DOI: 10.7860/NJLM/2026/87349.2980

Case Series

Pathology Section

Cytomorphological Spectrum of Parasitic Lesions Presenting as Superficial Nodules: A Series of Nine Cases

PUSPANJALI MISHRA[1], IPSITA PRADHAN[2], SUBHASHREE ARCHANA ROUT[3], ALOK RANJAN PANDA[4]

ABSTRACT

Parasitic infestations remain a significant public health challenge in developing countries like India and often present as nodular, cystic, or fluid-accumulating lesions that mimic neoplasms or other inflammatory processes. Fine Needle Aspiration Cytology (FNAC) is an easy, minimally invasive, and rapid technique useful for diagnosing such infestations, particularly when they present as superficial nodules or swellings. This retrospective case series evaluates nine cases (six cases of filariasis, two cases of hydatid cyst and one case of cysticercosis) of superficial swellings at various anatomical sites with cytological diagnoses of parasitic lesions observed over a two-year period at Veer Surendra Sai Institute of Medical Sciences and Research (VIMSAR), Burla, a tertiary care centre in Western Odisha, India. In all cases, parasites were incidentally detected. Retrospective data were collected from register about clinical details, cytomorphological findings and histology findings (wherever available). FNAC was performed using a 22/23-gauge needle the material aspirated was spread on a glass slide. In case of cystic lesion, cyst content was aspirated and smears were prepared from centrifuged deposit. The smears were stained with Diff-Quik (air dry) and Haematoxylin and Eosin (H&E) stain (after fixation with 95% alcohol). Subsequent excisional biopsy was done in some cases. The patients ranged in age from 17 to 55 years, highlighting that these lesions occur across a broad age spectrum. Clinical presentations typically involved a palpable nodule varying in size from 1 to 6 cm. The nature of the aspirate was purulent in the majority of cases, followed by clear fluid and blood-mixed aspirate. The affected sites in the present case series were breast, arm, hand, inguinal lymph nodes, scrotum, thyroid, nape of neck, thigh, calf. Cytological findings revealed filariasis as the most common parasite, followed by hydatid cyst and cysticercosis. In endemic regions, a careful evaluation of cytological material obtained from superficial nodules is essential for identifying parasitic infestations, providing a definitive diagnosis that guides appropriate management and prevents unnecessary surgical procedures.

Keywords: Cysticercosis, Filariasis, Fine-needle aspiration cytology, Hydatid cyst

INTRODUCTION

Parasitic infestations continue to be a major global health concern, particularly in low- and middle-income countries due to poor sanitation, unsafe water, and tropical climatic conditions [1,2]. Around 120 million people are currently infected globally by lymphatic filariasis [3]. Among helminthic infections, lymphatic filariasis, cysticercosis, and hydatid disease are of significant clinical and pathological importance due to their varied tissue involvement and diagnostic challenges.

Filariasis is a chronic parasite infection caused by thread-like nematode worms (filariae) that are transmitted to humans through the bite of infected mosquitoes (*Culex*) [4]. The parasites reside in the lymphatic system {*Wuchereria bancrofti* (most common), *Brugia malayi, Brugia timori*}, subcutaneous tissue {*Loa loa, Onchocerca volvulus*}, or serous cavities {*Mansonella perstans, Mansonella ozzardi*}, leading to a range of clinical manifestations. The adult worm resides in lymphatic vessels and lymph nodes, leading to lymphatic obstruction and chronic manifestation such as lymphoedema and elephantiasis. Microfilariae may be incidentally detected in peripheral blood smears and FNAC of a superficial nodule [5].

Hydatid cyst (Echinococcosis) is a zoonotic parasitic infection caused by the larval stage of *Echinococcus granulosus*. Transmission occurs when humans ingest eggs shed in the faeces of infected dogs [4]. The disease is characterised by the development of hydatid cysts in various human organs, most commonly in the liver (60-70%) and lungs (20-30%). Other rare sites are brain, heart, bone, subcutaneous tissue and muscle. Hydatid cysts are fluid-filled, spherical structure with three layers: Pericyst: outer fibrous tissue, Laminated membrane: acellular middle layer, Germinal layer: inner viable layer producing brood capsules and protoscolices (hydatid sand). FNAC is rarely done due to risk of rupture, but may show laminated membrane, scolices and hooklets [5,6].

Cysticercosis is a tissue infection caused by the larval form (*Cysticercus cellulosae*) of the pork tapeworm *Taenia solium*. Humans acquire cysticercosis by ingesting eggs of *Taenia soliumvia* contaminated food or water. The larvae disseminate haematogenously and encyst in tissues leading to the development of cysticerci (larval cysts) in muscles, subcutaneous tissues, eyes, or the Central Nervous System (CNS). On FNAC, *Cysticercus cellulosae* stage of the parasite are seen. Histopathology typically reveals a cystic structure with a well-defined wall and invaginated scolex [5,6].

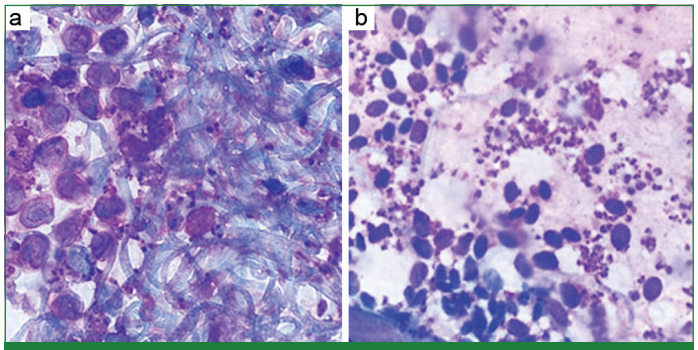
As these parasites present as superficial nodular swellings, FNAC is a useful and minimally invasive procedure for the diagnosis of parasitic infestations presented with nodular swellings [7,8]. Early recognition is essential for accurate diagnosis and appropriate management in endemic regions.

CASE SERIES

Case 1

A 34-year-old female presented with a right-sided breast lump, firm with mild tenderness, measuring approximately (2×2) cm with

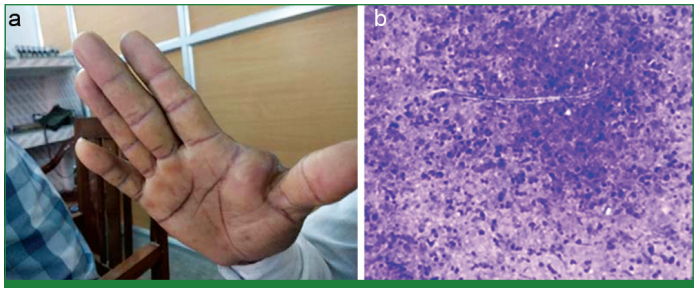
a clinical diagnosis of fibroadenoma. A 2mL of purulent fluid was aspirated, and cytology revealed a good number of polymorphs, many microfilariae, few benign-looking duct epithelial cells along with occasional cyst macrophages in a dirty background [Table/Fig-1].



[Table/Fig-1]: a) A bunch of spirally coiled microfilariae in an inflammatory background of breast aspirate, 400x, H&E; b) Breast aspirate showing numerous embryonated eggs of adult gravid filarial worm, (H&E,400x).

Case 2

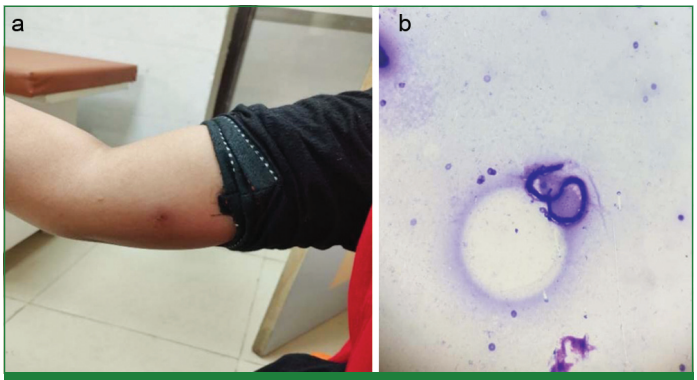
A 55-year-old male presenting with swelling of size 2.5×2 cm over first web space of the right hand of seven months' duration, the swelling was gradually increasing in size. Ganglion cyst purulent material came out on aspiration. Cytosmear showed a good number of polymorphs, a few sheathed microfilaria along with a few histiocytes and occasional fibroblasts, seen in a necrotic background [Table/Fig-2].



[Table/Fig-2]: a) Superficial nodules over hand right-side; b) Sheathed microfilariae of *Wuchereria bancrofti* associated with non specific inflammation and fibro histiocytic reaction Diff Quik (100x).

Case 3

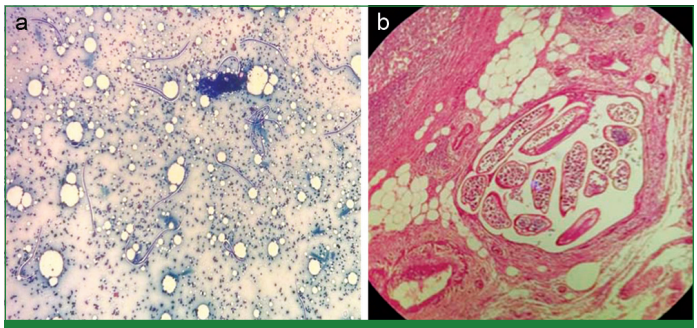
A 26-year-old female patient presented with a painless swelling of size 1.0×0.5 cm on the inner aspect of the right arm for six months, with a clinical diagnosis of Lipoma. The swelling was non tender and was not associated with fever or lymphadenopathy. The nature of the aspirate was a few drops of clear fluid. Cytosmear revealed microfilaria in a fluid background [Table/Fig-3].



[Table/Fig-3]: a) Small superficial nodule over right arm; b) Microfilaria in a fluid background in arm swelling Diff Quik (200x).

Case-4

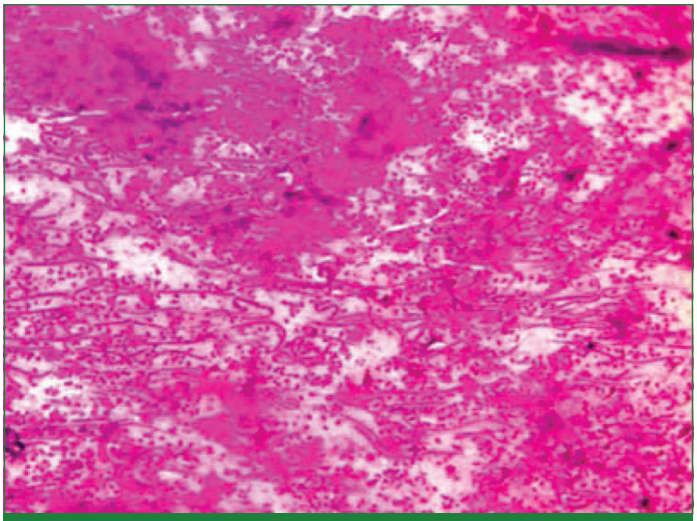
A 47-year-old male presented with left-side inguinal lymphadenopathy, measuring 2.5×2.5 cm, firm, with mild tenderness present since one year, history of on and off fever since three months. No contact of tuberculosis. Cytosmear showed a good number of polymorphs along with histiocytes seen in a dirty background. Occasional microfilariae present with a diagnosis suggestive of microfilariae with inflammation. Histology shows a double-barrelled uterus of the adult female filarial worm containing eggs and developing microfilariae larvae [Table/Fig-4].



[Table/Fig-4]: a) Microfilariae in inguinal lymph node aspirate Diff Quik (100x); b): Classic double barrel uterus of the adult female worm (*Wuchereria bancrofti*) with eggs and developing larvae (microfilariae) in the inguinal lymph node (H&E,100x).

Case 5

A 17-year-old male patient, presented with swelling in the right scrotum of size 3×2 cm since two months, gradually increasing in size, firm, tender, pain radiating to the right thigh with clinical diagnosis of Tuberculous Epididymo-orchitis. No H/O trauma, fever, or past history/contact h/o TB. FNAC yielded 3.5 mL of pus. Cartridge-Based Nucleic Acid Amplification Test (CBNAAT) report of the aspirated fluid came negative. Cytology revealed plenty of microfilariae larvae in an inflammatory background [Table/Fig-5].



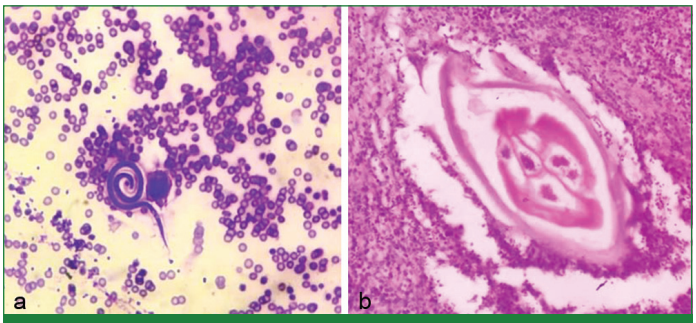
[Table/Fig-5]: Plenty of microfilariae in an inflammatory background, (H&E,100x).

Case 6

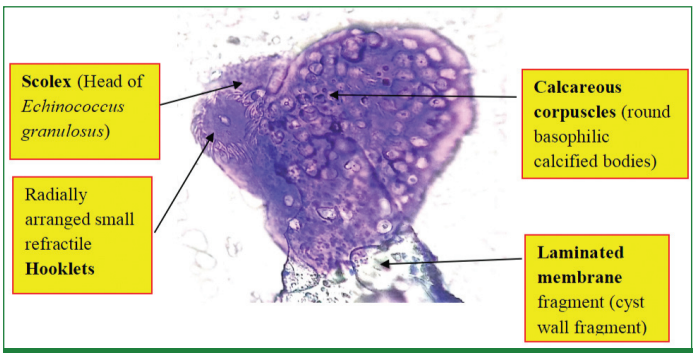
A 37-year-old female presented with diffuse thyroid swelling, which moves with deglutition, firm, gradually increasing in size since three years, with a clinical diagnosis of Colloid Goitre. No cervical lymphadenopathy. The thyroid function test shows hypothyroidism. Erythrocyte Sedimentation Rate (ESR) was mildly raised. Peripheral smear showed neutrophilic leukocytosis. The nature of aspirate was blood-mixed and the smear shows microfilae in a haemorrhagic background. Histology shows adult worm of *Wuchereria bancrofti* co-existing with lymphocytic thyroiditis [Table/Fig-6].

Case 7

A 30-year-old male presented with painless swelling on the front of the left thigh measuring 3×3 cm, soft-cystic, non tender for one year, with a clinical diagnosis of Lipoma. He had a history of having a pet dog. A 10 mL of clear watery fluid was aspirated. Cytosmears from centrifuged deposit of cyst fluid shows scolex with radially arranged hooklets and calcareous spherules along with few cyst macrophages in a necrotic background [Table/Fig-7].



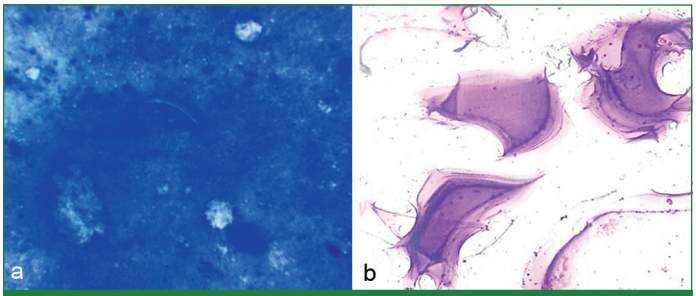
[Table/Fig-6]: a) Microfilarae in haemorrhagic background; b) Adult worm of *Wuchereria bancrofti* co-existing with lymphocytic thyroiditis (H&E, 100x).



[Table/Fig-7]: FNA smear showing scolex with radially arranged hooklets, calcareous corpuscles & laminated membrane, Diff-Quik, 400x].

Case 8

A 22-year-old female, from a rural background, presented with a swelling in the nape of the neck measuring (6×5) cm, soft-cystic, non tender, growing slowly, for five years. Clinical diagnosis was Lipoma. She was having pet dogs since childhood. The overlying skin showed no signs of inflammation. FNAC yielded 15 mL of clear fluid with white granularity and the swelling reduced in size following aspiration. After FNAC, no allergic reactions developed. Cytosmears were prepared from a centrifuged deposit of cyst fluid, showing eosinophilic and acellular laminated membrane with a few hooklets, along with cyst macrophages in an amorphous necrotic background. The cytomorphological diagnosis given was hydatid cyst [Table/Fig-8].

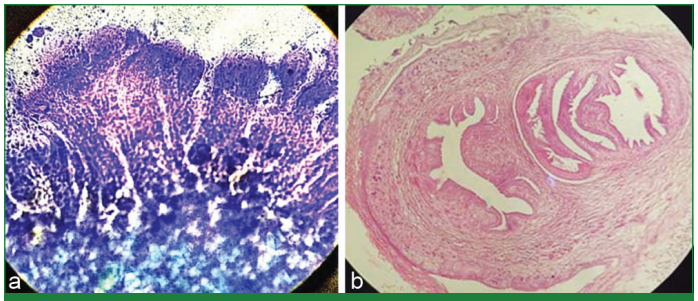


[Table/Fig-8]: a) Smear showing hooklets in a necrotic inflammatory background, 100XDiff Quik; b) Smear showing acellular laminated membrane of hydatid cyst Diff Quik (400x).

Case 9

A 25-year-old lady, from a rural tribal area, presented with a swelling, diffuse, ill-defined, and firm, measuring 2.5×1.5 cm over the left calf, noticed for four months. The swellings were non tender. The overlying skin appeared normal. Clinical diagnosis was lipoma spindle cell lesion. She had H/O taking porkmeat. FNA smear showed few drops of fluid and smear shows degenerated acellular granular fragments (degenerated *Cysticercus cellulosae*). Histopathology shows irregular membranous foldings and scolices representing cysticercus larvae [Table/Fig-9].

The present case series showed nine cases at different sites with different clinical presentations. FNAC was done in all cases with histopathology in few cases [Table/Fig-10].



[Table/Fig-9]: a) Degenerated acellular granular material of *Cysticercus cellulosae* (Diff-Quik, 400x); b) Larva of *Cysticercus cellulosae* (H&E 100x).

S. no.	Age/Sex	Site (Size)	Nature of aspirate	Microscopic finding
1	34/F	Rt Breast (2×2cm)	2 mL purulent fluid	Inflammation with Microfilariae
2	55/M	Rt hand (2.5×2cm)	0.5 mL pus	Inflammation with Microfilariae
3	26/F	Rt arm (1×0.5cm)	Few drops clear fluid	Microfilariae in a fluid background
4	47/M	Left inguinal lymph node (2.5×2.5cm)	2 mL pus	Inflammation with Microfilariae
5	17/M	Scrotal swelling (3×2cm)	3.5 mL pus	Inflammation with Microfilariae
6	37/F	Diffuse Thyroid swelling	Blood mixed	Microfilariae in a haemorrhagic background
7	30/M	Left thigh (3×3 cm)	10 mL clear fluid	Hydatid cyst
8	22/F	Nape of neck (6×5 cm)	15 mL clear fluid	Hydatid cyst
9	25/F	Left calf (2.5×1.5cm)	Few drops of dirty fluid	Cysticercosis

[Table/Fig-10]: Summary of all cases.

DISCUSSION

In this study, the age of patients ranged from 17 to 55 years, with a notable concentration in the 30-50 years age group, a demographic trend consistent with findings by Yadav YK et al., [8]. Clinical presentation typically involved palpable nodules varying from 1 to 6 cm. The nature of the aspirate provided immediate diagnostic clues, as majority cases yielded purulent material, while few produced clear fluid, primarily in cystic lesions similar to study by Yadav YK et al., [8]. In contrast, another study by Jaiswal P et al., found clear fluid in majority of the aspirate [9]. Many parasitic infestations can present as superficial nodules. The parasites causing diseases such as filariasis, hydatid disease, and cysticercosis have been detected by FNAC according to several studies [8,10,11].

Filariasis emerged as the most prevalent parasite in this series, followed by hydatid disease and cysticercosis, similar to a study by Panicker N et al., [12]. In contrast to the present series, another study by Jaiswal P et al., and Goyal P et al., showed cysticercosis as the most common cause of parasitic infestation [9,11]. While filariasis is commonly diagnosed in lymph nodes [13]. The detection of microfilariae in breast lumps is relatively rare and is usually an incidental finding when investigating suspected fibroadenomas [14]. This involvement is likely due to lymphatic obstruction by adult worms, leading to localised inflammation and nodule formation. Detection of microfilariae from uncommon sites like soft-tissue, similar to our findings (arm, hand) have also been reported by other researchers [15].

Most of Indian studies have also reported the testicular-scrotal region as a common site for complications of Filariasis in India [16]. The lymphatic vessels of the spermatic cord appear to be common and perhaps the principal site of adult *Wuchereria bancrofti* in men

with asymptomatic microfilaremia. Present study also documented a rare incidental finding of microfilariae in the thyroid gland co-existing with lymphocytic thyroiditis, a phenomenon rarely reported in global literature [17].

Hydatid cysts (echinococcosis) were identified in unusual locations, specifically the nape of the neck and the thigh, similar to a study by Boumediene M et al., [18]. While FNAC is traditionally avoided in deep-seated organs due to the risk of anaphylactic rupture, it proved to be a safe and effective diagnostic tool for these superficial presentations, revealing characteristic laminated membranes and hooklets [5].

Similarly, cysticercosis, caused by the larval stage of *Taenia solium*, was identified in one case presenting as soft-tissue swellings in the extremity. Although some researchers like Jaiswal P et al., nodules report cysticercosis as the most common parasitic nodule [9]. Cytologically, these cases were characterised by the presence of the *Cysticercus cellulosae* wall and calcareous corpuscles [6].

Collectively, these findings underscore that FNAC is a minimally invasive, rapid, and cost-effective modality for the early recognition of parasitic lesions. By identifying specific cytomorphological features- such as the sheathed microfilariae of *Wuchereria bancrofti* or the acellular membranes of hydatid cysts- pathologists can provide a definitive diagnosis that guides appropriate medical management and prevents unnecessary surgical procedures. In endemic areas, a high index of clinical suspicion and careful cytological evaluation are essential to distinguish these parasitic clinical masqueraders from other inflammatory or neoplastic processes.

CONCLUSION(S)

The FNAC is a highly effective primary diagnostic tool for identifying parasitic lesions that masquerade as tumours. In endemic regions, a high-index of clinical suspicion and meticulous cytological screening are essential for early recognition. Accurate cytomorphological identification of parasites like *Wuchereria bancrofti, Cysticercus cellulosae*, and *Echinococcus granulosus* ensures prompt medical management and precludes unnecessary surgical intervention.

REFERENCES

[1] World Health Organization. Vector-borne diseases. Internet, https://www.who.int/news-room/fact-sheets/detail/vector-borne-diseases (2024, accessed 15 May 2026).
[2] World Health Organization. Soil- transmitted helminth infections. Geneva, https://www.who.int/news-room/fact-sheets/detail/soil-transmitted-helminth-infections (2023, accessed 15 May 2026).
[3] World Health Organization. Lymphatic Filariasis. Internet, https://www.who.int/health-topics/lymphatic-filariasis#tab=tab_1 (2024, accessed 14 April 2026).
[4] Park K. Park's Textbook of Preventive and Social Medicine. 28th ed. Jabalpur: Banarasidas Bhanot Publishers, 2025.
[5] Chatterjee KD. Parasitology (Protozoology and Helminthology). 13th ed. New Delhi: CBS Publishers & Distributors, 2009.
[6] Paniker CKJ. Paniker's Textbook of Medical Parasitology. 9th ed. New Delhi: Jaypee Brothers Medical Publishers, 2021.
[7] Chaurasia Z, Agarwal S, Gupta R, Singh C, Jani S. Spectrum of parasitic infections on fine-needle aspiration cytology presenting as superficial nodules: A retrospective study of 5 years in a tertiary care hospital. Asian J Med Sci. 2023;14:160-65.
[8] Yadav YK, Gupta O, Aggarwal R. Cytological diagnosis of parasites presenting as superficial nodular swelling: Report of 35 cases. Journal of Parasitic Diseases. 2012;36:106-11.
[9] Jaiswal P, Iqbal J, Khan NS, Tandon P, Sharma M, Agarwal M. Parasitic infections encountered by a cytopathologist: An institutional experience. Asian J Med Sci. 2022;13:129-33.
[10] Santosh T, Kothari K, Agnihotri M. Cytological diagnosis of cysticercosis: Role of FNAC with on-site evaluation. IDCases. 2018;15:e00477. Doi: 10.1016/j.idcr.2018.e00477. PMID: 30591907; PMCID: PMC6305697.
[11] Goyal P, Sehgal S, Ghosh S, Mittal D, Kumar A, Singh S. A cytological study of palpable superficial nodules of parasitic origin: A study of 41 cases. Patholog Res Int. 2014. Epub ahead of print 2014. Doi: 10.1155/2014/373472.
[12] Panicker NK, Buch AC, Vimal S, Dharwadkar AP. Cytological diagnosis of microfilariae in subcutaneous nodule. Medical Journal of Dr DY Patil University 2012;5:71-72.
[13] Varghese R, Raghuveer CV, Pai MR, Bansal R. Microfilariae in cytologic smears: a report of six cases. Acta Cytol. 1996;40:299-301.
[14] Kapila K, Verma K. Diagnosis of parasites in fine needle breast aspirates. Acta Cytol. 1996;40:653-56.
[15] Yenkeshwar PN, Kumbhalkar DT, Bobhate SK. Microfilariae in fine needle aspirates: A report of 22 cases. Indian J Pathol Microbiol. 2006;49:365-69.
[16] Khare P, Kala P, Jha A, Chauhan N, Chand P. Incidental diagnosis of filariasis in superficial location by FNAC: A retrospective study of 10 Years. J Clin Diagn Res. 2014;8:FC05-FC08.
[17] Gangopadhyay M, Biswas B, Chowdhury M, Deoghoria D. Microfilaria in thyroid aspirate-An unexpected finding. J Cytol. 2011;28:240-41.
[18] Boumediene M, Tbini M, Driss S, Bensalah M, Jrad M. Hydatid cyst in the parotid gland, a rare localization of the disease: A case report. Int J Surg Case Rep. 2023;107:108355. Epub ahead of print 1 June. Doi: 10.1016/j.ijscr.2023.108355.

PARTICULARS OF CONTRIBUTORS:
1. Assistant Professor, Department of Pathology, Government Medical College and Hospital, Sundargarh, Odisha, India.
2. Assistant Professor, Department of Pathology, Sri Jagannath Medical College, Puri, Odisha, India.
3. Assistant Professor, Department of Pathology, Maharaja Krishna Chandra Gajapati Medical College and Hospital, Berhampur, Ganjam, Odisha, India.
4. Assistant Professor, Department of Community Medicine, Government Medical College and Hospital, Sundargarh, Odisha, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Puspanjali Mishra,
Quarter-No. 201, Block-B, Government Medical College and Hospital,
Sundargarh-770020, Odisha, India.
E-mail: pushpanjalimishra1989@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Jan 13, 2026
- Manual Googling: Apr 20, 2026
- iThenticate Software: Apr 25, 2026 (1%)

ETYMOLOGY: Author Origin

EMENDATIONS: 7

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Jan 10, 2026**
Date of Peer Review: **Feb 16, 2026**
Date of Acceptance: **Apr 27, 2026**
Date of Publishing: **Jul 01, 2026**