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Review Article

Paediatrics

77 Assessment of Child Psychiatric Disorders

This article focuses on key stages in the assessment of psychiatric disorders in children and adolescents. Key points on how the interview with an adolescent may be conducted in an 'adolescent-friendly' fashion are also discussed.

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82 Case of the Month: Woman Presented with a Soft Globular and Pedunculated Mass in Labia Majora

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83 Suicide Among Females with Pregnancy: A Retrospective Study

Suicide is an important indicator of mental and social health of society. It is a complex phenomenon involving socio-cultural, psychological and biological elements. Pregnancy is a special risk factor for suicide attempts among females. Low suicide rate during pregnancy and in the two years following could establish the 'protective effect of maternity'. The aim of the present study is to know the prevalence and profile of suicide in pregnant women.

Sanjeev Lalwani, Raghvender Bagla, Mamta Sood, Chittranjan Behera, Daya Nand Bhardwaj



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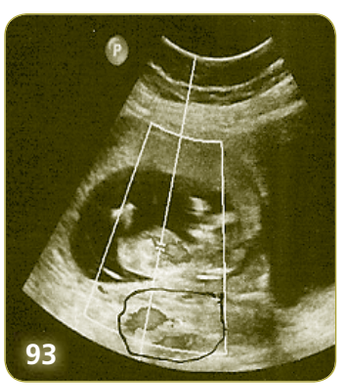
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Gynaecology

87 Influence of Menopause on the Periodontium

Menopause is defined as the permanent cessation of menstruation due to loss of ovarian follicular function, and usually takes place between 45 and 55 years of age. During menopause, periodontal symptoms can differ for each woman. Patients need proper guidance from the physicians regarding the influence of menopause on the periodontium and reference to a periodontist at the first sign of periodontal disease because both the conditions can be managed better when diagnosed in the early stages.

Roby V Emmanuel, Shiba Neelakantan K

91 In Practice (Answer)



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93 Molar Pregnancy with Viable Foetus Progressed to Term – Case Report

Madhushree Vijayakumar, Roopashree

Continuing Medical Education



98 Gestational Diabetes

Historically, there has been a lot of controversy over most aspects of gestational diabetes mellitus (GDM) as well as the relationship between GDM and type II diabetes mellitus. Recently, several major studies have substantially resolved these areas of controversy.

LL Chan, WL Lau, WC Leung

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Published by:
UBM Medica India Pvt Ltd
Empire Towers, No. 53, Railway Parallel Road, Kumara Park West,
Bengaluru-560020
Email: sukanya.ghildiyal@ubm.com

Enquiries and Correspondence

China
Teo Wai Choo
Tel: (86 21) 5213 6622
Email: enquiry.cn@ubmmedica.com

Hong Kong
Kristina Lo-Kurtz, Pagon Lo
Tel: (852) 2559 5888
Email: enquiry.hk@ubmmedica.com

India
Dr. Monica Bhatia
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Email: enquiry.in@ubmmedica.com

Indonesia
Hafta Hasibuan, Sri Damayanti
Tel: (62 21) 5365 2977
Email: enquiry.id@ubmmedica.com

Japan
Mamoru Takagi
Tel: (81 3) 5562 6961
Email: access-planning@eva.hi-ho.ne.jp

Korea
Young Taek Lee
Tel: (82 2) 2007 5400
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Malaysia
Meera Jassal, Lee Pek Lian,
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Tel: (60 3) 7954 2910
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Philippines
Denise Javier, Arlene Toribio
Tel: (63 2) 886 0333
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Singapore
Kim Teo, Carrie Ong, Petrine Ong, Kenric Koh
Tel: (65) 6223 3788
Email: enquiry.sg@ubmmedica.com

Taiwan
Carol Kuo
Tel: (886 2) 2577 6096
Email: enquiry.tw@ubmmedica.com

Thailand
Wipa Sriwijitchok
Tel: (66 2) 741 5354
Email: enquiry.th@ubmmedica.com

Vietnam
Nguyen Thi Lan Huong,
Bui Thi Cam Truc
Tel: (84 8) 3829 7923
Email: enquiry.vn@ubmmedica.com

Europe/USA
Kristina Lo-Kurtz, Maria Kaiser
Tel: (852) 2116 4352
Email: enquiry.hk@ubmmedica.com,
maria.kaiser@ubmmedica.com

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Case Studies
Interesting cases seen in general practice and their management.

Pictorial Medicine
Vignettes of illustrated cases with clinical photographs.



For more information, please contact:
The Editor
UBM Medica India Pvt. Ltd., 404, 4th Floor, DLF City, Phase-IV, Gurgaon, Haryana-122 009, India
email: sukanya.ghildiyal@ubm.com

PAEDIATRICS

The Millennium Villages project in Africa

The Millennium Villages project began in nine African countries (Nigeria, Mali, Senegal, Ghana, Uganda, Kenya, Rwanda, Tanzania, and Malawi) in 2006. In each country, a rural population (average, 35,000 people) with high levels of poverty and undernutrition was selected. Finance amounting to around US$120 per person was provided annually to support agriculture, the environment, business development, education, infrastructure, and health, in partnership with communities and local governments. Average spending per person was $27 at baseline and $116 by year 3. There were improvements in water supplies and sanitation, poverty levels, food security, stunting, and malaria prevalence at Millennium Village sites after 3 years. Under-5s mortality fell by 22% in these sites and by 33% relative to matched comparison sites. Provision of many maternal–child health interventions was improved.

The multifaceted intervention was beneficial in several ways including reduced child mortality.

Pronyk PM et al. The effect of an integrated multisector model for achieving the Millennium Development Goals and improving child survival in rural sub-Saharan Africa: a non-randomised controlled assessment. Lancet 2012; 379: 2179–2188; Malenga G, Molyneux M. The Millennium Villages project. Ibid: 2131–2133 (comment).

Management of type 2 diabetes in children and adolescents

The increased prevalence of obesity in children and adolescents has led to an increased incidence of type 2 diabetes. The physical and emotional challenges of adolescence, together with the increased frequency of obesity and diabetes in underprivileged communities, add to the difficulties of diabetes control. Three treatment approaches have been compared in a US multicentre trial.



A total of 699 patients aged 10–17 years with type 2 diabetes (mean duration, 7.8 months) and obesity (body mass index, 85th percentile or higher for age and sex) were randomized to metformin alone (M), metformin plus rosiglitazone (MR), or metformin plus a weight-loss lifestyle intervention (MW). Over an average follow-up of 3.9 years, loss of glycaemic control (glycated haemoglobin at least 8% for 6 months or sustained metabolic decompensation needing insulin) occurred in 45.6% of participants overall. The group rates for this outcome were 51.7% (M), 38.6% (MR), and 46.6% (MW). MR was significantly better than M, but MW was not significantly different from M or MR.

MR was the best of the three options. Most young people with type 2 diabetes will probably need combination drug therapy or insulin within a few years of diagnosis.

TODAY Study Group. A clinical trial to maintain glycemic control in youth with type 2 diabetes. NEJM 2012; 366: 2247–2256; Allen DB. TODAY – a stark glimpse of tomorrow. Ibid: 2315–2316 (editorial).

Treatment for infants of mothers who present late in pregnancy with an untreated HIV-1 infection

The best treatment for infants of mothers with human immunodeficiency virus (HIV)-1 infection who have not received antiretroviral therapy in pregnancy is uncertain. Three regimens have been compared in an international trial.

A total of 1,684 bottle-fed infants of mothers who received a diagnosis of HIV-1 infection late in pregnancy were randomized within 48 hours of birth in Brazil, South Africa, Argentina, or the USA to one of three treatment regimens: zidovudine for 6 weeks (Z6), zidovudine for 6 weeks plus three doses of nevirapine in the first 8 days (Z6 + Nev), or zidovudine for 6 weeks plus nelfinavir and lamivudine for 2 weeks (Z6 + Nelf L). The overall rate of *in utero* HIV transmission was 5.7% and was the same in all three groups. Transmission during labour occurred in 4.8% (Z6), 2.2% (Z6 + Nev), and 2.4% (Z6 + Nelf L). Overall, 8.5% of infants were infected by 3 months, 11.0% in the Z6 group, 7.1% in the Z6 + Nev group, and 7.4% in the Z6 + Nelf L group, a significantly greater rate in the zidovudine-only group compared with the other two groups. HIV-1 transmission was significantly associated with zidovudine monotherapy, higher maternal HIV load, and maternal use of illegal substances. Neutropenia occurred in 16.4%, 14.9%, and 27.5% of the three groups, respectively.

The Z6 + Nev and Z6 + Nelf L regimens were more effective than the Z6 regimen, and the Z6 + Nev was less toxic than Z6 + Nef L.

Nielsen-Saines K et al. Three postpartum antiretroviral regimens to prevent intrapartum HIV infection. NEJM 2012; 366: 2368–2379.

Zidovudine, lamivudine, and ritonavir-boosted lopinavir for HIV-infected children

For mothers and infants, who have previously been exposed to nevirapine, treatment of human immunodeficiency virus (HIV)-1 infection with a regimen including ritonavir-boosted lopinavir is better than



treatment with a nevirapine-based combination. The best treatment for children not previously exposed to nevirapine is uncertain. Now, a trial in six countries in sub-Saharan Africa and India has shown that a ritonavir-boosted lopinavir-based regimen is better than a nevirapine-based regimen for young children who are nevirapine-naive.

A total of 287 nevirapine-naive HIV-infected children aged 2–36 months were randomized to zidovudine and lamivudine with either nevirapine or ritonavir-boosted lopinavir. The median proportion of $CD4^+$ T-cells was 15% and median plasma HIV-1 RNA level 5.7 $\log_{10}$ copies/mL. Virological failure or treatment discontinuation by week 24 occurred in significantly more children in the nevirapine group (40.8% vs 19.3%). Drug resistance was present in 19 of 32 children in the nevirapine group tested at the time of virological failure. Mortality was greater in the nevirapine group (10/147 vs 3/140), and drug toxicity was also greater.

The results were better with the ritonavir-boosted lopinavir-based regimen, but these researchers point to difficulties in introducing this treatment: the liquid formulation is unpleasant to taste and deteriorates in hot temperatures, and the cost is twice that of the nevirapine-based regimen. New drug formulations are needed urgently.

Violari A et al. Nevirapine versus ritonavir-boosted lopinavir for HIV-infected children. NEJM 2012; 366: 2380–2389.

Neonatal screening with pulse oximetry for critical congenital heart defects: Systematic review and meta-analysis

Babies with congenital heart defects may be discharged from hospital before a diagnosis is made and may subsequently become suddenly and critically ill. A new systematic review and meta-analysis has confirmed that pulse oximetry screening of asymptomatic newborn babies is highly specific and moderately sensitive for the detection of critical congenital heart defects.

The review included 13 studies (229,421 babies). The sensitivity of pulse oximetry was 76.5% and the specificity 99.9%. The false-positive rate was 0.50% in the first 24 hours after birth and 0.05% when done later.

It is concluded that pulse oximetry screening should be introduced widely.

Thangaratinam S et al. Pulse oximetry screening for critical congenital heart defects in asymptomatic newborn babies: a systematic review and meta-analysis. Lancet 2012; 379: 2459–2464; Kemper AR, Martin GR. Screening of newborn babies: from blood spot to bedside. Ibid: 2407–2408 (comment); The Lancet. A new milestone in the history of congenital heart disease. Ibid: 2401 (editorial).

Oral immunotherapy for egg allergy in children

By the age of 2.5 years, around 2.5% of children have developed egg allergy. Complete dietary

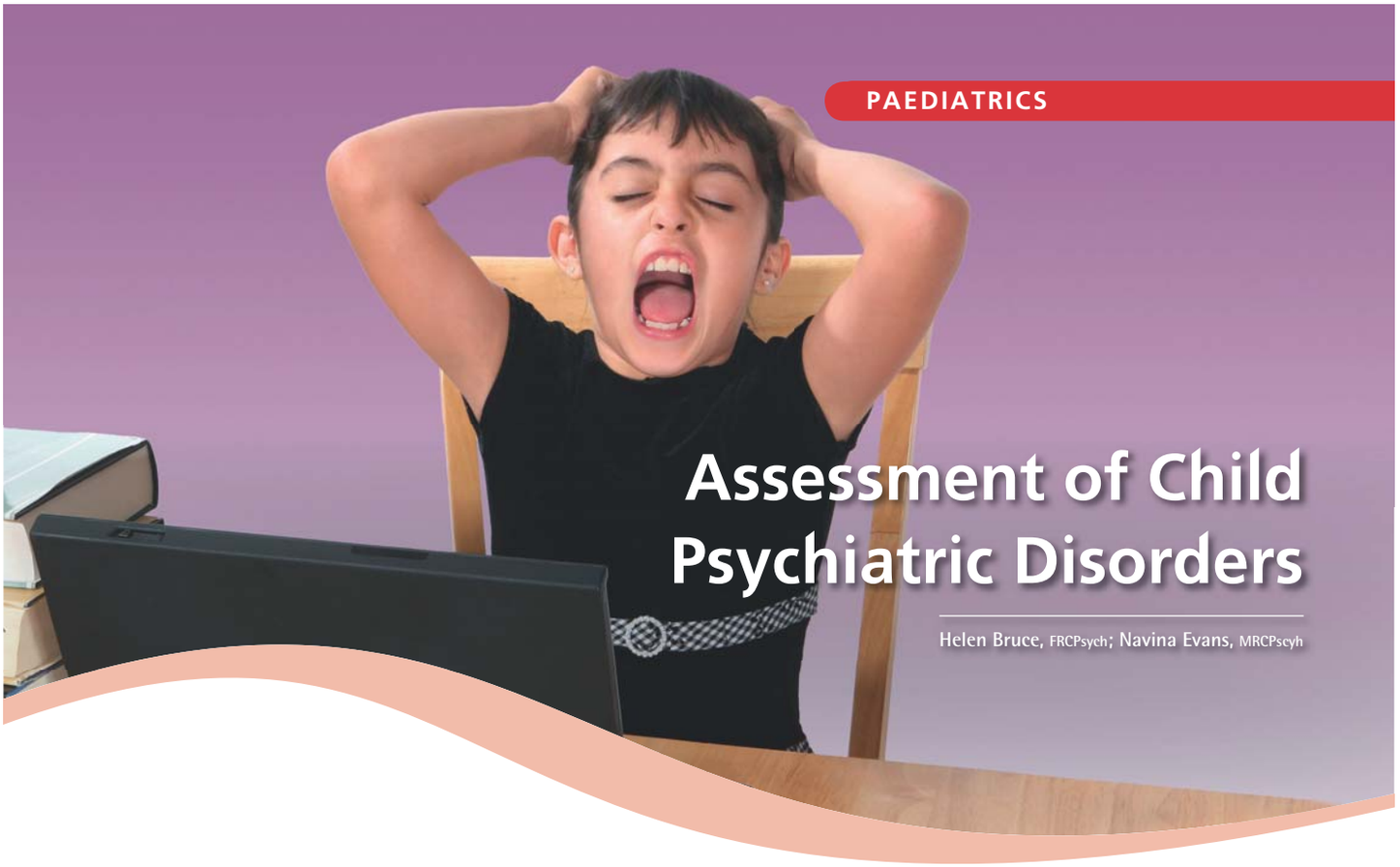


avoidance may be difficult. Now, a multicentre US trial of oral immunotherapy has given positive results.

The trial included 55 children aged 5–11 years with egg allergy without a history of severe anaphylaxis. All had raised levels of egg-specific IgE. Randomization was to oral immunotherapy (40 children) or placebo (15 children). Immunotherapy consisted of giving egg white powder in three phases, in increasing doses up to 2 g per day. Challenges with egg white were performed at 10 and 22 months. After a 5-g challenge at 10 months, no allergic symptoms (or mild symptoms) occurred in 55% (immunotherapy) vs none (placebo). At 22 months, 75% of children in the immunotherapy group passed a 10-g challenge. At 24 months, 29 of the 30 children who passed the 22 months' challenge were re-challenged and 11 passed. All of the children who passed the 24 months' challenge were able to eat egg at 30 and 36 months.

Oral immunotherapy may be successful in some children with egg allergy.

Burks AW et al. Oral immunotherapy for treatment of egg allergy in children. NEJM 2012; 367: 233–243.



Assessment of Child Psychiatric Disorders

Helen Bruce, FRCPsych; Navina Evans, MRCPscyh

This article is divided into two stages: assessment of psychiatric disorders in children and assessment of psychiatric disorders in adolescents. The general pointers at the beginning of the article are of relevance to both groups, as are the comments about early history.

SETTING THE STAGE

The assessment of a child or adolescent usually takes place over several meetings, using information from several different sources. (Table 1) An initial assessment interview is a key time to begin the therapeutic process of engagement with a family, and it is important to try to get it right.

The setting of the interview may vary hugely, from an accident and emergency department or a community location such as a schoolroom that is used for many other purposes, to a clinic setting with a room set up in an age-appropriate way for this purpose. Consideration must always be given to the safety of the child and the family, as well as that of the interviewers.

WHOM TO SEE

With a younger child, it is usually helpful to meet with the whole family at the start of the interview, but at some stage in the assessment, the parent(s) or guardian should be seen without the child being present. Where it is age appropriate, a younger child must also be given time to speak to the interviewers—either focusing the interview on them with the family present or meeting with the child alone. An adolescent will usually wish to be seen for some of the assessment without their parents.

Table 1. Stages of the assessment

- Preparation, including safety issues
- Family interview
- Interview with the child
- Interview with the parent(s)
- Physical examination and investigations
- Information from other sources

Table 2. Observing the child

Behaviour
- Appearance and dress
- Emotional responsibilities
- Mannerisms
- Activity level

Talk
- Form: coherence, spontaneity, prosody articulation
- Content: persistence, interruption of attention, child's interests

Anxiety and mood
- Fears and worries
- Restless
- Disturbed or aggressive
- Withdrawn or shy
- Sadness

Interactions
- Parent–child interaction
- Interaction with other family members
- Interaction with clinician

Intellectual function
- A brief overview of the child's current level of ability. Does this differ greatly from their chronological age?

Adapted from Harrington, 2005.[1]

FAMILY INTERVIEW

The interview should begin by making the family welcome and putting them at ease. What do the family see as the problem, and who has the problem? How are they trying to deal with it at present? What have they already tried, and what help have they already received? How does the problem affect their lives?

One strategy the assessor may use is to ask the family to work together in the session on an exercise, such as drawing up a family tree. This gives the assessor an insight into how family members relate to one another and also into the presenting problem. Are the parents sensitive to the child's communications? How do they respond? What is the parents' own relationship like? Is one family member ignored?

It is also important to ask who else is important to the child, but not present. This could be a separated parent or grandparent, for example. How would the family describe this person, and what would they say if they were in the room?

INTERVIEW WITH THE CHILD

With the younger child, it may not be possible formally to examine the child's mental state, and the clinician will need to rely on observation. This should include an observation of the child's behaviour, interactions with family, interactions with clinicians, and play. Key things to include are shown in Table 2.

At the end of the interview with the child, a helpful technique is to ask the child 'If you had three wishes, what would you wish for?' In response to this question, the child will often give useful information about their situation, fears and worries, using terms and a context that is meaningful to them.

INTERVIEW WITH THE PARENT(S) OR CARER

It is important to obtain from the parent(s) a thorough description of the current problem, as well as an account of the child's development and medical and school history. The key points are summarized in Table 3.

It is best if this information can be obtained from an interview with the parent or guardian without the child being present, to allow them to have a frank discussion and to give full details to the clinician.

PHYSICAL EXAMINATION AND INVESTIGATIONS

Most children who attend child mental health services are not routinely medically examined. It is important that consideration is given to a physical examination, if one has not already been done before the child is being seen in the clinic by the general practitioner or community paediatrician. Reasons for this assessment include the possibility of an underlying undetected physical condition that has caused the child's difficulties, or the prescription of medication that could have physical side effects, such as risperidone or methylphenidate. Guidelines can be found that are relevant to each medication and indicate the essential elements of physical examination. An example of this is the European Clinical Guidelines for Hyperkinetic Disorder,[2] but most National Health Service Trusts also have their own prescrib-

ing guidelines that state minimum levels of physical investigations required in their policies.

A baseline height and weight should always be recorded. Where there is suspicion of an underlying medical condition, a full physical examination is essential. A full neurological examination may also be required if the history is indicative of a neurological disorder such as developmental delay, epileptic fits or loss of skills. Other indicators include a history or physical appearance that suggests the child could have a congenital syndrome. Useful pointers to congenital syndromes include learning difficulty, dysmorphic features (including unusual facial features) and extreme values for height, weight or head circumference.[1]

Most children do not require further medical investigations unless there is a clinical indication or abnormalities have been found on the physical examination. However, it is important to carry out appropriate blood tests if medication is being considered.

OTHER SOURCES OF INFORMATION

Before the assessor seeks other sources of information (from educational or social services, for example), it is important to ensure that parental consent has been obtained for this. Other agencies involved with the family or child may have information that is useful in helping to understand the child's problems. Schools can provide particularly valuable accounts of a child's difficulties. It is usually best to obtain structured reports, in the form of a set of specific enquiries. Potential informants include the child's class teacher and the school's Special Educational Needs Coordinator (SENCO). Depending on the nature of the child's problem, the enquiry can be supported by standardized questionnaires that are available for teachers, such as the Conners' Rating Scales for Hyperactivity/Inattention. A school or nursery observation by the clinician (if resources allow) will also yield valuable information.

PUTTING IT ALL TOGETHER/ FORMULATION

First, the clinician will need to consider whether the child's behaviour, emotional state or presenting difficulty is abnormal. It must be carefully considered whether a symptom is abnormal in relation to a child's age and gender, culture or developmental stage. The symptom needs to be assessed as persistent, severe, frequent and of a sufficient extent to be considered abnormal. It is important to know whether the symptom is leading to functional impairment in the everyday life of the child. Four main criteria can be used to assess impairment:

- Interference with a child's development
- Social restriction
- Suffering or distress to the child
- Effect on others

Different aspects of the child's problems are best recorded using a multiaxial framework such as that of the *International Classification of Diseases, tenth revision (ICD-10)*, which records the following:

- Axis I: Clinical Syndrome
- Axis II: Disorders of Psychological Development
- Axis III: Mental Retardation
- Axis IV: Medical Illness
- Axis V: Psychological Disorders

An adequate formulation of the child's difficulties requires the examiner to piece together the presenting features of the problem, with any aetiological factors, and to comment on the differential diagnosis, management and prognosis. This evaluation will form the basis on which any intervention is planned.

ASSESSMENT OF THE ADOLESCENT

The general principles of assessment outlined above apply to any age of child. However, it is particularly important to bear in mind that the range of disorders seen in adolescence may differ from those found in younger children. (Table 4) There are some useful ba-

Table 3. Information from the parent(s) or carer

- Current problem as the parent sees it, and its effect on the family
- Behavioural problems (eg, aggression, conduct problems, truancy, running away)
- Emotional symptoms (anxiety, fears, depression, suicidality)
- Attention and concentration
- Activity levels
- School history, performance and attendance
- Family life and relationships, including any family history of illness
- Peer and sibling relationships
- Any recent adversity (eg, bereavement, trauma)
- Developmental history
- Physical health
- The child's temperamental characteristics
- The child's strengths

Table 4. Common disorders in adolescence

- Mild-to-severe depression
- Anxiety disorders
- Psychotic illness
- Mental health problems associated with substance misuse
- Obsessive–compulsive disorders
- Post-traumatic stress disorders
- Deliberate self-harm
- Emerging personality disorders

sic principles to guide the assessment in adolescents.

- To establish the characteristics of the young person's problem, even if it is not possible to formulate a diagnosis within the framework of *ICD-10*. It is sometimes sufficient to take a symptom-based or problem-focused approach to management.
- To pay attention to risk assessment and associated management. This is a very important aspect of care, because risk both to the individual and to others (within and outside the family) is more of an issue in adolescent disorders. The psychiatrist plays a crucial role in risk management, and should attempt to manage anxiety within the young person's social network.
- To have a good understanding of strengths, resilience and protective factors. These can be exploited in the management plan and enhance outcome.
- To establish predictors of good outcome at the outset of the management plan, in order to improve the child's prognosis.

There are key areas where the assessment of adolescents differs from the equivalent assessment of younger children. It is important to take into account developmental issues and to have a good understanding of the particular young person's stage of emotional, cognitive and psychological development, which may differ according to their physical maturity. Be aware that the individual's autonomy must be given due respect. This issue can cause tension in the assessment phase, but should not be ignored. Confidentiality is linked with this issue. Although it may not always be possible to guarantee confidentiality, the young person is entitled to a full explanation of how this right will, as far as possible, be respected.

Many patients have their first encounter with mental health services during their adolescence. The nature of this experience will affect their future compliance and engagement, so it is especially important to consider the long-term implications of their interaction with professionals at this stage.

When seeing the adolescent, it is helpful to establish what they personally see as the problem. They may not agree that they have a problem at all. Even if they do not agree with the parent or referrer, the examiner can still establish a rapport, and it is important to engage with the young person. The issue of confidentiality and its limits should be established. The process of assessment should be explained clearly. A psychiatric mental state examination should be carried out. At the end of the interview, it is important to ask the young person whether there is anything else they would like to talk about or that you should know which would help you in your assessment. It is also important to ask whether they have any questions for you.

The family interview is useful for gathering information. It is also a helpful space for observing interactions and gaining some insight into how the family members relate to one another, the adolescent's role in relation to the others, and how the particular family is negotiating the life-cycle changes involved at this stage of the young person's development.

The parents can be interviewed together with the young person, or separately. Many young people want to know what is being said about them, and they should not be excluded. At times, it may be more appropriate for the young person and the parent(s) to be seen separately, for instance, when the young person is extremely agitated or unwell, or

if the parents are concerned about talking in front of the young person. If this is done, the young person should be informed that the discussion is taking place and it should be made clear to all involved what level of information will be shared. It is important not to be drawn into colluding with any secrets between family members.

As with an assessment of a younger child, the aim is to gain a comprehensive picture. In addition to all of the information outlined in Table 3, it is also important to obtain a sexual, forensic, and drug and alcohol history.

The physical examination should be conducted when there are clinical indications. Appropriate investigations should be considered to rule out organic causes for the presentation.

As with a younger child, it is important to gather information from as many sources as possible in order to build an accurate and helpful picture. This will enable the application of a meaningful formulation and plan. However, it is important to be mindful of confidentiality and to be explicit about the limits and the process of sharing any confidential information with the young person.

The formulation is of particular importance. It should be phrased in such a way that the young person can be engaged in the plan of treatment and management. Adolescents are aware of their autonomy, and their co-operation is vital. As well as devising an account of the origins of the child's problem and its impact on their day-to-day functioning, the formulation should also reflect on sources of strength and resilience at the personal and family level. The *ICD-10* multiaxial framework remains useful as a way of summarizing the issues relevant to the child's difficulties, as these are often complex and require complex solutions.

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About the Authors

Dr Bruce is Consultant Child and Adolescent Psychiatrist at East London NHS Foundation Trust and is Honorary Clinical Senior Lecturer at Barts and the London School of Medicine and Dentistry, London, UK. Dr Evans is Consultant Child and Adolescent Psychiatrist working in a Tier Four Specialist Adolescent Service in East London. She also is Clinical Director for CAMHS in the East London Foundation NHS Trust.

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Case of the Month

Woman Presented with a Soft Globular and Pedunculated Mass in Labia Majora

Sreelatha Sampath Kumar, Ashwini Rani, BR Vani

Case Report

A 39 year old woman presented with a mass arising from the right labia majora since 10 years. It had gradually increased in size. The mass was globular, soft in consistency, non-tender pedunculated (attached to the labium by a stalk) and measured 6X5 cms (Figure 1). The skin overlying the mass was normal. A clinical diagnosis of lipoma was made. It was completely excised and sent for histopathological examination (Figure 2).



Figure 1. Penduculated mass arising from labia majora

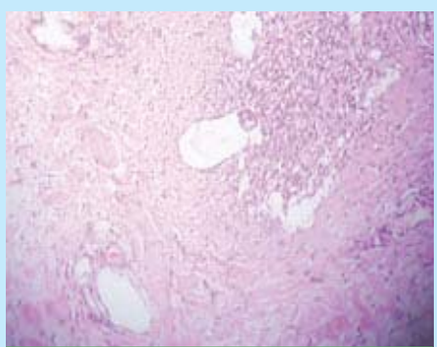
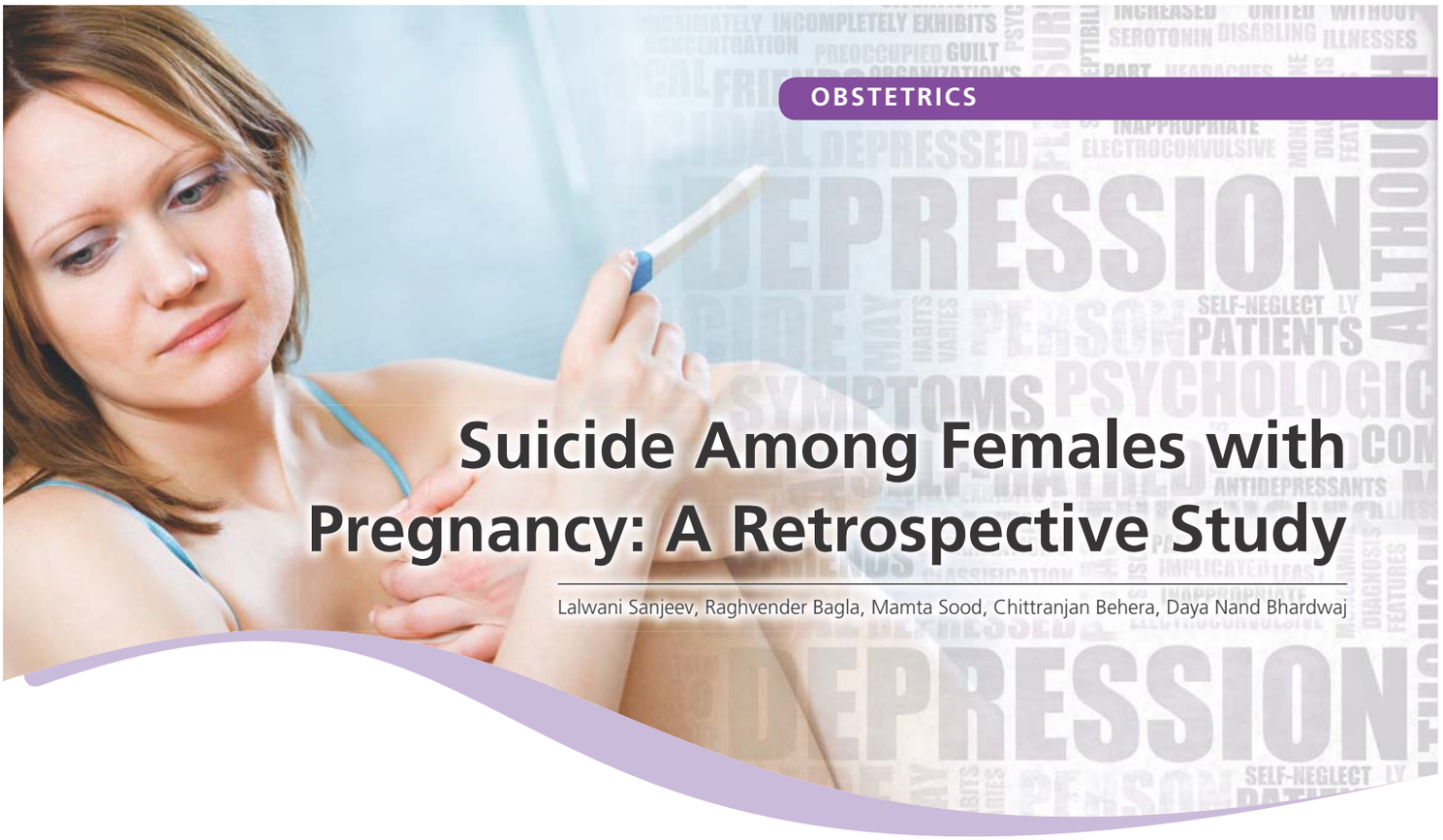


Figure 2. Histopathological report

(Continued on page 91)



Suicide Among Females with Pregnancy: A Retrospective Study

Lalwani Sanjeev, Raghvender Bagla, Mamta Sood, Chittranjan Behera, Daya Nand Bhardwaj

INTRODUCTION

Suicide is an important indicator of mental and social health of society.[1] It is a complex phenomenon involving socio-cultural, psychological and biological elements.[2] The number of suicides in India during the decade (2000–2010) has recorded an increase of 23.9% (from 1,08,593 in 2000 to 1,34, 599 in 2009). With 18.3% rise in population, increasing trend in suicide rate is observed during 2006 (10.5) to 2010 (11.4).[3]

Pregnancy is a special risk factor for suicide attempts among females.[4] Oates M has reported suicide though rare but as leading cause of maternal deaths.[5] In contrary to this Appleby[6] and Marzuk *et al*[7], reported that women during pregnancy have a low risk of suicide. Low suicide rate during pregnancy and in the two years following could establish the 'protective effect of maternity'.[8–9] Youchah *et al* mentions that pregnant women rarely commit suicide but, psychological factors, substance abuse and other intervening factors make this generalisation unreliable.[10]

We have earlier reported that at our hospital, autopsies were conducted on 19.2% of females over 5 year period. Out of these, 89.2% had died because of unnatural deaths; suicide was an important cause comprising of 40% of total unnatural deaths.[11] The present report was prompted by the observation that there were many pregnant females in this sample, though they were not separately analysed. Although literature is available from various countries,[6,12–16] there is deficiency of literature addressing the specific issue of suicide among pregnant females in India. There is need for such studies so as to increase awareness and understanding of suicide among pregnant females and plan strategies for its prevention. The aim of the present study is to know the prevalence and profile of suicide in pregnant women.

Table 1. Age of victim

Age in years	Victims	
	No. of cases	Cases (%)
16–20	20	24.69
21–25	39	48.15
26–30	19	23.46
31–35	3	3.70
Total	**81**	**100**

MATERIAL AND METHODS

The present study includes all cases of suicidal death of pregnant females on whom autopsy was conducted in the Department of Forensic Medicine and Toxicology, All India Institute of Medical Sciences, New Delhi (a tertiary care hospital) from January 1991 to December 2010. The data were collected from autopsy reports, inquest papers and clinical records and analysed as per age of victim, duration of pregnancy, cause and manner of death.

RESULTS

In the study period from January 1991 to December 2010, a total of 235 maternal deaths were reported, out of these 81(34.50%) cases were of suicidal deaths pertaining to pregnant females. Among these, commonest age group of victims involved was of 21–25 years (n=39, 48.15%) followed by 16–20 years (n=20, 24.69%) and 26–30 years (n=19, 23.46%) (Table 1). Majority of the victims were married (n=76, 93.83%) (Table 2). Magistrate inquest was held in 32 (39.51%) cases (Table 3). Among pregnant females most of the victims (n= 66, 81.49%) cases committed suicide during first and second trimester (Table 4). Commonest sex of the foetus determined was male in 25 (30.86%), female in 14 (17.28%) cases and was not possible to determine in 37 (45.68%) cases (Table 5). Hanging was the commonest method used to commit suicide (n=46, 58.02%) followed by poisoning (n=20, 24.69%) and burns (n=12, 14.81%) (Table 6). Viscera's were sent for chemical analysis in 41 (50.62%) cases,

Table 2. Marital status

Marital status	Cases	
	No. of cases	Cases (%)
Married	76	93.83
Unmarried	5	6.17
Total	**81**	**100**

Table 3. Type of inquest

Inquest	Cases	
	No of cases	Cases (%)
SDM	32	39.51
Police	49	60.49
Total	**81**	**100**

SDM:

DISCUSSION

Suicide is one of the important and potentially preventable causes of maternal mortality.[17] In our study, 81 (34.50%) cases were of suicide among deaths pertaining to pregnant females during autopsy. In the study from Bangladesh by Yusuf *et al*[18] reported that out of 425 women who were pregnant when they died due to injuries, 201 (47.4%) were due to suicide. The results noted in our report are lower, this could be because the data was collected from health service functionaries in all health facilities in Bangladesh. From India, we could not find any study related to suicide in pregnancy. However, Lal *et al*[19] reported that out of 219 deaths of mothers, slightly over 20% of accidental deaths were due to burns and suicide.

The commonest age group of pregnant females committing suicide was 21–25 years. This is in line with national data on suicide in India also suggest 15–29 years of age group with maximum number of suicidal deaths among females[3] and our previous study. However, Appleby reported that within the population of pregnant women, teenagers are at greater risk to commit suicide.[6] Out of nine suicides among pregnant women reported in Virginia, USA,[20] 4 were in the age group of 19–22 years.

Majority of pregnant females who committed

suicide in our sample, were married which is in line with national data. The causes of suicide among married pregnant females in India could include family problems, illness (prolonged illness, mental illness) and dowry related disputes. Some of the pregnant females (about 6%) were unmarried also. The causes of suicides among unmarried pregnant females could be love affairs, suspected or illicit relations, and illegitimate pregnancy.[3] In our study, magistrate inquest under section 176 Cr PC (Criminal Procedure Code) regarding dowry related deaths was held in 32 (39.51%) of cases wherein inquest was held to look into the harassment or cruelty by husband or parents in laws. Martin *et al* have also reported strong relationship between suicide during pregnancy and intimate partner violence.[21]

Our study did not show any significant difference in suicide committed in first and second trimester. Whitlock and Edwards found that pregnant women who attempted suicide did so primarily during the first two trimesters of pregnancy.[22] However, Appleby reported that most of the cases of suicide occurred in second trimester.[6]

In contrast to Hawton *et al,*[8] reporting that women are less likely to die violently, in the present study, hanging was the commonest method used to commit suicide followed by self-poisoning and self-immolation. Our findings are also in conformity with national data on suicide wherein hanging and poisoning are reported to be the leading causes of suicide among females.[3] Similar results were reported by Aaron *et al,*[23] from South India. Although self-immolation was used to commit suicide in 12 cases (14.81%), these numbers may not be indicative of actual number of fatalities due to self immolation as our institution lack burn center, therefore all those cases with even remote chance of survival would have been taken to health care set up having specialised treatment facility for thermal injuries. Our study includes only those cases in which victims were found dead at the spot. Majority (6 cases) of fatalities due to self-immolation occurred during second trimester, victims were of age group 21–30 years (9 cases) and in all cases burn injury was caused using dry flame. In all the cases percentage of total body surface area (TBSA) involved in burn was almost 100% making the survival of victims causing self-immolation impossible. These observations are in conformity with study from Iran by Karimi *et al.*[24] In studies from West, the commonest method used to commit suicide has been reported to gunshot injuries followed by overdoses, hanging and stabbing.[20]

Harassment of married women by husband or in laws for giving birth to female children is not uncommon in our country. However, sex of the foetus do not appear to be a contributory factor in suicide as in majority of the cases sex remained undetermined or foetus were of male sex.

Table 4. Gestational age

Gestational age	Cases	
	No. of cases	Case (%)
First trimester	32	39.51
Second trimester	34	41.98
Third trimester	14	17.28
Not known	1	1.23
Total	**81**	**100**

Table 5. Foetal sex

Sex of foetus	Cases	
	No. of case	Case (%)
Male	25	30.86
Female	14	17.28
Unknown	5	6.17
Undetermined	37	45.68
Total	**81**	**100**

Visceras preserved –41 cases

Table 6. Cause of death

Cause of death	Cases	
	No of case	Case (%)
Poisoning	20	24.69
Sulfos	7	
Others	2	
Unknown	10	
OP	1	
Hanging	47	58.02
Self immolation	12	14.81
Drowning	1	1.23
FFH	1	1.23
Total	81	100

In this study, no information was available regarding mental illness in the pregnant females who committed suicide. However, subsyndromal psychiatric symptoms and psychiatric disorders are common among pregnant women and may occur in about 10–41.2% of them.[25] National data also suggest that among females who committed suicide due to any illness, mental illness was the second leading contributor.[3] In pregnancy, although psychosis is rare, depressive and anxiety disorders are common.[6,26,27] Suicidal ideations have also been reported in pregnant women.[28] World Health Organization (WHO)[29] has recognised mental disorders as indirect causes of maternal deaths as these are the conditions not directly related to obstetric cause but can be worsened by the pregnant status. Pregnancy is also reported to be associated with a high rate of mental health disorders.[30]

LIMITATION

As reported by other authors, retrospective evaluation of data on suicide and reliance on death certificates provided very little or no information regarding precipitating circumstances on suicide. (Palladino *et al*[17], Hoyet DL[31]). As this is hospital based study, the findings may not be generalisable to the general population.

CONCLUSION

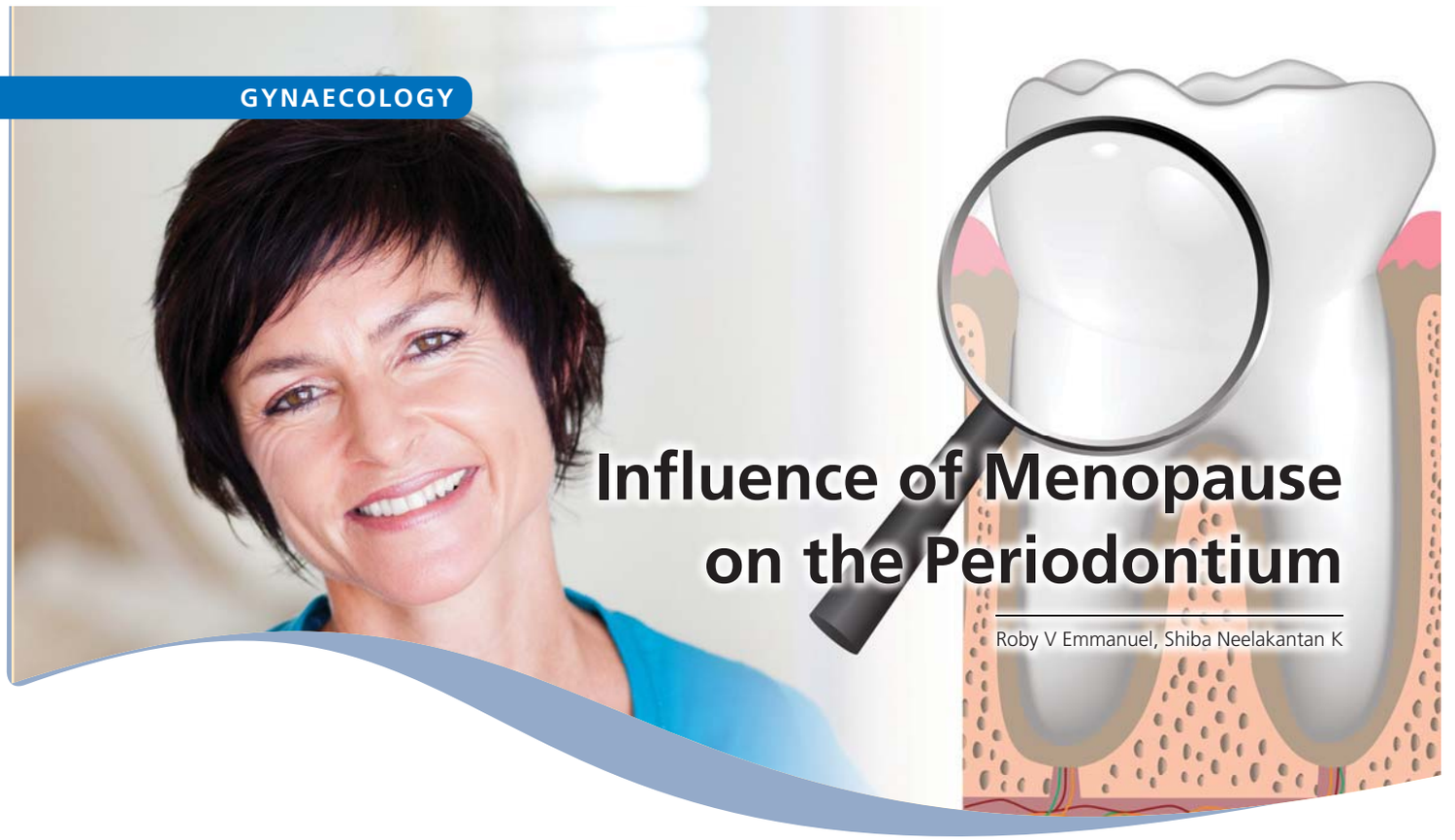
In the present study, over 2 decades, about 34.5% of suicidal deaths in pregnant females were identified in a tertiary care centre. Majority of them were married and suicides occurred in first two trimesters. Hanging was the commonest method used for committing suicide. These findings highlight the need for conducting community based studies to delineate correlates and determinants of suicide in pregnant females which will further help in developing strategies for its prevention.

About the Authors

Dr Sanjeev Lalwani is a Associate Professor, Dr Raghvender Bagla is a Senior Resident, Dr Chittranjan Behera is a Assistant Professor and Dr Daya Nand Bhardwaj is a Professor and Head, Department of Forensic Medicine and Toxicology and Dr Mamta Sood is a Associate Professor, Department of Psychiatry, All India Institute of Medical Sciences, New Delhi.

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Influence of Menopause on the Periodontium

Roby V Emmanuel, Shiba Neelakantan K

INTRODUCTION

Periodontium consists of the supporting structures of the teeth including the cementum, periodontal ligament, alveolar bone and gingiva (gums). Periodontal disease is a multifactorial condition and a major cause of tooth loss worldwide. Periodontitis is defined as an inflammatory disease of the supporting tissues of the teeth caused by specific microorganisms, resulting in progressive destruction of the periodontal ligament and alveolar bone with pocket formation, recession or both. The initial stage is inflammation of the gingiva (gingivitis).The clinical feature that distinguishes periodontitis from gingivitis is the presence of clinically detectable attachment loss. This is often accompanied by periodontal pocket formation and changes in the density and height of subjacent alveolar bone.[1] If left untreated periodontitis may lead to loss of tooth. Menopause is defined as the permanent cessation of menstruation due to loss of ovarian follicular function, and usually takes place between 45 and 55 years of age.[2]

Effects of Menopause on Periodontium

During menopause, periodontal symptoms can differ for each woman. Menopause hormonal imbalances can even affect other aspects of oral health, such as health condi-

tions in the salivary glands and the jawbone. In a model proposed by Genco and Grossi[3] for oestrogen deficiency as a risk factor for periodontal disease it has been observed that oestrogen deficiency leads to more production of bone-resorbing cytokines produced by immune cells (monocytes and macrophages) and osteoblasts. The host immune system produces more inflammatory cytokines that activate osteoclasts, which reabsorb bone when challenged by products related to periodontal bacterial plaque biofilm by bone-resorbing factors such as lipopolysaccharides, and toxins. For an oestrogen deficient woman to show signs of periodontitis, presence of dental plaque with pathogenic bacteria may be required.[4]

The menopause and the lack of ovarian steroids are known to promote important changes in connective tissue.[5] The mechanisms involved in this influence are not completely understood, but it is thought to be related to the action of oestradiol on the connective tissue.[6] The menopause triggers a wide range of changes in women's bodies, and the oral cavity is also affected. Although elevated levels of ovarian hormones, as seen in pregnancy and oral contraceptive usage, can lead to an increase of gingival inflammation with an accompanying increase in gingival exudates,[7] conversely, the menopause-the absence of ovarian sex steroids-has been related to a worsening in gingival health, and hormonal replacement therapy seems to ameliorate this trend.[8]

In menopause oestrogen deficiency induces cancellous as well as cortical bone loss. Highly increased bone resorption in cancellous bone leads to general bone loss and destruction of local architecture because of penetrative resorption and microfractures. In cortical bone the first response of oestrogen withdrawal is enhanced endocortical resorption. Later, also intracortical porosity increases. These lead to decreased bone mass, disturbed architecture and reduced bone strength.[9] Postmenopausal women represent a subpopulation with unique factors. Oestrogen deficiency after menopause[10,11] and consequent loss of bone mineral density[12,13] have been shown to be associated with increased rate of tooth loss. These relationships may be explained by increased severity of periodontal disease[14-16] and decreased bone mineral density[17,18] in oestrogen deficiency

Osteoporosis is caused by an uncoupling of the bone resorption/formation process with an exaggeration of resorption, reduction in bone formation or a combination of both. In most cases, postmenopausal osteoporosis is due to an abnormal increase in resorption or demineralisation and not a decrease in bone formation or remineralisation. Generalised bone loss from systemic osteoporosis may render the jaws susceptible to accelerated alveolar bone resorption. The compromised mass and density of the maxilla or mandible in a patient with systemic osteoporosis also may be associated with an increased rate of bone loss around the teeth or the edentulous ridge. Recent studies support the hypothesis that systemic bone loss may contribute to tooth loss in healthy individuals, and women with low bone mineral density tend to have fewer teeth compared to controls.

Although residual ridge resorption was thought to be a local problem caused or promoted by disuse, inflammation or mechanical factors, there now appears to be some evidence to support the idea that it is also a systemic problem. Several reports show a relationship between residual ridge reduction and osteoporosis. A correlation between mandibular basal bone mineral density and hip bone mineral density has been established. Another study suggests that severe osteoporosis that significantly reduces the bone mineral content of the jaws may be associated with less favourable attachment level in the case of periodontal

disease. Recent studies suggest that postmenopausal osteoporosis is a risk indicator for periodontal disease in postmenopausal white women.[19]

Oral Manifestations of Menopause

A number of physical changes are observed related to menopause including some that occur in the oral cavity. Changes in the oral mucosa occurring in menopausal women may vary from an atrophic to a pale appearance. The gingiva may appear dry and shiny, bleed easily and range from an abnormally pale colour to tissue that is very erythematous. However, some menopausal women with oral discomfort exhibit a clinically normal oral mucosal appearance, suggesting that oral discomfort may be due to other causes. Hormone replacement therapy (HRT) has been of some benefit in reducing oral discomfort in those who have both abnormal and normal mucosal appearance. Other oral symptoms and complaints of the menopausal patient including xerostomia, abnormal taste sensation and burning sensations.

Menopause may be associated with significant adverse changes in the orofacial complex. Women appear to experience an increase in oral symptoms that may result from endocrine disturbances (reduced oestrogen), calcium and vitamin deficiency and various psychological factors during their menopausal years.[20,21]

They may complain of dry mouth because of decreased salivary secretion, as well as a burning sensation of the mouth and tongue. Taste sensation may change, causing frequent complaints of a metallic taste.[22] Also during menopause, women may experience dysesthesia, dental caries, periodontitis and an osteoporotic jawbone unsuitable for conventional dental devices and implants. Some women develop concurrent senile atrophic gingivitis, in which an abnormal paleness of the gingival tissues develops. Other people develop a condition known as menopausal gingivostomatitis, which is characterised by gingivae that are dry and shiny, bleed easily and range in colour from abnormally pale to erythematous.[23]

CONCLUSION

In this context it is important that physicians be aware of the associations between menopause and periodontal problems. A common underlying mechanism may be involved which could lead to loss of bone in the spine and hips which could result in loss of alveolar bone in the jaws, increase the severity of periodontitis and eventually lead to loss of tooth. Patients need proper guidance from the physicians regarding the influence of menopause on the periodontium and reference to a periodontist at the first sign of periodontal disease because both the conditions can be managed better when diagnosed in the early stages.

About the Authors

Dr Roby V Emmanuel is a Professor, Department of Periodontology and Oral Implantology, Dr Shiba Neelakantan K is a Senior Lecturer, Department of Oral Medicine and Radiology, People's College of Dental Sciences and Research Centre, Bhanpur, Bhopal, Madhya Pradesh.

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Case of the Month

Woman Presented with a Soft Globular and Pedunculated Mass in Labia Majora

Sreelatha Sampath Kumar, Ashwini Rani, BR Vani

ANSWER

AGGRESSIVE ANGIOMYXOMA

Introduction

The histopathological diagnosis was angiomyxoma of the vulva. Aggressive angiomyxoma (AAM) is a rare benign mesenchymal tumour of unknown aetiology, usually occurring in the pelvi perineal region of females, in the reproductive age group. It is a rare tumour, only about 250 cases have been reported till 2010.[1] AAM is a slow growing neoplasm occurring almost exclusively in women of reproductive age group. The female:male ratio is 6:1.[2] It is called aggressive because of its locally infiltrative behaviour. AAM has high recurrence rate which is attributed to incomplete surgical excision. Hence long-term careful follow up is required for the early detection and treatment of recurrence.

Discussion

The term AAM was coined by Steeper and Rosai in 1983 for a morphologically distinctive, slow growing myxoid neoplasm occurring in the genital, perineal and pelvic regions of adult females.[3] AAM has a wide range of distribution between 16–70 years but peak incidence occurs in the 3rd decade. It occurs predominantly in females, but AAM is also reported in the inguinal region, spermatic cord, scrotum and pelvic cavity in males. The female: male ratio of AAM is 6:1. AAM is a slow growing tumour, usually reaches large size of >10 cm by the time of presentation.

It clinically presents as a painless slow growing soft tissue mass in pelviperineal region, often misdiagnosed as bartholin cyst, periurethral cyst or hernia. AAM is locally invasive, aggressively infiltrates the paravaginal and pararectal soft tissues. Grossly AAM is a soft, non-defined lobulated tumour with myxoid changes.

Microscopically the tumour is composed of spindle or stellate shaped cells with thick walled blood vessels scattered in a myxoid matrix; multinucleated giant cells are rarely seen. Cytological atypia and mitotic figures are rare or absent. The tumour cells express vimentin, desmin and smooth muscle antigen (SMA) and are negative for S–100.[4] The tumour cells express oestrogen and progesterone receptors.[5] Cytogenetic and molecular genetic analysis shows rearrangements in chromosomal region 12q13–15;t (8;12) (p12;15) causing dysregulation of HMGA2 gene resulting in over expression of HMGA2 in AAM. HMGA2 is positive in most aggressive angiomyxomas and is useful in the diagnosis, as most mesenchymal tumours which closely mimic AAM are negative for HMGA2. The conditions mimicking AAM are angiomyofibroblastoma, superficial angiomyxoma, fibroepithelial stromal polyp, cellular angiofibroma, myxoid neurofibroma, myxoid leiomyoma and myxofibrosarcoma.

Wide local excision is the treatment of choice. Except for the positive surgical margins, there are no clinical or histological predictors for tumour recurrence and hence effort should be towards obtaining adequate clearance with tumour free resected margins, which is achieved by wide local excision but this can cause significant morbidity due to its large size and its proximity to genitourinary and anorectal structures. Most often

the tumour is removed incompletely as it has the same consistency as that of normal connective tissue. Hence because of the highly infiltrating borders and incomplete excision, AAM has a high rate of local recurrence of 30%.[6] Metastasis is rarely seen. Preoperative angiographic embolisation, preoperative external beam irradiation and intraoperative electron beam radiotherapy are said to be useful in decreasing the chances of local recurrence to some extent.[7] HMGA2 can be used in evaluating margins of the resected specimens of AAM, in identifying foci of residual or recurrent tumour.

Long-term follow up is mandatory for the early diagnosis and treatment of local recurrence and metastasis. Imaging procedures as CT scan and MRI help in preoperative evaluation and post operative follow up as tumour is non-defined clinically.[8] The presence of oestrogen receptors in tumour and its enlargement in pregnancy suggest the possibility of hormone dependence of AAM. Hence GnRH agonists are suggested for the treatment of recurrent cases and also inoperable primary cases.[9] Radiotherapy is avoided except in advanced inoperative cases because of the risk of sarcomatous transformation.

Summary

AAM is a rare benign neoplasm occurring in females of reproductive age group in the pelvi perineal region, that can be mistaken both clinically and histologically for several conditions. Though rare, because of its locally invasive and high propensity of recurrence; AAM should be included as one of the differential diagnosis for any vaginal mass.

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About the Authors

Dr Sreelatha Sampath Kumar and Dr BR Vani are Associate Professor, Department Obstetrics and Gynaecology and Dr Ashwini Rani is a Junior Resident, Department Obstetrics Pathology, ESICMC and PGIMSR, Rajajinagar, Bangalore.

Molar Pregnancy with Viable Foetus Progressed to Term – Case Report

Madhushree Vijayakumar, Roopashree

INTRODUCTION

The incidence of mole with coexisting normal foetus is 1 in 100,000 pregnancies.[1] Partial hydatidiform mole differs from complete mole by its focal distribution, its slower transformation, the presence of an embryo/foetus and most often with the triploid karyotype (Figure 1).

Diagnosis could be established by ultrasound which most often reveals greatly enlarged placenta relative to the size of uterine cavity, cystic spaces within the placenta, an amniotic cavity either empty/amorphous foetal echoes, well formed but growth retarded foetus either dead or alive.[2]

We describe a case of molar change in a placenta that was associated with a normal foetus and how the pregnancy progressed.

Case Report

A 25 year old primigravida who conceived spontaneously on folic acid supplementation had uneventful first trimester with no hyperemesis or vaginal bleeding. Viability scan was done at 7–8 weeks gestational age showed a single gesta-

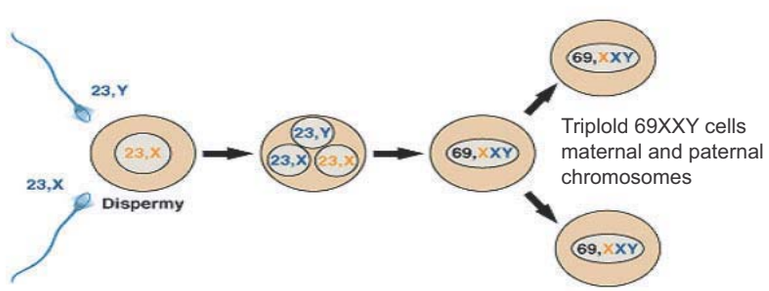


Figure 1. Formation of partial mole



Figure 2. Viability scan

tional sac, CRL 1.1 cms, corresponding to 7.3 weeks good cardiac activity, perigestational sac haemorrhage of size 1.4 cms seen just above the internal os (Figure 2). The routine ANC profile was within normal limits.

At 12+ weeks NT scan was done which showed molar tissue at the right fundal end of uterine cavity of the volume 48 cc ,with a healthy live foetus of 12.5 weeks gestational age NT was 1.4 mm, nasal bone was visible gross morphology of the foetus appeared normal, liquor was adequate (Figure 3).



Figure 3. NT scan

Mother was doing well. She had no hyperemesis and no bleeding per vaginum. Blood pressure was within normal limits. She had no proteinuria and her blood sugar levels were within normal limits.

She was referred to a Foetal medicine centre for further evaluation. The couple were counseled regarding the ongoing gestation with the molar transformation of a part of the placenta (Figure 4) and was advised a chorionic villus sampling to determine the karyotype of the foetus. Initial FISH report was normal karyotype the follow up culture after 3 weeks also was normal.

She was on regular antenatal visits. Anomaly scan at 21–22 weeks showed no gross anomaly in the foetus the persistence of molar changes of placenta in the fundus. Uterine artery Doppler was normal follow up with growth scans at 28 and 32 weeks showed adequate interval growth and adequate liquor. Pregnancy progressed uneventfully.

Term scan showed a single live 34–35 weeks gestational age grossly normal appearing baby weighing 2400 g, in cephalic presentation, good biophysical profile and a still persisting molar change at the fundus.

At 36 weeks of gestation, her blood pressures were found high with proteinuria 1+. She was started on alpha methyl dopa 250 mg thrice daily, with which her blood pressures remained under control. Her PET profile remained within normal limits. At 39 weeks labour was induced with Dinoprostone gel in view of pre-eclampsia. As labour progressed timely

amniotomy was done and blood stained liquor was drained, suggestive of abruptio placenta, examination revealed face presentation.

A decision for emergency LSCS was taken. Live girl baby was extracted with good APGARS, and birth weight of 2.9 kg, placenta and membranes were delivered in toto. A retroplacental clot of about 200 g was seen, hydropic changes in a part of the placenta was also noted (Figure 5). It was sent for histopathological examination

On histopathological examination, grossly placenta measured 15X15X3 cms, weighing 620 g. Insertion of cord was peripheral. Membranes were complete, cord measured 60 cms, cut surface showed 3 vessels and the hydropic part of placenta measured 11X8X1.5 cm (Figure 6). On its surface, it reveals multiple vesicles filled with clear fluid.

On microscopic examination, revealed enlarged villi with hydropic degeneration of the stroma, most villi showed fluid filled cisterns (Figure 7), trophoblastic layer showed focal florid hyperplasia, many villi were necrotic. It was reported as molar transformation (Figure 8).

Post operative period was uneventful, her blood pressures remained normal, did not require any antihypertensives. She was followed up with serial Hcg.[3] Weeks post partum her β hcg was 21.73 m IU/ml, 6 weeks post partum β hcg 8.2 m IU/ml, at 9 weeks postpartum β hcg 2 m IU/ml. Contraceptive options were discussed, she opted barrier method.



Figure 4. Molar tissue at fundus of uterus

DISCUSSION

The formation of moles is complex and it is not easily divisible into so called partial and complete moles. Rather individual genetic study is needed to make an accurate diagnosis because macroscopic or microscopic examination alone fails to assess the complexity of these entities.[4] When a foetus is present in conjunction with partial mole, it generally exhibits the stigmata of triploidy, including growth restriction, multiple congenital malformations.[5] This is compatible with both

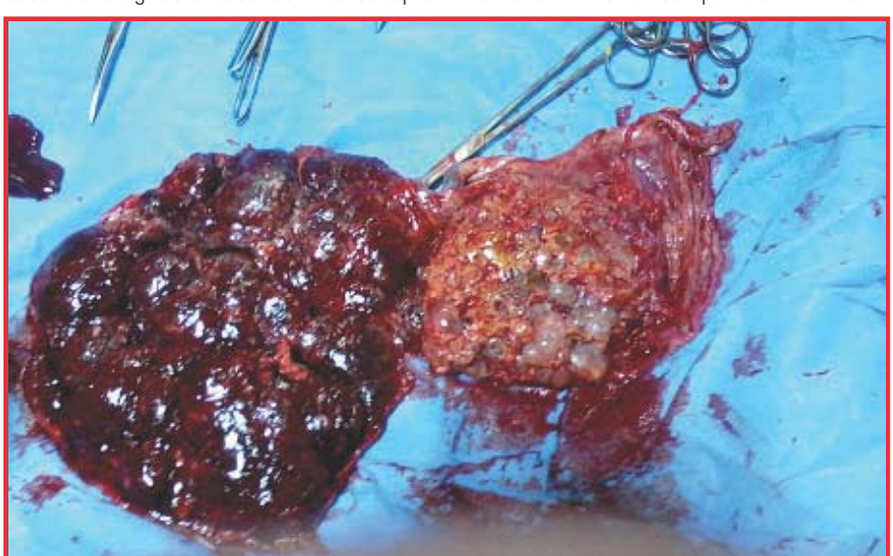


Figure 5. Gross examination of the placenta showing part of the placenta with molar changes



Figure 6. Part of the placenta with molar changes

foetal and placental development but not long term survival. Cytogenetically partial moles usually have triploid karyotype with the extra haploid set of chromosomes of paternal derivation. Whereas complete moles have a diploid karyotype that is entirely of paternal origin.[6]

Hydatidiform mole with a coexisting foetus can be established by the partial mole syndrome or by a twin pregnancy where the other conceptus has degenerated into a mole.[7] The theoretical explanation that it resulted from a twin dizygotic pregnancy in which one twin had developed normally and the other had degenerated into a complete mole. The difference between a partial and a complete mole cannot be firmly established by ultrasound because they both present with the same vesicular pattern.[8] In our case ultrasound revealed normal appearing foetus, but also a normal placenta connecting with sharply defined molar tissues. Since the normal placenta which was separate from molar tissues can be well defined, a complete mole pregnancy with a concurrent foetus can be diagnosed.

Risk of developing persistent gestational trophoblastic tumour should be kept in mind. The determining factor seems to be whether the molar component is partial or complete. Partial moles have a relatively low incidence of 4 percent of producing pGTT when compared to 20 percent risk in complete moles.[4] Careful surveillance for the pGTT is warranted.

Literature review have reported that pregnancies which continue beyond the 28th week, a surviving child may be expected in ~70% of pregnancies, the risk for intrauterine or neonatal death being ~30%. Persistent trophoblastic disease was reported in 9.1% of those who had continued.[9]

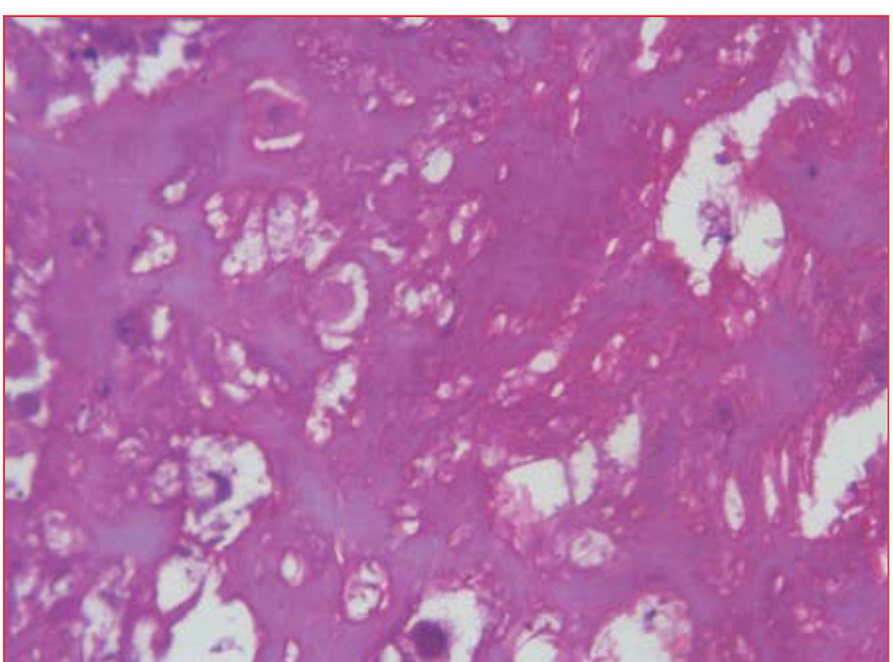


Figure 7. Microscopic examination

CONCLUSION

Molar pregnancy with a coexisting foetus progressing to term with good outcome is an extremely rare entity. They present

with varied complications. In few cases pregnancies may have to be terminated. Optimum management of these cases poses significant clinical dilemma to both patients and clinicians.

About the Authors

Dr Madhushree Vijayakumar is a Consultant and Dr Roopashree is a Resident, Department of Obstetrics and Gynaecology, St. Philomena's Hospital, Bangalore.

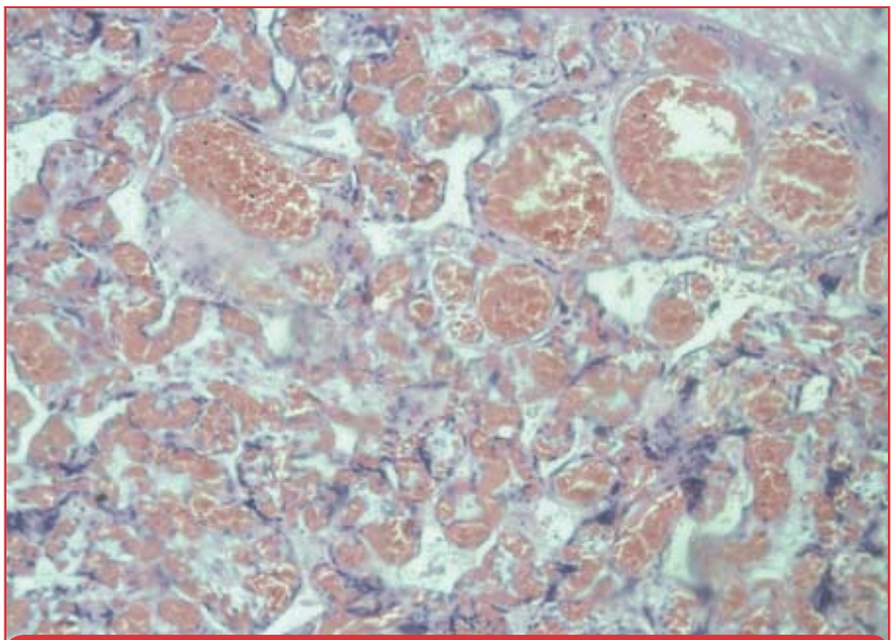


Figure 8. Microscopic examination of hyperplastic necrotic villi

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Gestational Diabetes

LL Chan, MBBS, MRCOG; **WL Lau,** MBBS, FRCOG, FHKAM (O&G); **WC Leung,** MBBS, MD, FRCOG, FHKAM (O&G), Cert RCOG (Maternal & Fetal Medicine)

INTRODUCTION

Gestational diabetes mellitus (GDM) is a controversial subject in obstetrics. It is defined by the National Diabetes Data Group in 1985 as carbohydrate intolerance of variable severity with onset or first recognition during pregnancy.[1] The first case report of GDM appeared in 1824, which described a mother with thirst, polyuria and glycosuria and the death of a macrosomic infant from shoulder impaction. Historically, there has been a lot of controversy over most aspects of GDM, including screening, diagnosis, risks, treatment, and the relationship between GDM and type II diabetes mellitus. Recently, several major studies have substantially resolved these areas of controversy, eg, the Hyperglycaemia and Adverse Pregnancy Outcomes (HAPO) study,[2] the Australian Carbohydrate Intolerance Study in Pregnant Women (ACHOIS),[3] and the Maternal-Fetal Medicine Units Network treatment of mild gestational diabetes (MFMUN-GDM)[4] clinical trials, which will be discussed further in this article.

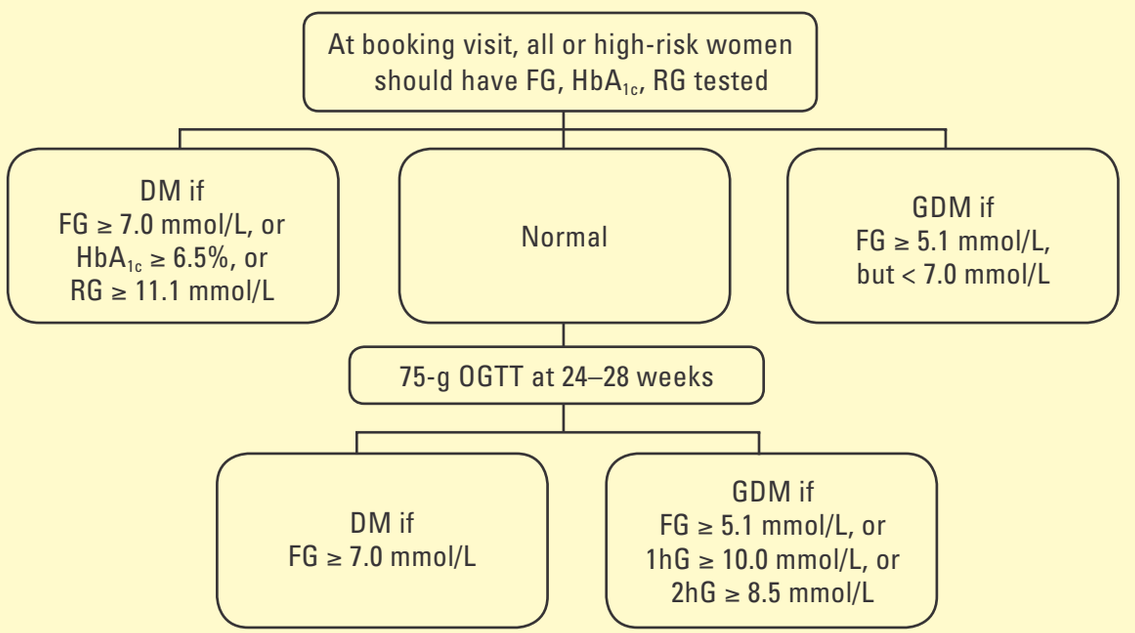


Diagnosis and treatment of gestational diabetes can help reduce the risk of many adverse pregnancy outcomes due to this condition.

INCIDENCE

The reported incidence of GDM varies with diagnostic criteria and characteristics of the population being studied (eg, age, body build, ethnic origins). The United States reported an incidence of 3–8%,[5] with a rising trend in more recent publications. The United Kingdom reported an incidence of 2%[6] and Canada described 3.8%.[7] In Hong Kong, a study[8] performed in a university teaching hospital, Queen Mary Hospital, showed that of the 16,383 women managed in the period 1998–2001, the prevalence of GDM increased from 1.3% (≤ 20 years), 2.5% (20–24 years), 6.2% (25–29 years), 10.3% (30–34 years), 21.7% (35–39 years), and 31.9% (≥ 40 years), respectively, from the youngest to the oldest cohort ($P < 0.001$). Another study[9] performed in a different university teaching hospital in Hong Kong, Prince of Wales Hospital, found that the prevalence of GDM was 14.2%. In our hospital, a regional hospital with around 6,000 deliveries per year, the incidences of GDM in 2008 and 2009 were 13.2% and 14.2%, respectively.

Figure 1. Flow chart showing guidelines as suggested by IADPSG[10]



1hG = 1-hour plasma glucose in 75-g oral glucose tolerance test; 2hG = 2-hour plasma glucose in 75-g oral glucose tolerance test; DM = diabetes mellitus; FG = fasting glucose; GDM = gestational diabetes mellitus; HbA_{1c} = glycated haemoglobin A_{1c}; IADPSG = The International Association of Diabetes and Pregnancy Study Groups; OGTT = oral glucose tolerance test; RG = random glucose.

SCREENING AND DIAGNOSIS

The diagnostic criteria of GDM were initially established more than 40 years ago, and these criteria were not designed to identify pregnant women at increased risk for adverse perinatal outcomes but rather women at higher risk for the development of diabetes after pregnancy. Following the publication of the HAPO study, the International Association of Diabetes and Pregnancy Study Groups (IADPSG) established a new set of diagnostic guidelines (Figure 1).[10] As more and more women suffer from diabetes before pregnancy, the IADPSG recommends screening women with risk factors at the booking visit by using random plasma glucose, fasting plasma glucose, or glycated haemoglobin A_{1c} paired with diagnostic thresholds, according to the current guidelines for the diagnosis of pre-existing diabetes. Moreover, GDM can be diagnosed at the booking visit with a fasting plasma glucose between 5.1 mmol/L and 7.0 mmol/L, hence lowering the thresholds of GDM in most guidelines. They also recommend that all women who do not have diabetes should be screened at 24–28 weeks' gestation with the 75-g oral glucose tolerance test. In contrast to the World Health Organization criteria which use an abnormal fasting or 2-hour plasma glucose for the diagnosis of diabetes, the IADPSG suggests that an abnormal 1-hour plasma glucose is adequate for the diagnosis. They also take into account the continuous association between maternal blood glucose concentrations and adverse perinatal outcomes as seen in HAPO. The agreed thresholds represent an odds ratio of 1.75 for birth weight, cord C-peptide, and fetal body weight being greater than the 90th percentile, relative to the odds of those outcomes at mean glucose values. Applying this system of testing and di-

agnostic criteria will probably double the incidence of GDM.[11]

RISKS

The HAPO study[2] was a 10-year, prospective, blinded, multicentre study, which enrolled 25,505 pregnant women. It aimed at studying the associations between the risks of adverse pregnancy outcomes and the degrees of maternal glucose intolerance less severe than overt diabetes. Exclusion criteria include fasting plasma glucose > 5.8 mmol/L, or the 2-hour plasma glucose *11.2 mmol/L, or a random plasma glucose *8.9 mmol/L. It showed an unambiguous, linear, positive association between maternal glycaemia and adverse pregnancy outcomes (eg, birth weight > 90th percentile, caesarean section, cord plasma C-peptide level reflective of fetal hyperinsulinemia, neonatal hypoglycaemia, excess neonatal adiposity, shoulder dystocia or birth injury, neonatal hyperbilirubinaemia, pre-eclampsia).[12,13] The risk factors and health risks of GDM are summarized in Tables 1 and 2.

TREATMENT

The ACHOIS[3] and the MFMUN-GDM[4] clinical trials demonstrated that diagnosis and treatment of GDM were worthwhile because these reduced the risk of many adverse pregnancy outcomes of GDM. In both studies which were double blind, women diagnosed with GDM in the late second and early third trimesters were randomized to two groups, ie, routine care or intervention. Intervention in both trials included

Table 1. Risks factors of gestational diabetes[a]

Risk factors	Odds ratio	References
Overweight	2	Torloni *et al*, Chu *et al*
Obesity	3.7	Torloni *et al*, Chu *et al*
Severe obesity	7	Torloni *et al*, Chu *et al*
Prior gestational diabetes	23	McGuire *et al*
Prior macrosomic infant	3.3	McGuire *et al*
Maternal age greater than 25 y	1.4	Cypryk *et al*
Maternal age greater than 35 y	2.3	Xiong *et al*
Multiple gestation	2.2[b]	Rauh-Hain *et al*
South East Asian	7.6[b]	Dornhorst *et al*
Hispanic	2.4[b]	Dooley *et al*
African American	1.8[b]	Dooley *et al*
Polycystic ovarian syndrome	2.9	Toulis *et al*
Parent with diabetes	3.2	Kim *et al*
Sibling with diabetes	7.1	Kim *et al*
Periodontal disease	2.6	Xiong *et al*
Low maternal birth weight	1.9	Seghieri *et al*

[a]Reprinted from *Obstetrics and Gynecology Clinics of North America*, 37(2), Pridjian et al, Update on gestational diabetes, 255–267, 2010, with permission from Elsevier.
[b]Relative risk compared with white race.

Table 2. Health risks of gestational diabetes[a]

Mother	Fetus	Newborn	Child/Adult
Birth trauma	Hyperinsulinaemia	Respiratory distress syndrome	Obesity
Increased caesarean delivery	Cardiomyopathy	Hypoglycaemia	Type 2 diabetes
Pre-eclampsia/ Gestational hypertension	Stillbirth	Hypocalcaemia	Metabolic syndrome
Type 2 diabetes	Large for gestational age/ macrosomia	Hypomagnesaemia	
Metabolic syndrome	Birth trauma	Hyperviscosity Polycythaemia Hyperbilirubinaemia Cardiomyopathy	

[a]Reprinted from *Obstetrics and Gynecology Clinics of North America*, 37(2), Pridjian et al, Update on gestational diabetes, 255–267, 2010, with permission from Elsevier.



Few studies have focused on the benefit of carbohydrates with a low glycaemic index.

dietary modification, blood glucose monitoring, and, if needed, insulin treatment. In the ACHOIS trial,[3] a composite measure of serious perinatal complications (defined as one or more of death, shoulder dystocia, bone fracture, and nerve palsy) was reduced by diagnosis and intervention (adjusted odds ratio, 0.33; 95% confidence interval, CI, 0.14–0.75; $P = 0.01$). A similar composite measure in the MFMUN-GDM trial[4] was also decreased but was not statistically significant (relative risk, 0.87; 97% CI, 0.72–1.07; $P = 0.14$). In both studies, rates of large-for-gestational-age (LGA)/macrosomia, pre-eclampsia and maternal pregnancy weight gain were reduced by intervention. Rates of shoulder dystocia and caesarean section were significantly decreased by treatment in the MFMUN-GDM trial only. Rates of induction of labour and of admission to the neonatal unit were increased by treatment in the ACHOIS trial only. Generally, these two trials showed that identification and treatment of GDM with a standard approach improved pregnancy outcomes.

DIETARY MODIFICATION

The scientific evidence for making nutritional recommendations for women with GDM is limited. Referral to nutritional counselling should ideally occur within 48 hours of the diagnosis of GDM.[15] The first meeting with a professional dietitian should be arranged within 1 week of the referral, and a total of three visits are suggested.[16] Throughout the pregnancy, the diet should be adjusted and individualized to meet the patient's food choice, financial needs, culture, habits, weight gain, physical activity, and blood glucose goals.

The Dietary Reference Intakes recommends no increase in calories for the first trimester but an additional 340 kcal/day during the second trimester and 452 kcal/day during the third trimester.[17] In obese women with GDM, a 30% caloric restriction help to avoid ketonuria or an increase in free fatty acids,[18] while improving glycaemic control. A more severe caloric restriction is not recommended. The National Institute for Clinical Excellence (NICE) guidelines[19] in the UK recommend that women with GDM whose pre-pregnancy body mass index is above 27 kg/m^2 should restrict caloric intake (to 25 kcal/kg/day or less) and engage in moderate exercise (of at least 30 minutes daily).

The goal of fractionating food intake into three meals and two to three snacks in between meals is to distribute the glucose intake throughout the day in order to control the postprandial glucose, while at the same time maintaining a satisfactory nutritional intake. The evening snack decreases the night-time ketogenesis related to fasting.

Generally, 40–45% of the calories in the daily diet come from carbohydrates, but this must be individualized.[20] One study showed that in women with GDM, carbohydrate restriction to < 42% led to fewer LGA infants, reduced rates of caesarean sections for macrosomia and cephalopelvic disproportion, and reduced need for insulin treatment, compared with a higher carbohydrate content (45–50%).[21]

Few studies have focused on the benefit of carbohydrates with a low glycaemic index (GI), which is a measure of how much each gram of available carbohydrate in the food increasing a person's blood glucose level following consumption of the food, relative to consumption of glucose. Food with carbohydrates that break down quickly during digestion and release glucose rapidly into the bloodstream tend to have a high GI, while food with carbohydrates that break down more slowly, releasing glucose more gradually into the bloodstream, tend to have a low GI. There have been no randomized studies with sufficient sample size to draw a conclusion on the benefits of carbohydrates with a low GI. Increased dietary fibre intake is traditionally recommended for women with GDM, as it may reduce the postprandial blood glucose. But no proof exists that extra dietary fibre intake is beneficial in these women.

PHARMACOTHERAPY

Drug treatment is necessary in 7–20% of women with GDM when, despite dietary modification, there is insufficient glucose control, high levels of fasting glucose, suboptimal weight gain (due to caloric restriction), or persistent hunger sensation. The Fifth International Workshop-Conference on Gestational Diabetes recommends the following blood glucose concentrations: fasting plasma glucose, 5.0–5.5 mmol/L; 1-hour postprandial plasma glucose, < 7.8 mmol/L; and 2-hour postprandial plasma glucose, < 6.7–7.1 mmol/L.[22] The NICE guidelines[19] recommend drug treatment if diet and exercise cannot control the blood glucose for 1–2 weeks, or if ultrasound shows possible fetal macrosomia (abdominal circumference above the 70th percentile) at diagnosis.

When counselling patients, health carers can reassure them that the rates of congenital malformations with the use of oral hypoglycaemic agents and insulin do not differ

Oral Hypoglycaemic Agents

Glyburide (or glibenclamide) is a second-generation sulfonylurea. It binds to receptors that are associated with the adenosine triphosphate-dependent potassium channels of pancreatic β cells to increase insulin secretion and insulin sensitivity of peripheral tissues. The onset of action takes approximately 1 hour with the peak level at 4 hours after intake. Studies on the placental transfer of glyburide are contradictory. *In vitro* studies showed minimal placental transfer, but the fetal response to various dosages of glyburide is not completely known.[23] A meta-analysis by Moretti *et al*[24] reported no differences between the insulin and glyburide groups with regard to birthweight, LGA/macrosomia, gestation at delivery, admissions to neonatal units, or neonatal hypoglycaemia.

Metformin belongs to the biguanide group. It inhibits hepatic gluconeogenesis and glucose absorption, and stimulates glucose uptake in peripheral tissues. The onset of action takes approximately 1 hour with the peak level at 2–4 hours after intake. Metformin does cross the placenta. Because it acts as an insulin sensitizer in peripheral tissues rather than as an insulin analogue, it is believed that fetal metabolism is less likely to be affected.[25] The Metformin in Gestational Diabetes (MiG) trial[26] of 751 women showed similar perinatal complications in both the metformin and insulin groups, with better acceptability in the metformin group; but subsequent insulin was indicated in 46.3% of women taking metformin.

Long-term safety data on infants whose mothers were treated with glyburide or metformin are lacking. Early neonatal complications, such as hypoglycaemia, are not common and do not differ very much from those resulting from insulin therapy. When counselling patients, health carers can reassure them that the rates of congenital malformations with the use of oral hypoglycaemic agents and insulin do not differ. The maternal glucose control (fasting blood glucose and 2-hour postprandial) by oral hypoglycaemic agents and insulin is also comparable.

Acarbose, an alpha glucosidase inhibitor, has been used less often. Preliminary studies showed that it was effective in decreasing postprandial hyperglycaemia in GDM, but its use has been limited by its side effects, like abdominal cramp-

ing.[27] Further studies are needed to better evaluate the potential placental transfer of this drug, as small amounts of acarbose can be absorbed into the bloodstream.

Insulin

Traditionally, insulin has been regarded as the standard treatment for diabetes, especially when diet and exercise fail to control the maternal blood glucose and there is no risk of placental transfer of insulin to the fetus.

Insulin requirements are not constant throughout the day: it is low at night with a sharp rise at dawn, followed by a gradual decrease during the rest of the day. Women in the first trimester are at risk of hypoglycaemic events because of emesis, and blood glucose levels should be closely monitored with appropriate adjustment of insulin. After the second trimester, insulin requirements rise. During labour, short-acting insulin should be used to achieve optimal glucose levels of between 4 and 8 mmol/L and to prevent neonatal hypoglycaemia. After delivery, glycaemic control must be relaxed to prevent maternal hypoglycaemia, especially in breastfeeding women. Insulin therapy should be stopped in women who have not taken insulin before pregnancy, while those women who are taking insulin for pre-existing diabetes should resume their pre-pregnant insulin dosages.

There are two types of insulin: human insulin and insulin analogue. The short-acting insulin analogue aspart has been shown to be safe in pregnancy in a randomized trial[28] and has been registered for this indication. The short-acting insulin analogue lispro has also been shown to be safe in observational studies. However, there is no safety data available on the long-acting insulin analogues detemir and glargine; both are prescribed off-label. Therefore, long-acting human insulin should be used instead.

ANTENATAL MANAGEMENT

Once GDM is diagnosed, visits to health carers or dietitians by the pregnant women should be made at least every 1–2 weeks and more frequently if complications occur. There is no consensus on the frequency and timing of antenatal surveillance tests in women with GDM. It is crucial to manage women, who do not comply with advice, require drugs, have macrosomic or growth-restricted fetuses, or have other obstetric complications, as though they had pre-existing diabetes and to begin close antenatal monitoring (eg, the NICE guidelines[19] suggest anomaly scan, echocardiography, growth scan at 28, 32 and 36 weeks' gestation, tests of fetal well-being after 38 weeks' gestation). History review, blood pressure measurement, and urine albumin testing to diagnose pre-eclampsia are also essential at every visit. In an attempt to prevent macrosomia and to guide the treatment, a randomized trial[29] compared ultrasound performed at 32 weeks' gestation with ultrasound at both 28 and 32 weeks' gestation. The rate of macrosomia was significantly higher in the group assessed only at 32 weeks (71.1% vs 33.3%; $P < 0.005$).

The mode and timing of delivery of women with GDM is controversial because sufficient data are lacking to make a recommendation.

Induction of labour in women with insulin-treated diabetes at 38 weeks' gestation is intended to reduce the risk of stillbirth. One study[30] failed to detect a benefit to expectant management beyond 38 weeks' gestation, as the rate of caesarean delivery was not reduced but rather the rates of LGA infants and shoulder dystocia were increased. For uncomplicated GDM, no strong evidence exists to support earlier induction of labour, which was also confirmed by a Cochrane review of randomized trials on elective delivery in women with diabetes.[31]

Prophylactic pre-labour caesarean section using estimated fetal weight by ultrasound has been proposed but is controversial. Recommendations concerning the lower estimated fetal weight thresholds for prophylactic caesarean section vary from 4,000 to 4,500 g. Both the American College of Obstetricians and Gynecologists and the Royal College of Obstetricians and Gynaecologists recommend prophylactic caesarean section if the estimated fetal weight is > 4,500 g. Another issue is the inaccuracy of ultrasound in estimating fetal weight, which leads to an increase in unnecessary caesarean deliveries and, therefore, caesarean-associated maternal and fetal morbidities, and additional health-care costs.

POSTPARTUM MANAGEMENT

Approximately 50% of women with GDM will develop type 2 diabetes within 5 to

10 years.[32] An Italian study[33] showed that GDM is a stronger predictor of later metabolic syndrome after adjustments for pre-pregnancy body mass index and age. In a large 4- to 23-year follow-up study in Denmark, 68% of the 481 women with previously diagnosed GDM had impaired glucose regulation, 59% had elevated fasting serum insulin, 54% had central obesity, 28% had hypertension, and 35% had dyslipidemia, presenting with higher triglycerides levels and lower high-density lipoprotein cholesterol levels compared with the control group.[34]

Diagnostic testing for diabetes is appropriate 6 weeks after delivery. It is unclear whether a traditional 2-hour 75-g oral glucose tolerance test or fasting plasma glucose test may be more useful at this time. The frequency of follow-up blood glucose tests for early detection of impaired glucose tolerance or diabetes varies from annual to triennial. Advice on postpartum weight loss, which may help reduce the occurrence of type 2 diabetes mellitus, includes breastfeeding, dietary modification, and exercising for at least 150 minutes every week.[35]

CONCLUSION

Without further cost analyses and confirmation of results from randomized intervention trials, the IADPSG guidelines are unlikely to be widely adopted worldwide. Without a uniform diagnosis, research on risks and management is difficult. Women with GDM should be treated with dietary modification, appropriate exercise, and drugs, if necessary. Oral hypoglycaemic agents (eg, glyburide, metformin) are as useful as but not better than insulin alone in terms of early pregnancy outcomes.

About the Authors

Dr Chan is a resident trainee, and Dr Lau and Dr Leung are consultants, practicing in the Department of Obstetrics and Gynaecology, Kwong Wah Hospital, Kowloon, Hong Kong SAR.

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