Correspondence

Need for early diagnosis of kidney disease in the rural population

About 10%–15% of the general population suffers from chronic kidney disease (CKD). The vast majority of CKD patients are in stages 1 to 3.[1] The condition usually goes undetected, and some of these patients progress to stage 5 CKD, necessitating renal replacement therapy (RRT). The treatment of RRT is expensive (about ₹20 000 per month life-long). The government spends only 1.04% of the gross domestic product on health with the major focus on primary healthcare in villages and some on secondary healthcare at the district level. Hence, the cost of RRT has to be met by out-of-pocket expenses by the patient. If diagnosed in its early stages, the progression of CKD can be halted and its associated medical and financial complications avoided. The International Society of Nephrology celebrates World Kidney Day on the second Thursday of March every year to spread awareness about CKD among the general population and healthcare workers.

The rural population has limited access to tertiary healthcare facilities (including renal services). Hence, the Government of India has launched the National Rural Health Mission (NRHM) to improve healthcare facilities among the rural population, including specialist medical care. We participated recently at health camps organized under the NRHM in two rural areas of Banka and Gidhour in Bihar. About 5000 patients attended the health camps over the course of 5 days. The patients were first screened by general practitioners of the district health services, and then referred to various specialists. The patients referred to the nephrologist presented with oedema, haematuria, dysuria, frequency, straining during micturition, nocturia, incontinence, nocturnal enuresis, stone disease, long-standing hypertension and diabetes; and a few previously diagnosed cases of CKD. We took with us urinary dipsticks (Multistix® 10 SG) for point-of-care-diagnostic testing, so that a reasonable diagnosis of proteinuria and/or haematuria could be made quickly. Urinary dipstick test can be done for 8 other parameters in the urine, namely: specific gravity, pH, blood, nitrite, ketone, leucocyte, urobilinogen and bilirubin. We used about 200 urinary dipsticks and detected urinary abnormalities in 26 patients. This included patients of nephrotic syndrome (5), glomerulonephritis (3), urinary tract infection (4) and diabetic (10) and hypertensive nephropathy (4). In 5 patients with a history of pedal oedema, the dipstick examination showed absence of proteinuria, ruling out a renal cause of oedema. In 2 patients who complained of dysuria we detected concentrated, highly acidic urine. The cost of a strip of urinary dipsticks is about ₹13, i.e. a total cost of about ₹2500. This is a miniscule amount compared with the cost of treatment of RRT. The use of urinary dipsticks (glucose and protein testing only) in selected cases would reduce the costs further.

To begin with, the facility of urine examination by dipsticks and preferably also for urine microscopy should be available in all primary health centres and later at all sub-centres. Examination of the urine in patients suspected to have renal disease and all those in high risk groups such as those with hypertension, diabetes, autoimmune diseases, as well as the elderly and relatives of patients with renal disease will help in the early detection of CKD. Patients with urinary abnormalities can then be referred to a higher centre for further evaluation and characterization of the renal disease. The proposed introduction of the Annual Health Survey of the general population is a welcome step. We suggest that urine examination and measurement of blood urea and creatinine, along with calculation of estimated glomerular filtration rate (eGFR) should also be incorporated in the survey. This will help in the early detection of CKD. In fact, even developed nations find it difficult to bear the cost of supporting patients on dialysis, and have instituted programmes for early detection of kidney disease.[2,3] In an earlier article we discussed the various public health measures to control the upsurge of CKD in India.[4] Early diagnosis is one of the key measures to reduce the burden of CKD in the community. It is high time that in India too we have in place a comprehensive national programme for the prevention of CKD. Until then it would be appropriate to incorporate simple measures such as urine examination and eGFR in the ongoing national health programmes.

REFERENCES

1 K/DOQI clinical practice guidelines for chronic kidney disease: Evaluation, classification, and stratification: Part 4. Definition and classification of stages of chronic kidney disease. *Am J Kidney Dis* 2002;**39** (2 Suppl 1):S46–S64**.**
2 Whaley-Connell AT, Sowers JR, Stevens LA, McFarlane SI, Shlipak MG, Norris KC, *et al*. Kidney Early Evaluation Program Investigators. CKD in the United States: Kidney Early Evaluation Program (KEEP) and National Health and Nutrition Examination Survey (NHANES) 1999–2004. *Am J Kidney Dis* 2008;**51** (4 Suppl 2): S13–S20.
3 Hallan SI, Dahl K, Oien CM, Grootendorst DC, Aasberg A, Holmen J, *et al*. Screening strategies for chronic kidney disease in the general population: Follow-up of cross sectional health survey. *BMJ* 2006;**333:**1047.
4 Bhowmik D, Pandav CS, Tiwari SC. Public health strategies to stem the tide of chronic kidney disease in India. *Indian J Public Health* 2008;**52:**224–9.

D. M. Bhowmik
S. K. Agarwal
Department of Nephrology
dmbhowmik@yahoo.co.in

C. S. Pandav
Centre for Community Medicine
All India Institute of Medical Sciences
New Delhi

Diagnosis of pulmonary tuberculosis by symptoms among tribals in central India

The prevalence of tuberculosis (TB) is an important epidemiological index to measure the burden of disease in a community and is estimated by population surveys. Two screening tools, namely symptom elicitation and chest X-ray, are used for screening the population in such prevalence surveys.[1] The use of chest X-ray is challenging due to limited availability of mobile X-ray units and lack of trained technical staff. Symptom elicitation is a relatively simple, rapid and inexpensive screening tool. Over the past few decades, a number of surveys for the prevalence of TB have used symptom elicitation for screening individuals.[2–5] However, the diagnosis of individuals with pulmonary TB by different symptoms has not been documented in any of these community surveys, except a study done among a rural population of Tamil Nadu, in southern India.[6] It is important to know the proportion of individuals who can be identified to have TB by various symptoms in order to choose the symptoms that need to be elicited in community surveys.

We did a study among tribal populations residing in 11 selected districts of Madhya Pradesh from July 2007 to February 2008. The estimated sample size was 20 000 adults ≥15 years of age. A complete census of the selected villages was done by house-to-house visits and eligible individuals were questioned for chest symptoms, namely: persistent cough for 2 weeks or more; chest pain for 1 month or more; fever for 1 month or more; and haemoptysis. Persons with any of these symptoms and also those with a history of having received anti-TB treatment were considered eligible for sputum collection. Two sputum samples, one spot and one overnight, were collected, transported to the laboratory and examined by smear microscopy and culture using standard methods.[7]

Of the 1703 symptomatic individuals, 1353 (79.4%) had cough for 2 weeks or more; 73 individuals (88%) with pulmonary TB of the 83 who were sputum-positive had this symptom (Table I). Chest pain was the next predominant symptom and was present in 237 symptomatic individuals (13.9%), contributing to 7.2% of the total individuals detected. The elicitation of a previous history of treatment identified 3.6% of the total individuals detected. Thus, we found that the elicitation of either of the 2 symptoms of cough and chest pain, and/or a history of previous treatment, led to the identification of 95% of symptomatic individuals and detection of almost 99% of sputum-positive individuals detected in the survey. Of the 64 individuals (3.8%) who had haemoptysis, only 1 was sputum-positive. The contribution of a history of fever alone (without cough and chest pain) in identifying symptomatic patients was negligible (21) and no individual was identified. Similar findings have also been reported by other workers.[2,6] This suggests that a history of fever alone may be safely excluded from symptoms to be elicited in future community surveys, without any appreciable impact on the number of symptomatic patients and those detected with sputum-positive pulmonary TB.

TABLE I. Distribution of individuals with sputum-positive (smear- and/or culture-positive) pulmonary tuberculosis by symptom status

Symptom	Sputum examined	Observed individuals
	n (%)	*n* (%)
Cough	1353 (79.4)	73 (88)
Chest pain without cough	237 (13.9)	6 (7.2)
Fever without cough or chest pain	21 (1.3)	—
Haemoptysis without cough, chest pain or fever	64 (3.8)	1 (1.2)
History of treatment without any of the above symptoms	28 (1.5)	3 (3.6)
Total	1703 (100)	83 (100)

ACKNOWLEDGEMENTS

This work was supported in part by the WHO, with financial assistance provided by the United States Agency for International Development under the Model DOTS project. We are grateful to Dr Neeru Singh, Director, Regional Medical Research Centre for Tribals (RMRCT), Jabalpur; Dr P. R. Narayanan, Former Director, Tuberculosis Research Centre (TRC), Chennai and Dr A. P. Dash, Former Director, RMRCT, Jabalpur for their encouragement and support. The contributions of the State Tuberculosis Officer, the WHO/RNTCP consultants and district health authorities of Madhya Pradesh, are gratefully acknowledged.

REFERENCES

1 World Health Organization. *Assessing tuberculosis prevalence through population-based surveys.* Geneva:WHO Regional Office for the Western Pacific; 2007:1–235.
2 Gopi PG, Vallishayee RS, Appegowda BN, Paramasivan CN, Ranganatha S, Venkataramu KV, *et al.* A tuberculosis prevalence survey based on symptoms questioning and sputum examination. *Indian J Tuberc* 1997;**44:**171–80.
3 Murhekar MV, Kolappan C, Gopi PG, Chakraborty AK, Sehgal SC. Tuberculosis situation among tribal population of Car Nicobar, India, 15 years after intensive tuberculosis control project and implementation of a national tuberculosis programme. *Bull World Health Organ* 2004;**82:**836–43.
4 Narang P, Tyagi NK, Mendiratta DK, Jajoo UN, Bharambhe MS, Nayar S. Prevalence of sputum-positive pulmonary tuberculosis in tribal and non-tribal populations of the Ashti and Karanja tehsils in Wardha district, Maharashtra State, India. *Int J Tuberc Lung Dis* 1999;**3:**478–82.
5 Chakma T, Vinay Rao P, Paul S, Kaushal LS, Datta M, Tiwary RS. Survey of pulmonary tuberculosis in a primitive tribe of Madhya Pradesh. *Indian J Tuberc* 1996;**43:**85–9.
6 Gopi PG, Subramani R, Narayanan PR. Evaluation of different types of chest symptoms for diagnosing pulmonary tuberculosis cases in community surveys. *Indian J Tuberc* 2008;**55:**116–21.
7 Central TB Division (CTD). *Module for Laboratory Technicians. Revised National Tuberculosis Control Programme.* New Delhi:Directorate General of Health Services, Ministry of Health and Family Welfare; 2005.

V. G. Rao
drvgrao@rediffmail.com
J. Bhat
R. Yadav
Regional Medical Research Centre for Tribals (RMRCT)
Indian Council of Medical Research
Nagpur Road, P.O. Garha
Jabalpur, Madhya Pradesh

P. G. Gopi
N. Selvakumar
Tuberculosis Research Centre (TRC)
Indian Council of Medical Research
Spurtank Road
Chennai, Tamil Nadu

D. F. Wares
Office of the WHO Representative to India
New Delhi

Effect of music on comprehension and recall among medical students in Kerala

Music influences our daily lives. The traditional notion that young students learn best in a completely quiet environment is being challenged. We attempted to understand (i) the effect of music on comprehension and recall, (ii) the effect of the type of music on learning, and (iii) the factors associated with music and learning.

Sixty medical students were selected randomly and given 3 articles of equal difficulty, of 210–300 words, from *Nature*. They were given 2.5 minutes to read and 2 minutes to answer the questions that followed with no music, eastern music and western music, respectively. Comprehension and recall were measured by the ability to read a passage in a stipulated time and to answer the questions that followed. This was followed by the administration of a questionnaire.

The mean age of the respondents was 20.4 years. The mean scores for the correct answers were 3.18 with no music, 4.3 with western music and 5.2 with eastern music. A significant difference in the mean scores with the different categories of music was found by repeated measure ANOVA. The student *t*-test was applied to test the difference in the mean scores of performance with no music and eastern music; no music and western music; and eastern music and western music. The difference in the mean scores of performance with no music versus eastern music was found to be highly significant ($p<0.001$, 95% CI 2.59–1.55). It was highly significant also in the case of western music versus eastern music ($p<0.001$, 95% CI 1.62–0.55). Mammarella *et al*. found that classical music significantly improved working memory performance, compared with no music.[1] In yet another study, covering second graders and students with reading disabilities, all students improved significantly with the use

of music from pre-test to post-test on the subtests word decoding, and word knowledge and the test total.[2]

Eighty-five per cent (51) of the respondents were found to have improved with music, where improvement was considered as a score higher by at least a point than the no music score. In the individual best performance according to category, 57% gave their best performance with eastern music and 20% with western music. A total of 58.3% of the students reported studying with music. The reasons cited included that it was helpful, prevented sleeping and improved concentration. This is supported by Vos *et al*., who said that music stimulates and awakens, revives bored or sleepy learners, and increases blood and oxygen supply.[3]

Though 85% improved with music, only 53.3% of the students perceived an improvement in performance.

A univariate analysis of improvement in performance and various factors such as the presence of lyrics, listening to music while studying and prior musical training were studied and no significant association was found.

Thus music has a positive effect on learning outcomes, as indicated by the scores in this study. The factors facilitating a positive outcome need to be studied further, e.g. perception regarding the effect of music, musical training and type of background music.

Our auditory and nervous systems are tuned to music. In this competitive world, harnessing the power of music can make a difference to the learning ability of students and give them an extra edge.

REFERENCES

1 Mammarella N, Fairfield B, Cornoldi C. Does music enhance cognitive performance in healthy older adults? The Vivaldi effect. *Aging Clin Exp Res* 2007;**19:**394–9.
2 Register D, Darrow AA, Standley J, Swedberg O. The use of music to enhance reading skills of second grade students and students with reading disabilities. *J Music Ther* 2007;**44:**23–37.
3 Vos J. Music and learning: Eight ways to use music for teaching and learning: An introduction to the music revolution. Available at *http://www.thelearningweb.net/music-learning.html* (accessed on 2 June 2008).

Aswathy S.
Beteena Kurian
Department of Biostatistics

Sreeja K.
L. S. Valsala
Adarsh Kalapurakal
Amrita Anil Kumar
Anjana A. S.
Anju Sarah Thomas
Aparna Prathap
Archana Rajendran Nair
Department of Community Medicine
Amrita School of Medicine
Amrita Health Care Campus
Elamakkara PO
Kochi
Kerala
aswathys@aims.amrita.edu

Suppurative odontogenic infection causing pyopericardium

A 24-year-old woman presented to the emergency room with a history of fever, toothache and swelling of the neck for 2 weeks. On admission, she looked ill, was febrile and had tachypnoea, tachycardia, a paradoxical pulse of >40 mmHg and a diffuse neck swelling, which was greater on the right than the left side. It did not move with deglutition. She had right lower third molar caries. Examination of the other systems was non-contributory. The possibility of cellulitis of the neck secondary to periodontal infection was considered. Laboratory investigations revealed a low haemoglobin level of 9.4 g/dl and neutrophilic leukocytosis of 20 050 per cmm. The other haematological and biochemical parameters were normal. Chest X-ray showed gross cardiomegaly and the electrocardiogram sinus tachycardia. A soft tissue scan of the neck revealed an abscess that was tracking down. A fine needle aspiration was attempted and the cytology was suggestive of a suppurative inflammation.

Echocardiography showed a thickened pericardium and fibrinous, loculated pericardial effusion—features suggestive of effusive constrictive pericarditis. CT scan of the neck and chest showed a collection of pus in the right side of the neck, extending from the level of the carotid bifurcation to the mediastinum inferiorly, with a prevascular and large pericardial component (Fig. 1). We drained 450 ml of pus from the pericardium and fluid analysis showed an exudate with neutrophilic leukocytosis and a very low sugar suggestive of a suppurative infection. The pericardial fluid smear for acid-fast bacilli was negative and the pus culture did not grow any organisms (could be due to treatment with multiple antibiotics prior to coming here). Hence, a final diagnosis of pyopericardium with constrictive pericarditis secondary to an odontogenic infection was made. The patient was treated with repeated pericardiocentesis and antibiotics. Her fever subsided and the neck swelling decreased in size. As features of pericardial constriction persisted, pericardiectomy was done and the patient was discharged in a stable condition.

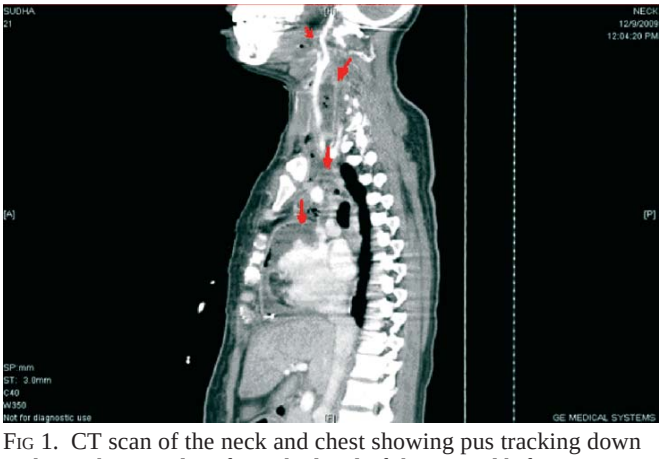

FIG 1. CT scan of the neck and chest showing pus tracking down the neck, extending from the level of the carotid bifurcation to the mediastinum inferiorly with prevascular and large pericardial component. Red arrows indicate the pathway of pus tracking down from neck to pericardium.

Suppurative odontogenic infections may extend to potential fascial spaces in the orofacial area (orofacial space infections), or deep in the head and neck (peripharyngeal space infections). The latter may be life-threatening. Rarely, cases of infection spreading further down the neck into the medistinum have been reported.[1] Early diagnosis and aggressive antimicrobial and surgical treatment are essential to successfully treat extensive cervico-mediastinal abscesses of odontogenic origin.[2] However, a delay in diagnosis is responsible for a high mortality (about 40%).[3] Pyopericardium secondary to tooth infection is very rare.[4] Zeitoun *et al.* reported 2 cases of cervical cellulitis and mediastinitis caused by odontogenic infections.[5] Dental infections can have serious medical complications, including death. However, early and prompt diagnosis and treatment can be life-saving.

REFERENCES

1 Pappa H, Jones DC. Mediastinitis from odontogenic infection. A case report. *Br Dent J* 2005;**198:**547–8.
2 Kinzer S, Pfeiffer J, Becker S, Ridder GJ. Severe deep neck space infections and mediastinitis of odontogenic origin: Clinical relevance and implications for diagnosis and treatment. *Acta Otolaryngol* 2009;**129:**62–70.
3 Biasotto M, Chiandussi S, Costantinides F, Di Lenarda R. Descending necrotizing mediastinitis of odontogenic origin. *Recent Pat Antiinfect Drug Discov* 2009;**4:**143–50.
4 Alsoub H, Chacko KC. Descending necrotising mediastinitis. *Postgrad Med J* 1995; **71:**98–101.
5 Zeitoun IM, Dhanarajani PJ. Cervical cellulitis and mediastinitis caused by odontogenic infections: Report of two cases and review of literature. *J Oral Maxillofac Surg* 1995;**53:**203–8.

Betsy Mathew
Geetha Francis
Sr Deepa
Department of General Medicine
St John's Medical College Hospital
Sarjapur Road
Bangalore
Karanataka
francis.geetha@gmail.com

Demand-based pay: A distressing trend in private sector medical education

In the past decade, medical education in the private sector in India has seen unprecedented growth.[1] Medical education is being recognized more as a big money-making business. A sudden rise in the number of medical colleges, especially in the private sector, has created a huge requirement for medical teachers.[2] It has been estimated that there is a 30%–40% shortage of medical faculty in India, leading to unhealthy practices when it comes to fulfilling the prescribed norms at the time of inspections by the Medical Council of India (MCI).[3]

Getting adequate faculty for certain branches is challenging. These include branches which are less preferred for postgraduation and those with relatively few postgraduate seats, such as forensic medicine and radiodiagnosis. The discrepancy between the number of postgraduate seats and faculty requirement has led to some questionable practices.[2] Since filling up all these teaching posts is a mandatory prerequisite for getting MCI recognition, colleges try their best to find appropriate persons and, more importantly, 'retain' them. This automatically leads them to offer a higher pay for these subjects than for disciplines for which there is less or no demand, resulting in a variation in pay for faculty at the same rank but in different disciplines. This is in contrast to government colleges, where a standard salary structure is followed for all disciplines according to seniority.

Besides the reputation of a specialty and an individual's competency, the anticipated income is an important factor influencing the preference for a particular specialty for postgraduation by medical students.[4] Therefore, influenced by this 'demand-based pay' in private medical colleges, medical graduates frequently opt for subjects that are in demand rather than a specialty of their choice. When students take up a specialty solely on the basis of the attractive prospect of high pay without having an actual liking for the subject, their proficiency in that specialty could be compromised.

The other negative aspect of 'demand-based pay' is the acute shortage of faculty in government medical colleges in certain branches for which substantially higher pay is offered in the private sector.[2] To avoid these shortcomings of the demand-based pay trend, the salary of the faculty in the private sector should be regularized, as was the medical tuition fee, and should be universally followed.

REFERENCES

1 Sood R. Medical education in India. *Med Teach* 2008;**30:**585–91.
2 Ananthakrishnan N. Acute shortage of teachers in medical colleges: Existing problems and possible solutions. *Natl Med J India* 2007;**20:**25–9.
3 Ananthakrishnan N. Medical education in India: Is it possible to reverse the downhill trend? *Natl Med J India* 2010;**23:**156–60.
4 Shah SU. The medical students' dilemma: Which postgraduate specialty to pursue? *J Postgrad Med* 2009;**55:**294–5.

Joseph N. M.
Department of Microbiology
Mahatma Gandhi Medical College and Research Institute
Pillaiyarkuppam
Puducherry
noyaljoseph@yahoo.com

Arun Babu T
Department of Paediatrics
Sri Lakshmi Narayana Institute of Medical Sciences
Puducherry

Sharmila V.
Department of Obstetrics and Gynaecology
Indira Gandhi Medical College and Research Institute
Puducherry

Rampur chemical spill tragedy: Accountability in transporting chemicals

The media reported that people who fell into a pool in Manpur near Rampur in Uttar Pradesh on 16 May 2008 turned blind. Many of the victims were brought to the Eye casualty of Dr Rajendra Prasad Centre for Ophthalmic Sciences (RAPCOS), All India Institute of Medical Sciences (AIIMS), New Delhi. On the same day, a team of experts from RAPCOS went to Manpur to evaluate the source of the problem, ascertain the chemical responsible for the ocular morbidity and assess the victims admitted in the Rudrapur and Haldwani government hospitals nearby. The team collected samples of the spilt chemical. An analysis of these samples revealed a strong alkali—caustic soda (i.e. sodium hydroxide of approximately 40% w/v with pH >13.3). From the site spillage analysis, it was found that the estimated quantity spilt was 4000–8000 L, spread over an area of >200 m^2 of the water channel.

Further enquiries revealed that a tanker carrying the chemical had spilt the chemical into the water channel. Unfortunately, at the time of the spillage, nobody in the village knew about the nature of the chemical and nothing was done to clear it. Due to the hot weather, the spilt chemical got more concentrated. On 15 May 2008, an open mini-van carrying labourers overturned in that area and as a result, the chemical-soaked mud splashed on the labourers' faces and upper chests. Some of them had to crawl to get out, which exposed them to greater chemical injury.

After our report, the site was filled with mud and the chemical-mixed mud was collected and transferred to specially built cement tanks on barren land to avoid sodium toxicity to the agricultural land. The toxic mud is still to be processed.

The patients presented to RAPCOS casualty about a day after the incident. The standard treatment protocol for acute chemical burns was followed. Due to associated systemic burns, all patients were admitted. The eye injuries ranged from Roper–Hall grade II (22.6%), III (19.4%)

to IV (58.1%). Exposure to a chemical with very high pH and inadequate washing of the eyes in the first instance may have contributed to the severity of the injuries. In 4 eyes, failure of epithelial regeneration in the form of a total epithelial defect was noted. Tarsorrhaphy was done in these patients and opened when re-epithelialization was noted at 3 weeks. The patients were followed every 3 months for a year.

In addition to ocular surface destruction, a progressive damage to the deeper structures of the eye was noted. The complications included secondary glaucoma (22.6%), cataract (19.4%), pseudopterygium (16.1%), avascular scleral melts (12.9%), symblepharon (9.7%), adherent leucoma, pyogenic granuloma, trichiasis, anterior staphyloma and phthisis. Of the 31 eyes, 2 developed a bacterial infection—corneal ulcer developed in 1 patient with coagulase-negative *Staphylococcus* and another patient had a pyogenic granuloma. Both were managed with a therapeutic penetrating keratoplasty. Phthisis developed in one eye and anterior staphyloma in the other.

This incident raises several questions. Why was the chemical spillage not reported to the local police station? Why was no responsibility pinned on the driver or the owner of the chemical tanker? Why did the company which received the chemical not report the spillage to the local administration? Even after the Bhopal gas leak tragedy, no lessons have been learnt. Safety regulations for the transport of hazardous chemicals need to be urgently revamped. Accountability and responsibility need to be assigned and the disaster management system needs to be streamlined.

ACKNOWLEDGEMENT

We acknowledge the help and support of Mr Somdutt Mauriya, Subdivisional Magistrate, Rampur.

Thirumurthy Velpandian
Amit Sobti
Alok Kumar Ravi
Pankaj Gupta
Namrata Sharma
Jeewan Singh Titiyal
Supriyo Ghose
Dr Rajendra Prasad Centre for Ophthalmic Sciences
All India Institute of Medical Sciences
New Delhi

Giant Brunner gland adenoma manifesting as iron deficiency anaemia and intussusception

A 43-year-old woman presented with epigastric discomfort, easy fatiguability and generalized weakness for 3–4 years. She had no history of fever, jaundice, abdominal distension, bleeding from any site, vomiting, diarrhoea, anorexia or weight loss. She had received multiple blood transfusions in the past. Her haemoglobin level was 6.3 g/dl, with microcytic hypochromic anaemia. The serum ferritin level was low (23.3 µg/dl). The stool was positive for occult blood on 4 occasions. The ultrasound of the abdomen was normal. An upper gastrointestinal endoscopy showed a large pedunculated mass with a stalk in the second part of the duodenum, causing partial occlusion of the duodenal lumen (Fig. 1). Endoscopic resection was not possible because of the large size of the polyp. The woman was advised surgical resection, but she refused.

Later, the woman presented with acute intestinal obstruction and on laparotomy, a duodeno-duodenal intussusception was seen. Longitudinal duodenotomy revealed a polyp with a long stalk, 4 cm (3 cm (2 cm. The polyp was excised with a surrounding margin of 3 cm. Histopathological examination of the excised polyp revealed normal intestinal villi with sheets of proliferating but benign-looking submucosal glandular structures, along with focal areas showing collections of chronic inflammatory cells (Fig. 1). A diagnosis of giant Brunner gland adenoma was made. Six months later, the patient is doing well. She has a normal haemoglobin level of 11.6 g/dl and her stool samples are negative for occult blood.

Benign tumours of the duodenum are rare. In an autopsy series, such tumours were found in 0.008% of patients, with Brunner gland adenomas accounting for 11% of these lesions.[1] Most commonly, such tumours are found at the junction of the first and second part of the duodenum, on the posterior wall. These individuals can have symptoms, such as abdominal pain, nausea, vomiting and anaemia. Acute gastrointestinal bleeding was the clinical presentation in 56% of cases, whereas 11% of the cases had occult bleeding and 11% were asymptomatic.[2] Uncommon manifestations include abdominal mass, pancreatitis, biliary obstruction, duodenojejunal intussusception[3,4] or circumferential involvement of the duodenum.[5] Our patient presented with iron deficiency anaemia and later developed intussusception.

The aetiopathogenesis of Brunner gland adenoma remains obscure. Hyperchlorohydria, chronic inflammation of the duodenum and *Helicobacter pylori* have been implicated. However, the most accepted hypothesis remains that brunneroma is a dysembryoplastic lesion or hamartoma.[6]

The diagnosis is not always easy as the radiological findings are often non-specific.[7] Computed tomography is useful only to confirm the absence of extraluminal extension of the adenoma. Traditional endoscopy with punch biopsies are usually superficial and are negative.[8] In our case, the diagnosis was made upon conducting a postoperative biopsy of the duodenal mass, because the endoscopic biopsy was normal.

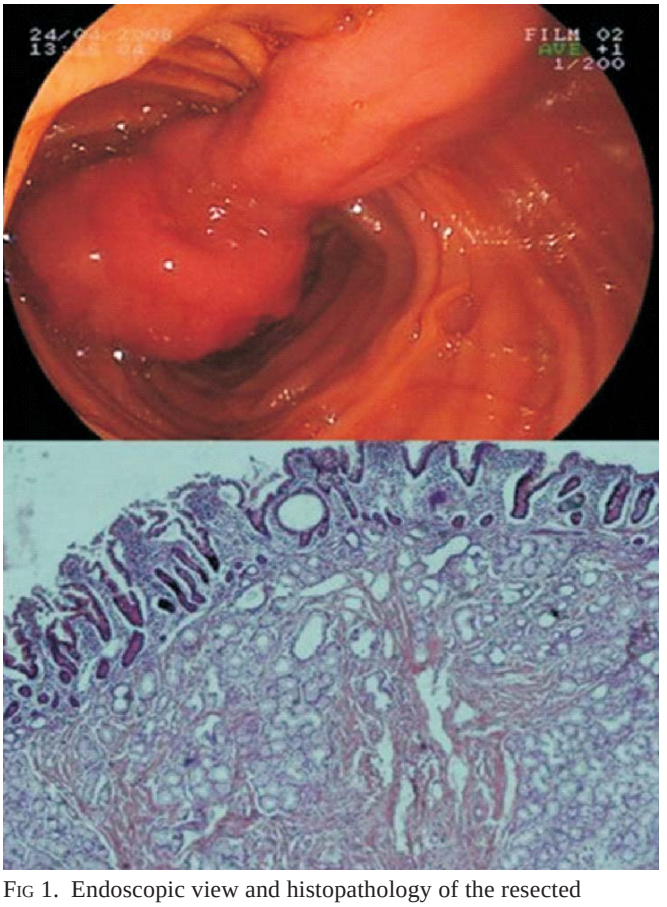

FIG 1. Endoscopic view and histopathology of the resected specimen revealing enlarged and hypertrophied Brunner gland

Endoscopic polypectomy represents the ideal treatment, being more cost-effective and less invasive than abdominal surgery.[9] However, its success depends on the site and size of the adenoma and the presence of a stalk. Surgical resection is indicated if endoscopic removal fails or is not possible. In incidentally diagnosed patients, it is controversial whether treatment is required. However, as demonstrated by our case, relatively large adenomas should be excised to avoid obstructive complications in the future.

REFERENCES

1 Botsford TW, Crowe P, Croker DW. Tumors of the small intestine: A review of experience with 115 cases including a report of a rare case of malignant hemangio-endothelioma. *Am J Surg* 1962;**103:**358–65.
2 Mayoral W, Salcedo JA, Montgomery E, Al-Kawas FH. Biliary obstruction and pancreatitis caused by Brunner's gland hyperplasia of the ampulla of Vater: A case report and review of the literature. *Endoscopy* 2000;**32:**998–1001.
3 Peetz ME, Moseley HS. Brunner's gland hyperplasia. *Am Surg* 1989;**55:**474–7.
4 Hwang JH, Kim J, Moon SH, Kim YS, Woo GH, Jung JO, *et al*. A case of Brunner's gland hamartoma with severe anemia and intussusception. *Korean J Gastrointest Endosc* 1997;**17:**691–5.
5 Varma D, Prakash K, Augustine P, Mahadevan P, Ramesh H. Brunner's gland adenoma with circumferential duodenal involvement. *Indian J Gastroenterol* 2001;**20:**243–4.
6 Kaplan EL**,** Dyson WL, Fitts WT Jr. Hyperplasia of Brunner's glands of the duodenum. *Surg Gynecol Obstet* 1968;**126:**371–5.
7 Merine D, Jones B, Ghahremani GG, Hamilton SR, Bayless TM. Hyperplasia of Brunner glands: The spectrum of its radiographic manifestations. *Gastrointest Radiol* 1991;**16:**104–8.
8 Perez A, Saltzman JR, Carr-Locke DL, Brooks DC, Osteen RT, Zinner MJ, *et al*. Benign nonampullary duodenal neoplasms. *J Gastrointest Surg* 2003;**7:**536–41.
9 Park JH, Park CH, Lee SJ, Lee WS, Joo YE, Kim HS, *et al*. The safety and usefulness of endoscopic polypectomy for treatment of Brunner's gland adenomas. *Korean J Gastroenterol* 2004;**43:**299–303.

Rajiv Singla
Praveen Bharti
Rajat Jain
Suresh Kumar
K. K. Ganguly
P. Kar
Department of Medicine
Maulana Azad Medical College
New Delhi

Students' perspective of a pathology museum

There is a need to introduce innovative practices and modify the existing infrastructure to teach medical students. A well-maintained pathology museum is often the only source of information on rare diseases.[1] Regular visits to a pathology museum are, therefore, considered an essential component of teaching pathology to medical students.[2] However, due to technological progress, the pathology museum is gradually losing its importance compared to other methods of teaching, such as virtual presentations, problem-based integrated learning modules and web-based clinical pathological cases.[3–5]

We carried out a study at 2 medical colleges in Puducherry to ascertain the students' opinion on a pathology museum and their suggestions on how to improve it. A total of 554 MB,BS students from the third to the seventh semester were included. The mean (SD) age of the students was 21.5 (2.0) years. Of them, 281 (50.7%) were males. A majority (87.9%) of the students felt that pathology was important for clinical practice and 92.2% agreed that the museum was a 'silent teacher'. In a similar survey by Chatelain *et al*., 93% of students felt that pathology had a major role in modern medicine.[6] Students learnt pathology through self-study (34.5%), by relying on lectures (27.4%), through practicals (26.4%), from a museum (9%) and through other means (2.7%). Overall, there is a need to emphasize the importance of pathology museums and practicals to the students.

Only 68 students (12.3%) had visited the museum at least once a week. Of them, 48 (70.6%) visited the museum because of their own interest, while the rest visited it because it was required. The common reasons given by students for not visiting the museum were shortage of specimens (21.6%), lack of interest (18.6%), lack of space (10.8%) and the smell of formalin (6.3%). Most students (86.6%) preferred to visit the museum during break hours. Hence, allowing access to the museum even during break hours would enable more students to visit it. In addition, students will feel encouraged to clarify their doubts if staff is available in the museum throughout the day. Most students (78%) felt that pathology museums need to be improved. The students suggested the addition of more models, charts and specimens (38.6%), adequate space and lighting (16.8%), and an orderly arrangement (9.9%). Ganguly *et al*. observed that more students utilized a museum if it was systematically rearranged and stations focusing on specific organ systems were created.[5] Most students (69.9%) were willing to visit the museum if it was improved by the addition of new specimens, charts, models and plastinated specimens.

REFERENCES

1 Ferrari L, Coda R, Fulcheri E, Bussolati G. The role of the pathological anatomy museum: Past glory, present crisis, and future prospects. *Pathologica* 2001;**93:** 196–200.
2 Nesi G, Santi R, Taddei GL. Art and the teaching of pathological anatomy at the University of Florence since the nineteenth century. *Virchows Arch* 2009;**455:**15–19.
3 Shibata S, Manabe T, Yamashita K, Kajita H. Role of the medical museum in teaching medical students. *Arch Pathol Lab Med* 1991;**115:**539–43.
4 Lam AK, Veitch J, Hays R. Resuscitating the teaching of anatomical pathology in undergraduate medical education: Web-based innovative clinicopathological cases. *Pathology* 2005;**37:**360–3.
5 Ganguly PK, Chakravarty M, Latif NA, Osman M, Abu-Hijleh M. Teaching of anatomy in a problem-based curriculum at the Arabian Gulf University: The new face of the museum. *Clin Anat* 2003;**16:**256–61.
6 Chatelain D, Charfi S, Cordonnier C, Leclercq F, Sevestre H. Medical students and the teaching of pathology: Results of a survey in the faculty of medicine of Amiens. *Ann Pathol* 2009;2**9:**173–9.

Narayanappa Shiroorkar Pradeepkumar
Department of Pathology
Sri Lakshmi Narayana Institute of Medical Sciences
Puducherry
drnspradeepkumar@yahoo.com

Noyal Mariya Joseph
Department of Microbiology

Dhananjay Kotastane
Department of Pathology
Mahatma Gandhi Medical College and Research Institute
Puducherry

Vinayak Kanade
Indian Institute of Science
Bangalore
Karnataka

Reversible cardiomyopathy due to doxorubicin

Doxorubicin is a broad-spectrum cancer chemotherapeutic agent used mainly in combination chemotherapy for various tumours. Its acute adverse effects are nausea, vomiting, myelosuppression, cardiac rhythm abnormalities, hypotension, myocarditis–pericarditis

syndrome, myocardial infarction and sudden death. The chronic side-effect is dilated cardiomyopathy (DCM) leading to congestive cardiac failure, which is usually irreversible and transplantation is the curative treatment.[1] Patients usually develop cardiomyopathy within the first year of completing therapy, with a median of 5–9 months.[2] However, there have been reports of doxorubicin-induced cardiomyopathy which was reversed with standard heart failure treatment.[3] The risk factors attributed to the development of doxorubicin-induced cardiomyopathy are cumulative dose, age >70 years or <15 years, mediastinal radiotherapy, previous cardiac disease, comorbid illnesses such as hypertension, coronary artery disease, liver disease and other agents with known cardiotoxic effects that can potentiate cardiomyopathy when administered along with doxorubicin.[4] We describe a patient who had reversible DCM due to doxorubicin and developed an embolic stroke.

A 45-year-old woman who underwent doxorubicin-based combination chemotherapy (cumulative dose 400 mg/m^2) for non-Hodgkin lymphoma was admitted 9 months after the last cycle with cardioembolic stroke. Her blood investigations were normal. Echocardiogram showed dilatation of all four chambers, left ventricular ejection fraction (LVEF) of 28% and a clot in the left ventricle. Echocardiograms done before and after every cycle of chemotherapy were normal. She had normal coronary arteries on angiography and negative serology for hepatitis B, C viruses and HIV. She was treated with low molecular weight heparin, antiplatelets, angiotensin-converting enzyme inhibitors, beta-blockers and anti-oxidants. Her neurological status improved and echocardiogram done 6 months later was normal (LVEF 57%).

Lefrak *et al*.[5] and Swain *et al*.[6] reported that 4%–5% of patients would develop DCM and cardiac failure due to doxorubicin. The risk increases with increasing cumulative dose and may also occur at lower doses.[6] It can be prevented by minimizing the dose and infusional drug schedules, alternate delivery systems and use of liposomal formulations.[7] Doxorubicin-induced cardiomyopathy can be treated with standard anti-failure medications. However, these measures provide only symptomatic relief and do not offer a cure for the underlying aetiology, which may progress further.[4]

This report aims to highlight the possibility of doxorubicin-induced cardiomyopathy occurring at cumulative doses below 500 mg/m^2 and that it could be reversible. These patients should be monitored with serial echocardiograms for worsening of LV function. As doxorubicin-induced cardiomyopathy can also be a late manifestation, echocardiography should be repeated at 3, 6 and 12 months after the completion of doxorubicin-based combination therapy and every 2 years thereafter for early recognition and initiation of cardioprotective treatment.

REFERENCES

1 Singal PK, Iliskovic N. Doxorubicin-induced cardiomyopathy. *N Engl J Med* 1998;**339:**900–5.
2 Jensen BV, Skovsgaard T, Nielsen SL. Functional monitoring of anthracycline cardiotoxicity: A prospective, blinded, long-term observational study of outcome in 120 patients. *Ann Oncol* 2002;**13:**699–709.
3 Saini J, Rich MW, Lyss AP. Reversibility of severe left ventricular dysfunction due to doxorubicin cardiotoxicity: Report of three cases. *Ann Intern Med* 1987;**106:**814–16.
4 Yahalom J, Portlock CS. Long-term cardiac and pulmonary complications of cancer therapy. *Hematol Oncol Clin North Am* 2008;**22:**305–18.
5 Lefrak EA, Pitha J, Rosenheim S, Gottlieb JA. A clinicopathologic analysis of adriamycin cardiotoxicity. *Cancer* 1973;**32:**302–14.
6 Swain SM, Whaley FS, Ewer MS. Congestive heart failure in patients treated with doxorubicin: A retrospective analysis of three trials. *Cancer* 2003;**97:**2869–79.
7 van Dalen EC, van der Pal HJ, Caron HN, Kremer LC. Different dosage schedules for reducing cardiotoxicity in cancer patients receiving anthracycline chemotherapy. *Cochrane Database Syst Rev* 2006;**4:**CD005008.

A. Murali
S. Sujithkumar
Department of Medicine
PSG Institute of Medical Sciences and Research
Coimbatore
muralimd2000@yahoo.com

N. Srinivasan
Department of Medicine
SRM Medical College
Chennai

R. Kannan
Department of Medicine
Saveetha Medical College
Chennai
Tamil Nadu