

Spectrum of Benign Breast Disease; a Critical Review of Therapy: A Single – Center Experience

Vijay Pratap Singh ^{a^o}, Akash Kumar Singh ^{a[#]}, Pranab Kumar Verma ^{b[†]},
Sumantra Sircar ^{a[‡]}, Vishal Mohan Singh ^{c[¶]} and Arun Kumar Jha ^{d^{‡*}}

^a Department of Surgical Oncology, Savera Cancer and Multispeciality Hospital, Savera Cancer & Multispeciality Hospital, Lohiya Nagar, Near Rajendra Nagar Overbridge, Dr. R.N. Singh Road, Kankarbagh, Patna - 800020, India.

^b Department of Histopathology, Savera Cancer and Multispeciality Hospital, Savera Cancer & Multispeciality Hospital, Lohiya Nagar, Near Rajendra Nagar Overbridge Dr. R.N. Singh Road, Kankarbagh, Patna - 800020, India.

^c Department of Anesthesia, Savera Cancer and Multispeciality Hospital, Savera Cancer & Multispeciality Hospital, Lohiya Nagar, Near Rajendra Nagar Overbridge Dr. R.N. Singh Road, Kankarbagh, Patna - 800020, India.

^d Department of Clinical Research, Savera Cancer and Multispeciality Hospital, Savera Cancer & Multispeciality Hospital, Lohiya Nagar, Near Rajendra Nagar Overbridge Dr. R.N. Singh Road, Kankarbagh, Patna - 800020, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: A benign breast condition is one that is not cancer. These conditions often go away on their own or are easily treated. Because a few benign breast conditions can increase your risk of getting cancer in the future, you may need to have follow-up tests or exams with your benign breast disease comprises a large spectrum of disease which ranges from mastalgia, nipple discharge to discrete lump. Medical management with Danazol, bromocriptine, primrose oil and Vitamin E capsules has importance along with surgical intervention in few cases.

^oSenior Surgical Oncologist & Managing Director;

[#]Consultant Surgical Oncologist;

[†]Consultant Onco Pathologist;

[‡]Senior Surgical Oncologist;

[¶]Senior Anesthesiologist & Head of Department;

[‡]Head of Medical Research & Development;

*Corresponding author: Email: dr.arunkujha@gmail.com, saveraoncojournals@gmail.com;

Materials and Methods: One hundred and one (n=101) patients with mastalgia, nipple discharge and breast lump were treated with medical or surgical management. Post treatment all patients were followed up for symptomatic relief.

Results: Majority of the patients (n=64) presented with mastalgia. Rest of the patients presented with nipple discharge and discrete lump. Most patients (n=75) were treated with Danazol, Linoleic Acid or Vitamin E. 85% patients were satisfied with the treatment administered to them.

Conclusion: Benign breast disease is a diverse spectrum with miscellaneous symptoms. Benign breast diseases are common in female patients and fibroadenoma is the commonest of them all. Triple assessment gave a firm diagnosis and it eliminates unnecessary anxiety in the patients about breast cancer or any other serious illness. Medical management is mainstay with indication of surgery in few cases.

Keywords: Benign breast disease; aberrations of normal development and involution; fibrocystic disease; breast abscess; FNAC; mammogram.

1. INTRODUCTION

Benign breast diseases are common disorders, up to 30% of women are clinically presented with benign breast diseases and seeking treatment at sometimes in their lives [1]. The term benign breast diseases abbreviated as BBD encompasses a heterogeneous clinical and pathological condition which ranges from inflammatory condition to benign neoplastic conditions [2]. A comprehensive classification which puts all the processes of physiological changes, growth, development and involution into a single frame work termed as ANDI (Aberrations of Normal Development and Involution) [3].

The most frequently seen benign lesions of the breast are summarized as developmental abnormalities, inflammatory lesions, fibrocystic changes, stromal lesions, and neoplasms.

Aim of the Study:

1. To determine the frequency and presentations of different subgroups of Benign Breast Disease.
2. To evaluate the treatment results in Benign Breast Disease.

1.1 Developmental Abnormalities

Ectopic breast (mammary heterotopia) is the commonest congenital anomaly, which has been described as both supernumerary and aberrant breast tissue [4]. Underdevelopment of the breast (hypoplasia), when congenital, is usually associated with genetic disorders, such as ulnar-mammary syndrome [5]. The complete absence of both breast and nipple (amastia) or presence of only nipple without breast tissue (amazia) is rare [6].

1.2 Inflammatory and Related Lesions

1.2.1 Mastitis

Inflammatory breast cancer, as the name suggests, mimics an infectious or inflammatory etiology. Most patients with inflammatory breast cancer are diagnosed after an initial treatment with antibiotics or anti-inflammatory therapies failed to show clinical improvement. Mammographic and sonographic evaluations are helpful in establishing the diagnosis. Image-guided biopsy of the abnormal breast parenchyma or skin biopsy confirms the diagnosis. A negative skin biopsy should not be used to exclude the diagnosis.

Chart 1. Early and late reproductive phases

	Normal	Disorder	Disease
Early reproductive years (15-25 yrs)	Lobular development	Fibroadenoma	Giant Fibroadenoma
	Stromal development	Adolescent hypertrophy	Giantmastia
	Nipple eversion	Nipple inversion	Subareolar abscess
Late reproductive year (26-35 yrs)	Cyclical changes of menstruation	Cyclic mastalgia	Incapacitatory mastalgia
	NA	Nodularity	NA
	Epithelial hyperplasia of pregnancy	Bloody nipple discharge	NA

1.2.1.1 Acute mastitis

Acute mastitis usually occurs during the first 3 months postpartum as a result of breast feeding. Also known as puerperal or lactation mastitis. Risk factors fall into two general categories: improper nursing technique, leading to milk stasis and cracks or fissures of the nipple, which may facilitate entrance of microorganisms through the skin; and stress and sleep deprivation, which both lower the mother's immune status and inhibit milk flow [7,8,9].

1.2.1.2 Granulomatous mastitis

Many different types of organisms can cause granulomatous mastitis. Systemic autoimmune diseases such as sarcoidosis and Wegener's granulomatosis can involve the breast [10,11]. The etiology of the disease remains largely unknown [12].

Histologically, chronic noncaseating granulomatous inflammation is typically limited to lobuli. The recommended therapy of idiopathic granulomatous mastitis is complete surgical excision whenever possible plus steroid therapy. Long-term follow up is necessary in these patients [13,14].

1.2.1.3 Foreign body reactions

Foreign materials, such as silicone and paraffin, which are used for both breast augmentation and reconstruction after cancer surgery, may cause a foreign body-type granulomatous reaction in the breast. Silicone granulomas ("siliconomas") usually occur after direct injection of silicone into the breast tissue or after extracapsular rupture of an implant.

1.2.1.4 Recurring subareolar abscess

Recurring subareolar abscess (Zuska's disease) is a rare. Bacterial infection of the breast that is characterized by a triad of draining cutaneous fistula from the subareolar tissue; a chronic thick, pasty discharge from the nipple [15]. The disease is caused by squamous metaplasia of one or more lactiferous ducts in their passage through the nipple, probably induced by smoking [16].

1.2.2 Mammary duct ectasia

It is a disease of primarily middle-aged to elderly parous women, who usually present with nipple discharge, a palpable subareolar mass,

noncyclical mastalgia, or nipple inversion or retraction. The most important histologic feature of this disorder is the dilatation of major ducts in the subareolar region. The pathogenesis and the etiology of the disease are still being debated. Smoking has been implicated as an etiologic factor in mammary duct ectasia [17,18]. Mammary duct ectasia generally does not require surgery and should be managed conservatively [19]. In some patients, clinical presentation and mammographic findings may suggest malignancy, and biopsy may be required to exclude malignancy.

1.2.3 Fat necrosis

Fat necrosis of the breast is a benign nonsuppurative inflammatory process of adipose tissue. It can occur secondary to accidental or surgical trauma. Clinically, fat necrosis may mimic breast cancer if it appears as an ill-defined or spiculated dense mass, associated with skin retraction, ecchymosis, erythema, and skin thickness [20]. Mammographic, sonographic, and magnetic resonance imaging findings may not always distinguish fat necrosis from a malignant lesion. Excisional biopsy is required if carcinoma cannot be excluded preoperatively [21].

1.2.4 Fibrocystic Changes

Fibrocystic changes (FCCs) constitute the most frequent benign disorder of the breast. Such changes generally affect premenopausal women between 20 and 50 years of age [22–29].

FCCs may be multifocal and bilateral. The most common presenting symptoms are breast pain and tender nodularities in breasts. The exact pathogenesis of the entity is not clear, hormonal imbalance, particularly estrogen predominance over progesterone, seems to play an important role in its development [30].

Therefore, it is practical to evaluate FCCs under a classification system first proposed by Dupont and Page [31], as nonproliferative lesions, proliferative lesions without atypia, and proliferative lesions with atypia (atypical hyperplasia). In various studies, it has been shown that the great majority of breast biopsies (up to 70%) show nonproliferative lesions. FCCs comprise both cysts (macro and micro) and solid lesions, including adenosis, epithelial hyperplasia with or without atypia, apocrine metaplasia, radial scar, and papilloma.

1.2.5 Cysts

Cysts are fluid-filled, round or ovoid structures that are found in as many as one third of women between 35 and 50 years old. Cysts cannot reliably be distinguished from solid masses by clinical breast examination or mammography; in these cases, ultrasonography and fine needle aspiration (FNA) cytology, which are highly accurate, are used.

1.2.6 Adenosis

Adenosis of the breast is a proliferative lesion that is characterized by an increased number or size of glandular components, mostly involving the lobular units. The most common types are Sclerosing adenosis and Microglandular adenosis [32]. Sclerosing adenosis can manifest as a palpable mass or as a suspicious finding at mammography. It is strongly associated with various proliferative lesions, including epithelial hyperplasias.

Microglandular adenosis of the breast is characterized by a proliferation of round, small glands distributed irregularly within dense fibrous and/or adipose tissue. Most of the glandular structures have open lumina in which eosinophilic material is usually seen. The most important histological feature of microglandular adenosis is that it may lack the outer myoepithelial layer seen in other types of adenosis [33,34].

1.2.7 Metaplasia

They are more frequently found in younger women. All normal and metaplastic apocrine cells can be stained with gross cystic disease fluid protein 15. Clear cell metaplasia of the breast is a rare lesion. Its significance comes from its morphologic similarity to clear cell carcinoma [35].

1.2.8 Epithelial hyperplasia

Epithelial hyperplasia (ductal or lobular type) is one of the most challenging FCCs to diagnose properly. Epithelial hyperplasia is the most common form of proliferative breast disease. It can be difficult to distinguish between ductal and lobular hyperplasias.

1.2.8.1 Ductal lesions

Normally, breast ducts are lined by two layers of low cuboidal cells with specialized luminal

borders and basal contractile myoepithelial cells. The most important cytologic features of mild, moderate, or florid epithelial hyperplasia are an admixture of cell types (epithelial cells, myoepithelial cells, and metaplastic apocrine cells) and variation in the appearances of epithelial cells and their nuclei [36,37]. The term atypical ductal hyperplasia is defined as a type of a ductal hyperplasia that morphologically mimics low-grade ductal carcinoma in situ (DCIS). Atypical ductal hyperplasia is a rare condition among patients having biopsies for a palpable mass, seen in 4% of symptomatic benign biopsies. In contrast, 31% of biopsies performed because of micro calcifications show atypical ductal hyperplasia [38]. Women with atypical ductal hyperplasia develop cancer usually within 10–15 years of the diagnosis. The risk for cancer declines after 15 years [39,40].

Routine follow-up for both breasts is recommended. Therapy options, such as chemoprevention, should be determined on the basis of other risk factors for breast cancer.

1.2.8.2 Lobular lesions

Lobular-type epithelial proliferations, both atypical lobular hyperplasia and lobular carcinoma in situ, are collectively termed lobular neoplasia because, unlike ductal lesions, which exhibit heterogeneous morphologic features, the histologic features of lobular type epithelial proliferations are very similar, and the only difference between atypical lobular hyperplasia and lobular carcinoma in situ is the extent and degree of epithelial proliferation. Lobular neoplasia is a relatively rare breast lesion. It rarely manifests itself clinically. Lobular neoplasia is identified as an incidental finding in biopsies excised for other abnormalities.

1.2.9 Columnar cell lesions

Columnar cell lesions of the breast represent a spectrum of lesions that have been encountered with increasing frequency in needle core breast biopsies because these lesions are commonly associated with microcalcifications and detected by mammographic screening.

1.2.10 Radial Scar and Complex Sclerosing Lesion

Radial scars are benign pseudoinfiltrative lesions of uncertain significance. They are characterized by a fibroelastotic core with entrapped ducts,

surrounded by radiating ducts and lobules displaying variable epithelial hyperplasia, adenosis, duct ectasia, and papillomatosis [41]. The role of FNA cytology in diagnosis is limited. A spiculated lesion suggestive of radial scar or complex sclerosing lesion at mammography may be excised on the basis of its size and amount of sampling performed by core biopsy [42-44].

1.2.11 Intraductal papilloma and papillomatosis

Intraductal papilloma is a discrete benign tumor of the epithelium of mammary ducts. It can arise at any point in the ductal system and shows a predilection for the extreme ends of the ductal system: the lactiferous sinuses and the terminal ductules [45]. Juvenile papillomatosis of the breast is defined as severe ductal papillomatosis occurring in young women of <30 years old. There only eight male juvenile papillomatosis cases reported in the literature [46].

1.3 Proliferative Stromal Lesions

1.3.1 Diabetic fibrous mastopathy

Diabetic fibrous mastopathy is an uncommon form of lymphocytic mastitis and stromal fibrosis. Clinically, diabetic fibrous mastopathy is characterized by solitary or multiple ill-defined, painless, immobile, discrete lesions in one or both breasts that raise the suspicion of carcinoma.

The pathogenesis of diabetic fibrous mastopathy is unknown. The mammographic and sonographic findings of these lesions are also highly suspicious for breast cancer, so a biopsy is always essential for definitive diagnosis [47,48].

1.3.2 Pseudoangiomatous stromal hyperplasia of the breast

Pseudoangiomatous stromal hyperplasia (PASH) is a benign myofibroblastic proliferation of nonspecialized mammary stroma. Originally, hormonal stimulation (particularly with progesterone) was suggested in the etiology of PASH. Clinically, rare cases of PASH present as a well-circumscribed, dense, rubbery mass mimicking a fibroadenoma or a phyllodes tumor. Both the mammographic and sonographic features in PASH are nonspecific, so biopsy of

these lesions is necessary to exclude a malignancy [49,50].

1.4 Neoplasms

1.4.1 Fibroadenoma

Fibroadenoma is the most common lesion of the breast; it occurs in 25% of asymptomatic women. It is usually a disease of early reproductive life; the peak incidence is between the ages of 15 and 35 years [51]. Fibroadenoma presents as a highly mobile, firm, nontender and often palpable breast mass. Phyllodes tumor is a fibroepithelial tumor of the breast with a spectrum of changes. Benign phyllodes tumor is usually difficult to differentiate from fibroadenoma. Minimally invasive techniques, such as ultrasound-guided cryoablation, seem to be an excellent treatment option for fibroadenoma in women who wish to avoid surgery [52].

Fibroadenomas in older women or in women with a family history of breast cancer have a higher incidence of associated carcinoma [53,54].

1.4.2 Lipoma

Lipoma of the breast is a benign, usually solitary tumor composed of mature fat cells. If the clinical diagnosis of lipoma is confirmed by either FNA biopsy or core biopsy, and the mammogram and the ultrasonogram show nothing suspicious for malignancy at the site, the patient is normally followed through palpation after 6 months. However, if the diagnosis is not certain or the lesion grows rapidly, the tumor should be surgically removed [55,56].

1.4.3 Adenoma

An adenoma is pure epithelial neoplasm of the breast. This lesion is divided into tubular, lactating, apocrine, ductal, and so-called pleomorphic (i.e., benign mixed tumor) adenoma [57].

1.4.3.1 Nipple adenoma

This is a benign tumor of the ductal epithelium that often clinically mimics Paget's disease and pathologically may be misinterpreted as an adenocarcinoma. Typically, nipple adenoma presents as a discrete, palpable tumor of the papilla of the nipple. Erosion of the nipple and nipple discharge are usually seen. Nipple adenoma is considered a benign lesion, but

rarely malignant change within or contiguous with nipple adenoma has been defined [58,59].

1.4.3.2 Hamartoma

Hamartoma of the breast is an uncommon benign tumorlike nodule, also known as fibroadenolipoma, lipofibroadenoma, or adenolipoma, composed of varying amounts of glandular, adipose, and fibrous tissue. Clinically, hamartoma presents as a discrete, encapsulated, painless mass. On macroscopic examination, hamartomas are typically well-circumscribed lesions with smooth contours. The current management of hamartomas is surgical removal.

1.5 Granular Cell Tumor

Granular cell tumor is an uncommon, usually benign neoplasm that originates from Schwann cells of the peripheral nervous system. Clinically, granular cell tumor can simulate carcinoma because of its fibrous consistency, fixation to the pectoral fascia, skin retraction, and ulceration. Mammographic and ultrasonographic findings may further increase the suspicion of a malignant lesion [60]. Clinical presentations include cyclic or noncyclic mastalgias, nipple discharge, and discrete lump or diffuse lumpiness. 90% Patient may present with one or more symptoms. Breast lump in premenopausal women are benign and usually represents with fibroadenoma in early reproductive period. In middle reproductive period fibrosis, hyperplasia and cyst are more likely. In later reproductive period hyperplasia, cyst and carcinoma in situ are more common. Multipapilloma, sclerosing adenosis and radial scar are other clinical presentations of breast lump. Spontaneous, serous or bloody, unilateral single duct discharges are considered pathological or non-pathological. It needs radiological evaluation. Etiology of mastalgia remains unproven. Role of caffeine, iodine deficiency, and alteration in fatty acid levels in the breast, fat intake in diet and psychological factors in the etiology of breast pain has been suggested [61-69].

Medical management of BBD is mainstay of treatment. Danazol, bromocriptine and tamoxifen has been proven to be effective. Linoleic acid in the form of evening primrose oil has been found to be effective. In randomized trials Vitamin E tablets being widely used and found to be ineffective. Surgical management in discrete breast lump is found to be satisfying in subset of

patients of fibroadenoma, multiple papilloma, sclerosis adenosis and fibrocystic disease. This study was conducted at a tertiary cancer centre. Patients with BBD were followed up for a period of 6 months with surgical and non surgical treatment. Results were interpreted in terms of patient satisfaction and quality of life.

2. METHODS

Study Design: Observational study.

Sample Size: 101 patients.

Study Duration: 6 months (From June 2020 to December 2020).

Sponsor: No funding to conduct this study.

Mode of contact: Telephonic Follow ups done.

Inclusion Criteria:-

- Women of age groups 16-55 years.
- Lactating mothers.
- Willingness to sign the informed consent form.
- Willingness to turn up for routine follow ups.

Exclusion Criteria:-

- Histopathologically proven cases of neoplastic lesions.
- Lost to follow ups.
- Not willing to sign informed consent form.

One hundred and one patients (n=101) clinically presented with mastalgia, breast lumps and nipple discharge visited OPD of tertiary cancer care centre between June 2020 to December 2020. Histopathologically confirmed neoplastic lesions were excluded from this study. Biopsy proven fibroadenoma and phyllodes tumor cases were also excluded from this study. All patients undergone USG and breast bilateral mammography (B/L MMG). Majority of medical management in the form of Danazol or Vitamin E/ Linoleic acid for at least 2 months or maximum 6 months. Few patients underwent surgery in the form of lumpectomy or microdocheotomy. Patients post treatment were on regular follow ups.

3. RESULTS

A total of (n=101) patients visited tertiary cancer centre in the Medical and Surgical Oncology

Table 1. Result of treatment captured on the basis of patient satisfaction and relief in symptoms

Patient Satisfaction	Yes	No
	85%	15%
Symptoms relieve	Yes	No
	Complete response in 55%	20%
	Partial response in 25%	

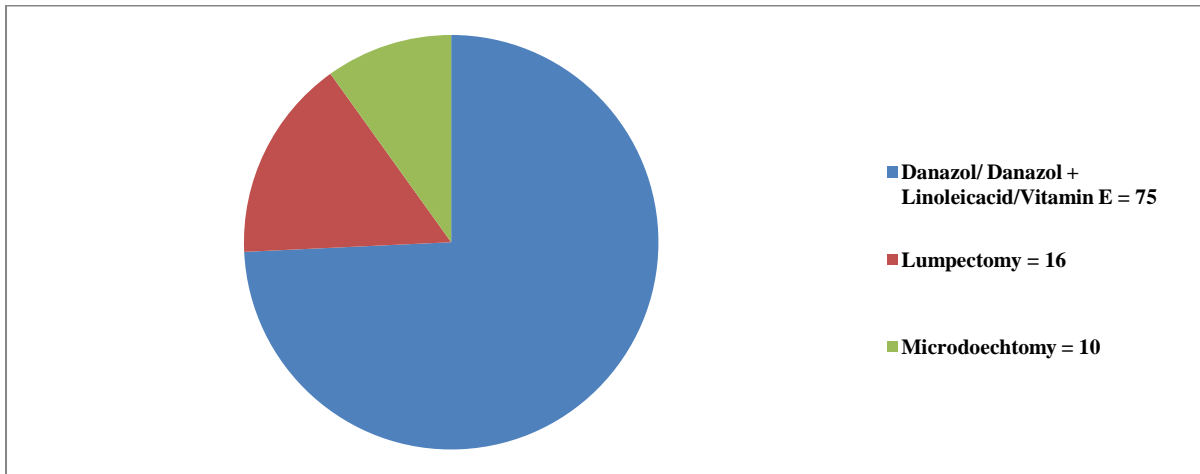


Fig. 1. Line of treatment administered to the patients

department. Patients presented with Fibrocystic disease was 29 (29.29%), Fibroadenosis 17 (17.17%), Ductal papilloma 13 (13.13%), Ductal ectasia 20 (20.2%), Ductal hyperplasia 6 (6.02%), Inflammatory breast disease 10 (10.1%), Granulomatous mastitis 6 (6.06%).

Data interpretation of the treatment result was done in the form of symptoms relive and patient satisfaction. Most of the patients (64.6%) clinically presented with mastalgia followed by breast lumps in 22.2% patients. Nipple discharge was also observed in the patients and discharge was classified into Serous (14.14%), Greenish (5.05%), Milky (6.06%), Bloody discharge (8.08) patients. Discrete breast lump, another remarkable clinical presentations found in 22.22% patients followed by menstrual irregularity were seen in 41.41% patients.

During follow-up we have observed 85% had satisfactory response where in 15% patients they had not satisfied with the treatment administered. Complete response seen in 55% patient, partial response seen in 25 patients and 20% patients had not symptomatic relief. They were advised to visit the hospital for routine follow up.

4. DISCUSSIONS AND CONCLUSION

In this study majority of the patients presented with cyclic or non-cyclic mastalgia. One third of the patients experienced nipple discharge and few patients presented with breast lump. Menstrual irregularity was almost present in patients with mastalgia. Among all diagnosed benign breast disease fibrocystic disease was in majority followed by ductal papilloma and ductal ectasia. Navneet et al found 40% women with fibroadenoma, 50% patients with nodularity and mastalgia and less than 10% with galactorrhea and nipple discharge [70].

Hatim et al. similarly found 77.62% cases of fibroadenoma followed by fibrocystic disease (4.3%) and gynaecomastia [71]. As fibroadenoma was excluded from our study, fibrocystic disease was also in majority in our study too. Many randomized and non-randomized clinical trials have been done regarding the efficacy of Linoleic acid, Danazol, bromocriptine and tamoxifen in the treatment of BBD. Linoleic Acid is found promising in few randomized clinical trials but Vitamin E is considered ineffective in randomized trials [72-74].

As hormonal depletion principle of mastalgia is well effective treatment. Many hormonal treatments i.e. GnRH analogue, Androgens have been tried to treat symptoms associated with Danazol, Linoleic acid or Vitamin E. Lumpectomy and microdochectomy is the main surgical modality being used in minority of the patients with mixed results. In our study 75% of the patients were treated medically with Danazol, linoleic acid or Vitamin E. Rest of the patients were treated surgically. Majority of the patients were satisfied by their treatment with 55% having complete symptomatic relief.

Finally we concluded that benign breast disease being a wide spectrum of disorder is successfully treated by medicine in majority of the cases followed by surgery in few cases.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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