

## Leukaemia Section

### Short Communication

# Interdigitating Dendritic Cell Sarcoma

Diego Conde Royo, Luis Miguel Juárez-Salcedo, Samir Dalia

Principe de Asturias University Hospital, Madrid, [diegoconderoyo@gmail.com](mailto:diegoconderoyo@gmail.com) (DCR), Guadalajara University Hospital, Guadalajara, Spain (LMJS), Oncology and Hematology, Mercy Clinic Joplin, Joplin, MO, USA (SD).

Published in Atlas Database: December 2018

Online updated version : <http://AtlasGeneticsOncology.org/Anomalies/InterdigitDendritCellSarclD1727.html>

Printable original version : <http://documents.irevues.inist.fr/bitstream/handle/2042/70582/12-2018-InterdigitDendritCellSarclD1727.pdf>  
DOI: 10.4267/2042/70582

This work is licensed under a Creative Commons Attribution-Noncommercial-No Derivative Works 2.0 France Licence.  
© 2019 Atlas of Genetics and Cytogenetics in Oncology and Haematology

## Abstract

Interdigitating Dendritic Cell Sarcoma (IDCS) is a very uncommon neoplasm embedded in the group of histiocytic and dendritic cell neoplasms. IDCS is a diagnosis of exclusion, being mandatory the preclusion of follicular dendritic cell sarcoma, histiocytic sarcoma, melanoma, and metastases, among another neoplasm. The clinical course is aggressive. BRAF V600E has been reported in IDCS.

### Keywords

Interdigitating Dendritic Cell Sarcoma; histiocytic and dendritic cell neoplasms; BRAF

## Clinics and pathology

### Disease

Interdigitating Dendritic Cell Sarcoma (IDCS) is a very uncommon neoplasm embedded in the group of histiocytic and dendritic cell neoplasms. Only about 100 cases have been reported in the literature (Saygin C et al., 2013). IDCS is derived from normal interdigitating dendritic cells (IDCs), whose role consists to present antigens to T cells and regulate cellular immune response (Saygin C et al., 2013; Lupato V 2016). An association between IDCSs and solid tumors or others hematologic malignancies (usually B-cell neoplasms) has been reported (Saygin C et al., 2013; Pokuri VK et al., 2015). Neoplastic cells typically express, intensively and diffusely, the S100 protein (Fachetti et al., 2017). This neoplasm arises mainly involving lymph nodes

(as isolated mass); whereas extranodal sites, like liver, skin, lung or gastrointestinal tract are less common (Lupato V et al., 2016).

The clinical course is aggressive; some series described a median survival of 9 months in disseminated cases (Saygin C et al., 2013).

There is no standardized treatment. Surgical resection, chemotherapy and/or radiotherapy are therapeutic options and the choice of one over the other depends on whether the disease is located or disseminated (Saygin C et al., 2013; Dalia S et al., 2014).

**PATHOGENESIS** The etiopathogenesis of IDCS remains unclear. Hematopoietic stem cells from bone marrow are the origin of IDCs, which are localized in T-zones of lymphoid organs. In addition migration of Langerhans cells to lymph nodes constitutes another etiology of IDCs (Wu L et al., 2007). An infectious origin of IDCS (Epstein-Barr virus or human herpesvirus), like others dendritic cells (DCs) neoplasms, has been dismissed (Saygin C et al., 2013; Pokuri VK et al., 2015).

Several studies mentioned the relationship between IDCS and a variety of malignant neoplasms (hematologic or not).

In fact, it has been demonstrated the same clone origin of IDCS and low-grade B lymphomas, due probably to a transdifferentiation mechanism (where B cells changes phenotypically but remains its genotypic features); showing identical clonal immunoglobulin heavy chain (IGH) gene rearrangements (Fraser CR et al., 2009; Saygin C et al., 2013)

## Epidemiology

IDCS is an extremely rare malignancy. Saygin C et al reviewed 100 of IDCs cases, reporting a slightly male predominance, with the median age of diagnosis in 56 years. Regarding geographic distribution, Asian and the USA represents the majority of IDCS cases, being 40% and 32% respectively (Saygin C et al., 2013).

## Clinics

In general, clinical presentation consists of a painful cervical or axillary mass; therefore isolated nodal involvement is the most frequent location of IDCS (47%) (Xue T et al., 2018; Saygin C et al., 2013). However, nodal and extranodal region or solitary extranodal site, have also been reported in 28% and 25% of all cases respectively (Saygin C et al., 2013). Among extranodal lesions, 26% of them affect the liver, being the extranodal IDCS most common (Xue T et al., 2018); however lung, spleen, bone marrow and digestive system could also be affected (Pokuri VK et al., 2015). Systemic symptoms like fatigue, fever or weight are less common than others DCs neoplasms; even so they have been described in IDCS with nodal and extranodal disease (Saygin C et al., 2013). It has been reported that 13% of local recurrence and 39% of distant metastases 6 and 9 months after initial salvage treatment, respectively. Lymph nodes (29%), liver (11%), lung (11%) and bone marrow (8%), represent usual sites affected by metastases (Saygin C et al., 2013).

## Pathology

Neoplastic cells are since ovoid to a spindle, also shows abundant eosinophilic cytoplasm where we could found an important amount of endoplasmic reticula and mitochondria (Skala SL et al., 2018; Xue T et al., 2018). Frequently, cell borders are indistinct. The nuclei morphology is not uniform, and usually presents large-sized nucleoli (Xue T et al., 2018). Different growth patterns have been described, as sheets, nests, whorls or fascicles (Skala SL et al., 2018). Less typical of sarcomas or carcinomas (except those with lymphoepithelial origin) is the presence of sheets of small lymphocytes among all the dendritic cells; being a histologic key of IDCS (Dalia S et al., 2014).

**IMMUNOPHENOTYPE** Immunohistochemical studies are an important diagnostic tool since differential diagnosis represents one of the main issues of IDCS's management. However, there is no specific marker for IDCS (Xue T et al., 2018). IDCS cells characteristically express S100, vimentin, and CD68 (variable); whereas they are consistently negative for Langerhans cell histiocytic and follicular dendritic cell markers (CD1a, langerin, CD21, CD23, and CD35) (Lupato V et al., 2016). Ki-67 proliferative index usually ranges between 0-

70%, with a median value of 10% (Saygin C et al., 2013).

**DIAGNOSIS** IDCS is a diagnosis of exclusion, being mandatory the preclusion of follicular dendritic cell sarcoma, histiocytic sarcoma, melanoma, and metastases, among another neoplasm (Facchetti F et al., 2017). Diagnosis requires several diagnostic tools, since clinic suspicious, immunophenotypic markers, histological features to imaging techniques. It is important to emphasize that initially 11% of IDCS are misdiagnosed as other malignancy (Saygin C et al., 2013). In terms of staging, computed tomography and bone marrow biopsy are usually performed (Pokuri VK et al., 2015). Diagnostic features defining of IDCS are: expression of S100 and vimentin, a cell with dendritic processes and solitary cervical/axillary mass (Skala SL et al., 2018).

## Cytogenetics

Nowadays it remains one of the areas around IDCS where further knowledge needs to be achieved. Thus there is no molecular finding specific of IDCS. IGH gene rearrangements have been reported in some IDCS cases similar to other histiocytic/dendritic cell neoplasms (Fraser CR et al., 2009).

## Genes

BRAF V600E has also been reported in IDCS (O'Malley DP et al., 2015). Certainly, new techniques, such as next-generation sequencing (NGS), should be implemented to reach molecular advances.

## Treatment

There is no consensus on treatment strategy. The vast majority of patients are treated by surgery with or without chemotherapy and/or radiotherapy (Xue T et al., 2018). Chemotherapy regimens usually used are ABVD (doxorubicin, bleomycin, vinblastine, dacarbazine), CHOP (cyclophosphamide, doxorubicin, vincristine, prednisone), ICE (ifosfamide, cisplatin, etoposide) or DHAP (dexamethasone, cisplatin, high dose of cytarabine) (Pokuri VK et al., 2015). Surgical resection and/or radiotherapy are the preferred option in localized IDCS; whereas chemotherapy is preferred in disseminated IDCS (Dalia S et al., 2014).

Significantly better overall survival (OS) is seen in localized versus distant disease (Saygin C et al., 2013; Perkins SM et al., 2013). In those limited disease cases, the therapeutic choice between surgery or non-surgery modalities continues to be debated. One study showed a statistically significant difference in OS with surgery (Perkins SM et al., 2013) that could not be confirmed (Saygin C et al., 2013).

In disseminated cases chemotherapy is often used, indeed completes remissions in patients with IDCS have been reported with ABVD schemes (Helbig G

et al., 2015; Kyogoku C et al., 2015). Some authors recommend surgery with adjuvant chemotherapy, but further studies is needed to make stronger recommendations.

### Prognosis

Prognostic factors associated with adverse outcomes (relapse and death) in IDCS are young age, intra-abdominal disease and the combination of nodal and extranodal involvement (Saygin C et al., 2013). It has been proposed that the greater activity of antigen presentation in young people could explain their worse prognostic (Saygin C et al., 2013). The median survival in the group of patients with this diagnostic is of 9 months in metastatic disease local disease cases. In local disease, the survival rate after 2 years of follow-up was 68% (Saygin C et al., 2013).

## References

- Dalia S, Jaglal M, Chervenick P, Cualing H, Sokol L. Clinicopathologic characteristics and outcomes of histiocytic and dendritic cell neoplasms: the moffitt cancer center experience over the last twenty five years. *Cancers (Basel)*. 2014 Nov 14;6(4):2275-95
- Facchetti F, Pileri SA, Lorenzi L, Tabanelli V, Rimsza L, Pittaluga S, Dirnhofer S, Copie-Bergman C, de Leval L, Rosenwald A, Wotherspoon A, Fend F. Histiocytic and dendritic cell neoplasms: what have we learnt by studying 67 cases. *Virchows Arch*. 2017 Oct;471(4):467-489
- Fraser CR, Wang W, Gomez M, Zhang T, Mathew S, Furman RR, Knowles DM, Orazi A, Tam W. Transformation of chronic lymphocytic leukemia/small lymphocytic lymphoma to interdigitating dendritic cell sarcoma: evidence for transdifferentiation of the lymphoma clone. *Am J Clin Pathol*. 2009 Dec;132(6):928-39
- Helbig G, Wichary R, Pająk J, Budny M, Makowska M, Machura K, Kubeczko M, Kyrz-Krzemień S. Sustained remission after ABVD treatment for interdigitating dendritic cell sarcoma. *Contemp Oncol (Pozn)*. 2015;19(1):83-5
- Kyogoku C, Seki M, Ogawa S, Miyamoto K, Ito Y, Kurita N, Yokoyama Y, Sakata-Yanagimoto M, Obara N, Hasegawa Y, Fujishima F, Ichinohasama R, Nakamura S, Chiba S. Complete Remission in Systemic Skin Interdigitating Dendritic Cell Sarcoma after ABVD Chemotherapy. *J Clin Exp Hematop*. 2015;55(1):33-7
- Lupato V, Romeo S, Franchi A, Mantovani M, Dei Tos AP, Tirelli G, Da Mosto MC, Boscolo-Rizzo P. Head and Neck Extranodal Interdigitating Dendritic Cell Sarcoma: Case Report and Review of the Literature. *Head Neck Pathol*. 2016 Jun;10(2):145-51
- O'Malley DP, Agrawal R, Grimm KE, Hummel J, Glazyrin A, Dim DC, Madhusudhana S, Weiss LM. Evidence of BRAF V600E in indeterminate cell tumor and interdigitating dendritic cell sarcoma. *Ann Diagn Pathol*. 2015 Jun;19(3):113-6
- Perkins SM, Shinohara ET. Interdigitating and follicular dendritic cell sarcomas: a SEER analysis. *Am J Clin Oncol*. 2013 Aug;36(4):395-8
- Pokuri VK, Merzianu M, Gandhi S, Baqai J, Loree TR, Bhat S. Interdigitating dendritic cell sarcoma. *J Natl Compr Canc Netw*. 2015 Feb;13(2):128-32
- Saygin C, Uzunaslán D, Ozguroglu M, Senocak M, Tuzuner N. Dendritic cell sarcoma: a pooled analysis including 462 cases with presentation of our case series *Crit Rev Oncol Hematol* 2013 Nov;88(2):253-71
- Skala SL, Lucas DR, Dewar R. Histiocytic Sarcoma: Review, Discussion of Transformation From B-Cell Lymphoma, and Differential Diagnosis *Arch Pathol Lab Med* 2018 Nov;142(11):1322-1329
- Wu L, Liu YJ. Development of dendritic-cell lineages *Immunity* 2007 Jun;26(6):741-50
- Xue T, Jiang XN, Wang WG, Zhou XY, Li XQ. Interdigitating dendritic cell sarcoma: Clinicopathologic study of 8 cases with review of the literature *Ann Diagn Pathol* 2018 Jun;34:155-160

---

*This article should be referenced as such:*

Conde Royo D, Juárez-Salcedo LM, Dalia S. Interdigitating Dendritic Cell Sarcoma. *Atlas Genet Cytogenet Oncol Haematol*. 2019; 23(10):317-319.

---