



## Pelvic Nodular Histiocytic and Mesothelial Hyperplasia in a Patient with Endometriosis and Uterine Leiomyoma

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Nodular histiocytic and mesothelial hyperplasia (NHMH) is a rare and benign proliferative lesion composed of histiocytes with scattered mesothelial cells which was first reported in hernia sac by Rosai and Dehner in 1975.<sup>1</sup> They described NHMH as a “benign reactive condition simulating a neoplastic process.”<sup>1</sup> Since then, several cases have been reported in lung, pleura, inguinal region, urinary bladder, and pelvic cavity.<sup>2-9</sup> We report a case of incidentally detected NHMH, presenting as a pelvic nodule during laparoscopic surgery for uterine myoma and endometriosis.

### CASE REPORT

The patient was a 38-year-old woman complaining of abdominal discomfort and infertility without previous pregnancy history. A 8.3×5-cm-sized intramural type myoma was found on gynecologic sonography. There was no medical history of previous abdominal or pelvic surgery. During laparoscopic myomectomy, a left ovarian cyst (2.6×1.6 cm in size), a bladder peritoneal mass (1.6×1 cm in size), and a small nodule in cul-de-sac cavity were incidentally obtained. The pathologic diagnosis of left ovary cyst and bladder peritoneal mass was endometriosis. Gross examination of the mass in cul-de-sac cavity showed a grayish white and solid nodule, measuring 0.8×0.5 cm in size. Microscopically, two populations of cells were identified. The

majority of cells showed nodular clusters of round to polygonal cells with moderate amount of pale to pink granular cytoplasm and ovoid or grooved nuclei. The other cell type was low cuboidal cells of stripped arrangement, which were entrapped in nodular clusters (Fig. 1A, B). Immunohistochemically, the round to polygonal cells in nodular lesions showed positivity for the histiocytic marker (CD68) (Fig. 1C), whereas negative for neuroendocrine markers, such as CD56, synaptophysin, and chromogranin. The low cuboidal cells were immunoreactive for pancytokeratin and the mesothelial markers, such as WT-1 and calretinin (Fig. 1D). These histopathologic features are consistent with NHMH.

### DISCUSSION

NHMH is a benign lesion, which is characterized by non-neoplastic proliferation of histiocytes and mesothelial cells. This lesion is very rare and only 20 cases have been reported in the literature (Table 1). Although patients with these tumors range in age from 2 to 80 years, approximately 70% of the patients are over 40 years old with a mean age of 50.56. This lesion exhibits a slightly higher predilection for female in a ratio of 1.33 to 1. NHMHs are mostly incidental findings and occur at the serosal lining. The lung and pleura are the most frequently affected sites and account for 50% of the NHMH cases. The inguinal region, urinary bladder, and pelvis are less commonly affected sites.

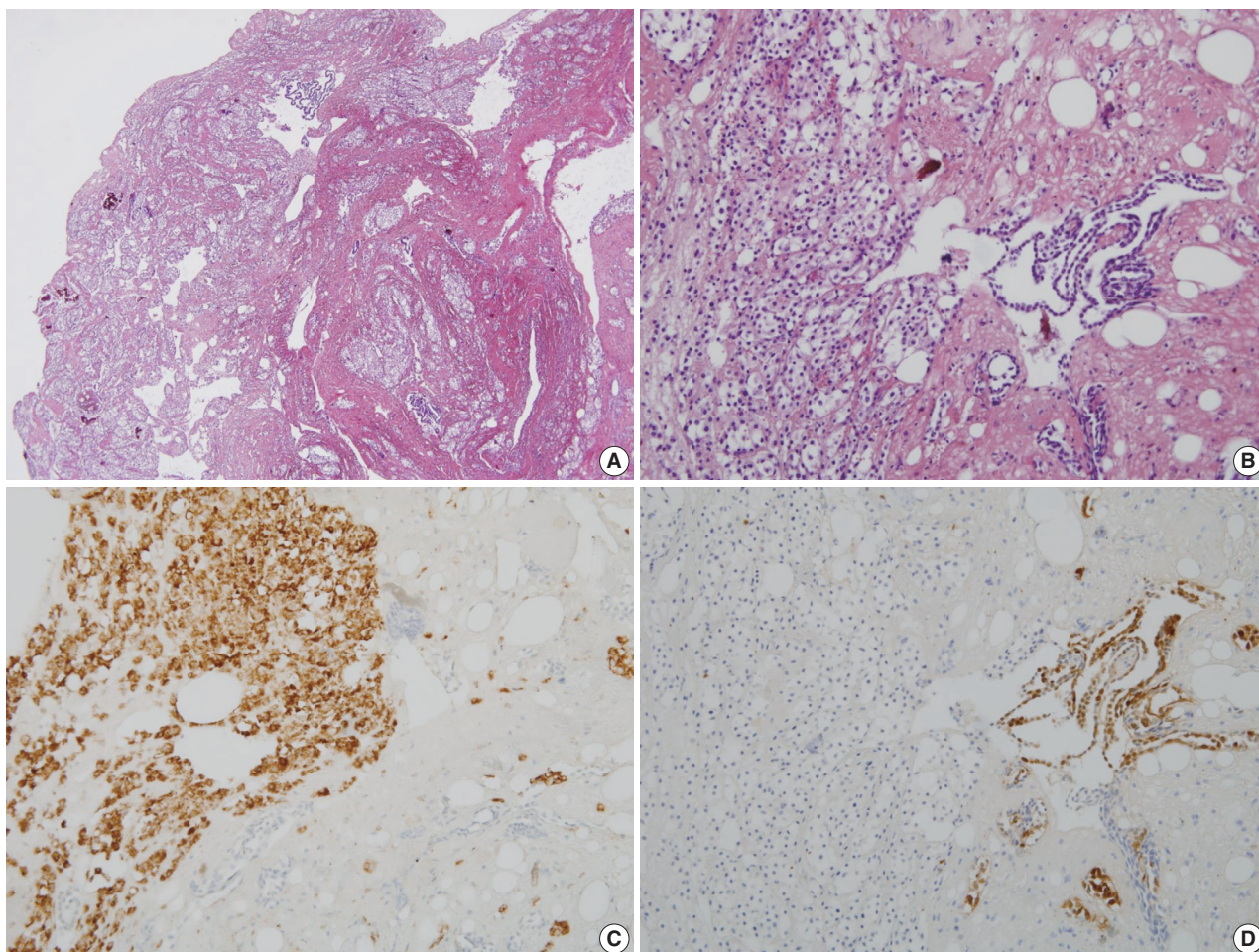
Pathologically, the diagnosis of NHMH is made by identifying nodular proliferation of both histiocytic and mesothelial components supported by immunohistochemistry. The histiocytes are arranged in solid sheets or nests with a mixture of fibrin materials, and they are immunoreactive against CD68. The me-

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**Fig. 1.** Pathologic findings. (A) Incidentally obtained pelvic nodule reveals a nodular histiocytic and mesothelial hyperplasia, which is a nodular proliferation of two different cell types, histiocytes and mesothelial cells. (B) High power view shows collection of larger histiocytes, which is admixed with fibrin materials, and strips of smaller mesothelial cells. (C) The histiocytes are immunoreactive for CD68. (D) The mesothelial cells are positive for calretinin.

sothelial component, which is arranged in a glandular- or strip-like structure, is positive for mesothelial markers such as calretinin and WT-1. The nuclear atypia is typically absent.

Mesothelial/monocytic incidental cardiac excrescence (MICE), a tumour-like lesion similar to NHMH, is also predominantly composed of histiocytes and scattered mesothelial cells.<sup>10</sup> It can occur incidentally in pericardium, heart chamber and valve, and it has often been found during cardiac valve replacement surgery. MICE are also considered as a reactive condition. Therefore, NHMH and MICE may belong to the same disease entity.

NHMH is considered a reactive lesion which results from irritation by inflammation, mechanical trauma, or adjacent tumors.<sup>2,6</sup> It has been postulated that the nodular aggregation of these reactive cells is mediated by adhesion molecules, such as CD34.<sup>5</sup> Although our case did not have mechanical irritation such as previous surgery or procedure, the patient had a large in-

tramural leiomyoma and endometriosis as accompanying diseases, supporting the above mentioned pathogenesis.

Although benign-looking cytological findings support that the NHMH represents benign reactive proliferation of histiocytes and mesothelial cells, the lesion can be confused with other mesothelial lesions and neoplasms such as low-grade neuroendocrine tumors, mesothelioma, granulosa cell tumor, Langerhans cell histiocytosis, metastatic carcinoma, seminoma and malignant lymphoma. Therefore, immunohistochemical studies as well as histologic examination with proper clinical history provide clues to obtain an accurate diagnosis. In the present case, the solid pattern of histiocytic proliferation with a delicate capillary network (Fig. 1B) was morphologically similar to the histologic finding of a metastatic renal cell carcinoma and paraganglioma, which were excluded by immunohistochemistry.

In conclusion, it is important that pathologists should be aware

**Table 1.** Clinical features and pathologic differential diagnosis based on previously reported and present cases

No.	Age (yr)/ Sex	Site	Underlying condition	Differential diagnosis	Reference
1	57/M	Lung (LLL)	Old TBC lesions	Neuroendocrine neoplasm	Chan <i>et al.</i> <sup>2</sup>
2	51/F	Lung (RLL)	Weil-Felix agglutination test (+), possible rickettsial pneumonia	Neuroendocrine neoplasm, ectopic meningioma	Chan <i>et al.</i> <sup>2</sup>
3	23/F	Pleura	Metastatic sarcoma to lung	Metastatic sarcoma	Ordóñez <i>et al.</i> <sup>3</sup>
4	78/F	Pleura	Unknown	Metastatic adenocarcinoma, epithelioid hemangioendothelioma	Ordóñez <i>et al.</i> <sup>3</sup>
5	80/F	Pleura	Unknown	Malignant mesothelioma, metastatic carcinoma, ectopic meningioma, paraganglioma	Choi and Song <sup>4</sup>
6	Elderly/ M	Pleura	Carcinoma in the lung	Primary or metastatic carcinoma, carcinoid tumor, mesothelioma, histiocytosis X	Chikkamuniyappa <i>et al.</i> <sup>6</sup>
7	53/F	Pleura	Multiple bilateral lung nodules	Primary or metastatic carcinoma, carcinoid tumor, mesothelioma, histiocytosis X	Chikkamuniyappa <i>et al.</i> <sup>6</sup>
8	79/M	Lung	Past history of ischemic cardiac disease	Malignancy	Rossi <i>et al.</i> <sup>8</sup>
9	76/F	Lung (RLL)	Bilateral pneumonia (history of chronic lymphocytic leukemia)	Non-small cell carcinoma, neuroendocrine tumors, ectopic meningioma	Bejarano <i>et al.</i> <sup>7</sup>
10	40/F	Lung (LUL)	Consolidation (lung), scleroderma	Non-small cell carcinoma, neuroendocrine tumors, ectopic meningioma	Bejarano <i>et al.</i> <sup>7</sup>
11	44/F	Lung (RLL)	History of pancreatic carcinoma, history of chemopneumonitis	Non-small cell carcinoma, neuroendocrine tumors, ectopic meningioma	Bejarano <i>et al.</i> <sup>7</sup>
12	78/F	Lung (LUL)	Lung mass	Non-small cell carcinoma, neuroendocrine tumors, ectopic meningioma	Bejarano <i>et al.</i> <sup>7</sup>
13	46/M	Lung (LLL)	Bilateral infiltrates (lung) (s/p heart transplant)	Non-small cell carcinoma, neuroendocrine tumors, ectopic meningioma	Bejarano <i>et al.</i> <sup>7</sup>
14	62/M	Lung (LLL)	Bilateral infiltrates (lung) (s/p heart transplant)	Non-small cell carcinoma, neuroendocrine tumors, ectopic meningioma	Bejarano <i>et al.</i> <sup>7</sup>
15	2/M	Inguinal	Strangulated hernia	-	Chan <i>et al.</i> <sup>2</sup>
16	71/M	Inguinal	Relapsed inguinal hernia	-	Suarez-Vilela and Izquierdo-García <sup>5</sup>
17	5/M	Inguinal	-	Neuroendocrine tumors, Langerhans cell histiocytosis, seminoma, mesothelioma	Cai <i>et al.</i> <sup>9</sup>
18	36/F	Pelvis	Infertility	Well-differentiated adenocarcinoma, leukemia/lymphoma	Chikkamuniyappa <i>et al.</i> <sup>6</sup>
19	37/F	Pelvis	Endometriosis	Well-differentiated adenocarcinoma, leukemia/lymphoma	Chikkamuniyappa <i>et al.</i> <sup>6</sup>
20	74/M	Bladder	Noninvasive papillary transitional cell carcinoma	Invasive transitional cell carcinoma into the lamina propria	Ordóñez <i>et al.</i> <sup>3</sup>
Present case	38/F	Pelvis	Uterine leiomyoma endometriosis	Metastatic renal cell carcinoma, paraganglioma	

M, male; LLL, left lower lobe; TBC, tuberculosis; RLL, right lower lobe; LUL, left upper lobe.

of this entity and correlate clinically, histologically, and immunohistochemically to make a correct diagnosis.

### Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

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