assisted suicide, but in many third world countries, where there is no such legal infrastructure, the procedure would easily get dishonoured.

Oriental religions as well as Abrahamic faith traditions are opposed to ending life voluntarily. In general, all faith traditions believe that life that is nearing the biological end need not be preserved at all costs and that one does not have to go to extraordinary lengths to preserve a terminally ill person's life. This means, for instance, that while a terminally ill person should not be denied basic care, he or she could refuse treatment that might prove to be futile or unduly burdensome for the dying person - passive voluntary euthanasia.

A scientific belief in after death existence is not without its pitfalls unless it is accompanied by the spiritual corollary of sanctity of earthly life. Science alone cannot highlight the sanctity of life; Divine standards are helpful in comprehending the sacredness of life. In fact, science has taken us to a cross road with Professor Schwartz's new instrumental communication and it is time mark the boundaries of healthy survival research and the unhealthy ones.

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None declared

Author Details
Dr James Paul Pandarakalam, Consultant Psychiatrist, Northwest Boroughs Health Care NHS Foundation Trust, Warrington WA2 8WN, UK
CORRESPONDENCE: Dr James Paul Pandarakalam, Consultant Psychiatrist, Northwest Boroughs Health Care NHS Foundation Trust, Hollins Park Hospital & AFG Rehab Hospitals, Winnick Lane, Warrington WA2 8WN, UK
Email: jpandarak@hotmail.co.uk

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Letter to Editor

Prevention and management of accidental carotid artery cannulation; Novel use of a double male Luer lock connector

Asif Mahmood, Dumisani Ncomanzi, Asquad Sultan & Sandeep Sharma

Abstract

Internal jugular central line insertion is a common procedure performed in anaesthesia and intensive care. Often performed by junior staff. We performed a survey in our anaesthetic and intensive care department to review the methods used to confirm central venous cannulation before dilatation and also how they would manage accidental carotid artery cannulation including follow up. Our survey highlighted a lack of venous transduction before dilatation despite accepted benefits of doing so. This survey also revealed the management of accidental carotid artery cannulation was mostly unknown or unsafe. This survey highlighted the need educate departments regarding the management of accidental carotid artery cannulation. We also describe a method of central venous transduction before dilation via the arterial line transducer without the need to 'break' the arterial line transducer.

Keywords: Central venous pressure wave forms; Ultrasonography; Carotid cannulation, Central line

Abbreviations: CT - computed tomography; CVP - central venous pressure

We would like to draw the attention of your readers to the outcome of a survey undertaken in Kettering General Hospital. We wanted to determine what methods clinicians use to confirm central line cannula/needle position before dilatation and what their removal plan would be for an accidental insertion of a central line (>7 Fr) into the carotid artery.

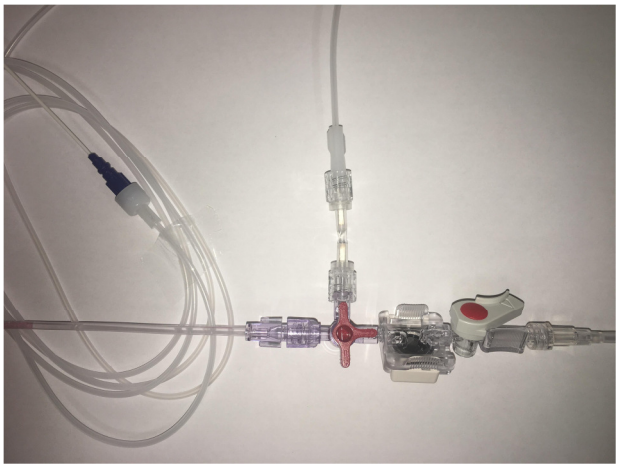
We performed a paper survey of 52 doctors in anaesthesia/intensive care at Kettering General Hospital. We achieved a 100% return rate. We asked the doctors to answer questions based on their practise over the previous year period. The majority of people surveyed were consultants (47%). The results of the survey revealed doctors mostly utilised ultrasound confirmation of guidewire before dilatation (89%) but only 19% utilised pressure transduction. A large proportion of doctors surveyed either did not know how to manage carotid artery cannulation with a >7 Fr central line (35%) or would 'pull and press' (40%). Only 5% of the doctors who would 'pull and press' would arrange computed tomography (CT) angiogram follow up.

We highlighted a lack of clarity, which may be widespread. It is advisable to seek a vascular surgeon or interventional radiology input to facilitate line removal due to the excessive complications related to the 'pull and press' technique (47% complication rate).[1] Complications include pseudoaneurysm formation, airway compromising haematomas, arteriovenous fistula, stroke and death.[1] If such lines are removed by the 'pull and press' technique it is recommended to arrange CT angiogram even if the patient is asymptomatic due to the possibility of pseudoaneurysm or arteriovenous fistula formation.[1]

We correctly utilised ultrasound confirmation of guidewire position before dilatation. However ultrasound alone has not eliminated accidental arterial dilatation. This still occurs despite ultrasound usage especially in cases involving inexperienced clinicians and the guidewire going through the vein and into the artery.[2] The combined use of ultrasound and transduction may further reduce the incidence of carotid cannulation.[3] This may prove invaluable in centres without vascular or interventional radiology support.

Our centre has reduced its usage of central venous pressure (CVP) monitoring. This may reflect our lack of transduction prior to dilatation for central line insertion. Hence we devised a novel use of the double male Luer lock connector. This connector allows the female connector end of an infusion line to connect to the female connector of the blood aspirating port of an arterial transducer. This will then allow transduction of a central line cannula, before dilatation, via the arterial transducer by turning the 3-way tap (Figure 1). This removes the need to set up a separate transducer and also prevents the need to disconnect connections in the arterial line to allow CVP confirmation, as this was considered an infection risk.

Figure 1: Double male Luer lock connector attached to the blood aspirating port of an arterial transducer, with a fluid line connecting this to the central venous cannula



Competing Interests
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Author Details
ASIF MAHMOOD MBCHB,FRCA, Kettering General Hospital, Department of Anaesthesia, Kettering, UK.
DUMISANI NCOMANZI MBCHB, FRCA, Kettering General Hospital, Department of Anaesthesia, Kettering, UK.
ASQUAD SULTAN MBBS, FFARCSI, DESRA, Kettering General Hospital, Department of Anaesthesia, Kettering, UK.
SANDEEP SHARMA BSC, MBBS, FRCA, Kettering General Hospital, Department of Anaesthesia, Kettering, UK.
CORRESPONDENCE: ASIF MAHMOOD, Kettering General Hospital, Department of Anaesthesia, Kettering, UK.
Email: asifmahmood@doctors.net.uk

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Resuscitation

Jennifer Wolkin

Stale and stilted inhales and exhales:
a striking absence of contentedness.

This neuroplastic beast of a brain-
wired with the wonder and wisdom to thrive

and yet, too, the demons
clinging to dendritic branches
choking cellular expression.

I can hear myself screaming
for a serotonergic surge
then goading the glia:

start pruning any circuitry that has died from shame
and find a neurogenesis waiting to be unearthed.

Sometimes, layers upon layers have to be excavated
before the brain's resuscitation allows for easier breaths.

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Author Details
JENNIFER WOLKIN, PhD, Psychologist, NYC, USA
CORRESPONDENCE: Jenniferwolkinphd@gmail.com
Email: Jenniferwolkinphd@gmail.com