

Taxonomy of Diabetic Lumbosacral Radiculoplexus Neuropathy and Diabetic Radiculoplexus Neuropathy

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CONCEPPT/IDNC Taxonomy

Washington D.C.

(author has nothing to disclose)

Radiculoplexus Neuropathies

- Conditions involving roots, plexus and peripheral nerves:
 - Cervical (CRPN)
 - Thoracic (TRN)
 - Lumbosacral (LRPN)
- These conditions can involve people with diabetes mellitus (DM) (DRPN) or without DM (RPN).

Diabetic Lumbosacral Radiculoplexus Neuropathy (DLRPN)

Synonyms for DLRPN

- Neuritic paralysis, Bruns, 1890
- Paralytic neuropathy, Leyden, 1893
- Diabetic myelopathy, Garland, et al., 1953
- Diabetic amyotrophy, Garland, 1955
- Diabetic femoral - sciatic neuropathy, Skanse, et al., 1956
- Diabetic femoral neuropathy, Calverley, et al., 1960
- Diabetic mononeuropathy multiplex, Raff, et al., 1968

Synonyms for DLRPN (continued)

- Proximal diabetic neuropathy, Williams, et al., 1976 and Asbury, 1977.
- Bruns-Garland syndrome, Chokroverty, et al., 1977 and Barohn et al., 1991.
- Diabetic polyradiculopathy, Bastron and Thomas, 1981.
- Painful lumbosacral plexopathy, Bradley, et al., 1984.
- Diabetic chronic inflammatory demyelinating polyradiculoneuropathy, Krendel, et al., 1995.
- Diabetic lumbosacral radiculoplexus neuropathy, Dyck, et al., 1998.
- Multifocal diabetic neuropathy, Said, et al., 2003.

DLRPN Historical Perspective

Clinical Features

- Pain followed by weakness
- Complete recovery within a year
- Purely a motor syndrome
- Purely a proximal syndrome
- Accompanied weight loss
- Affecting only patients with type 2 DM

Overview of DLRPN

1. Core diagnostic features:

- Summary of literature limitations and controversies of existing criteria
- Discuss rationale for new CONCEPT/IDNC criteria
- Differential diagnosis
- Core diagnostic criteria

2. Common features

- Description of DLRPN
- Epidemiology of DLRPN
- Life span

3. Medical co-morbidity

4. Neurobiological factors and risk factors

5. Functional consequences

- Associated complications

Diagnostic Criteria for DLRPN

- No agreed upon standard diagnostic criteria exists.
- Every study of DLRPN either developed their own diagnostic criteria or did not have any criteria listed.

Diagnostic Criteria for DLRPN

- Garland, H.; Proceedings of Royal Society of Medicine, 1959.
- No inclusion criteria listed.
 - Diabetes mellitus is short-lived
 - Pure motor syndrome (pain is usual)
 - Asymmetrical symptoms and signs
 - Legs affected first (arms rarely involved)
 - Reduced reflexes but extensor plantar response in half

Diagnostic Criteria for DLRPN

- Garland, H.; British Journal of Clinical Medicine, 1961.
- No inclusion criteria listed.
 - Diabetes mellitus
 - Progressive weakness and wasting of lower limb muscles (pelvifemoral distribution)
 - Involvement more above the knee than below
 - Arflexia
 - Extensor plantar responses

Diagnostic Criteria for DLRPN

“Mononeuropathy Multiplex in Diabetes Mellitus”

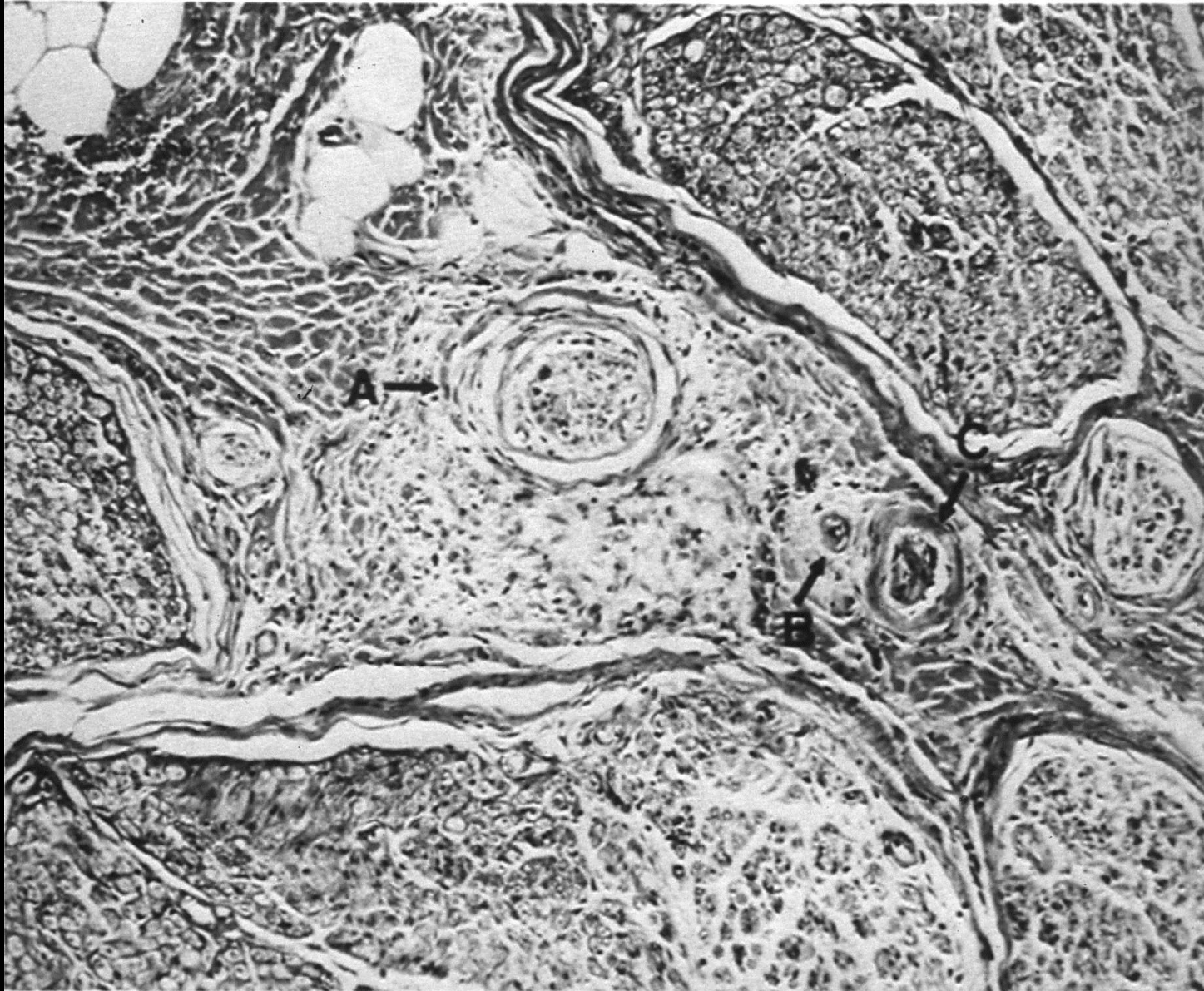
- Raff, M. and Asbury, A.; NEJM, 1968.
 - Inclusion criteria was rapid, asymmetrical, motor greater than sensory neuropathy in diabetic patients
 - Included cranial-nerve palsies and mononeuropathies
 - Recovery was the rule

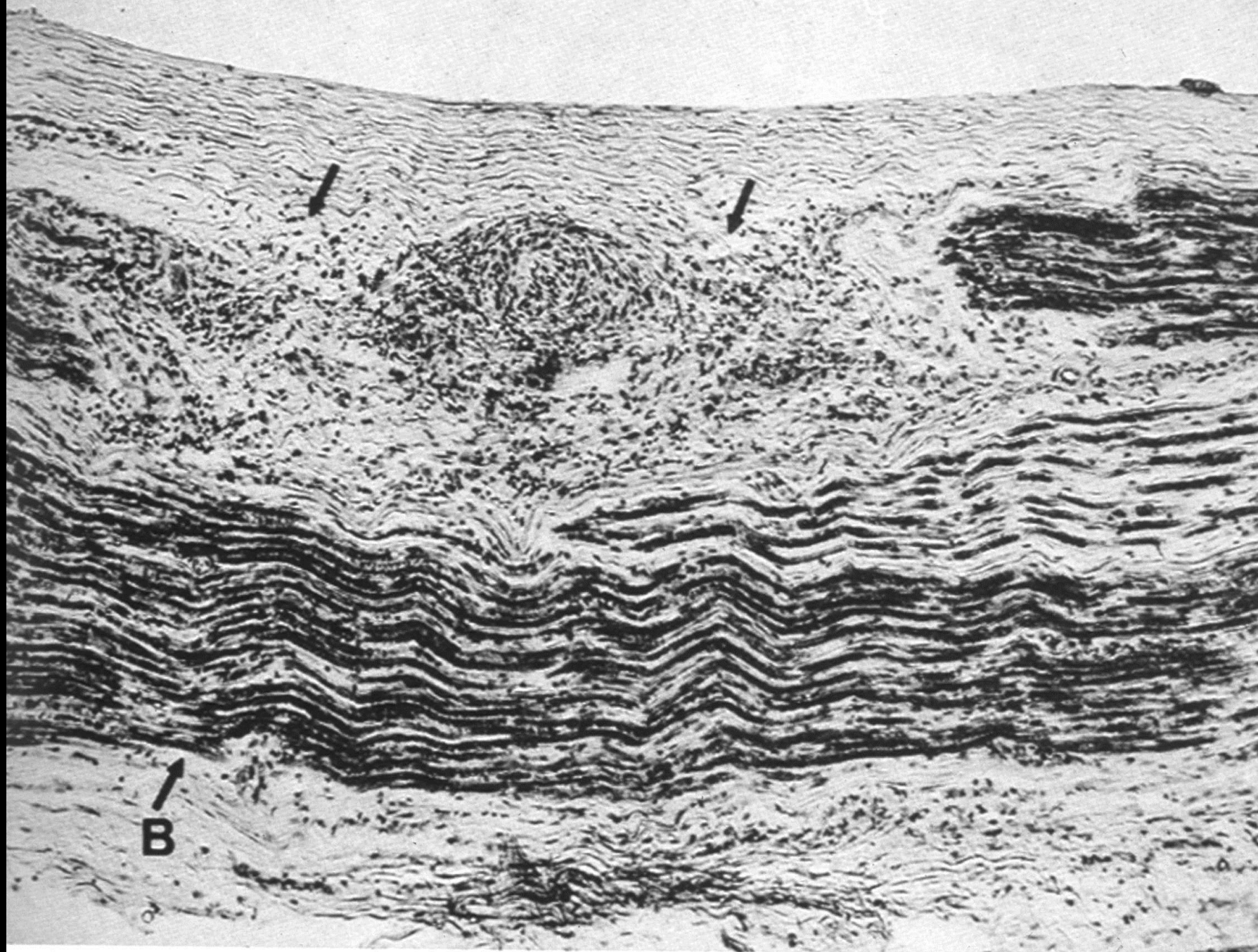
Pathophysiology of DLRPN

“Diabetic Mononeuropathy Multiplex”

- Raff et al.; Arch Neurol, 1968
 - “Infarcts” in nerve implicating ischemia
 - Multifocal fiber loss
 - An occluded artery
 - Perivascular inflammation judged to be reactive

Cross-section of recent infarct in left obturator nerve involving interfascicular bundle (A) and its surrounding perineurium and epineurium. Vessel (B) supplying the infarcted area arises from the occluded artery (C) (H & E, $\times 140$).





Raff et. al, 1968

Pathophysiology of DLRPN “Bruns – Garland Syndrome”

- Chokroverty et al; Ann Neurol, 1977
- No inclusion criteria.
 - 12 patients with “pelvifemoral” weakness and wasting with normal sensory examination
 - Insidious onset, unilateral or bilateral and slowly progressive
 - Metabolic derangement not microangiopathy
 - Different than ischemic diabetic mononeuropathy multiplex

Pathophysiology of DLRPN

“Proximal Diabetic Neuropathy”

- Asbury A.K.; Ann Neurol, 1977
 - Proximal diabetic neuropathy not a well-defined syndrome
 - Two poles of a continuum
 - Asymmetrical weakness, rapid evolution (ischemic basis)
 - Symmetrical weakness, slow progression (metabolic factors)

Diagnostic Criteria for DLRPN “Diabetic Polyradiculopathy”

- Bastron and Thomas; Mayo Clinic Proceedings, 1981.
- Inclusion criteria:
 - Presence of diabetes mellitus
 - A polyradiculopathy involving chest wall, abdomen, back, buttock, thigh and leg or foot
 - EMG and neurological exam in keeping with polyradiculopathy

Pathophysiology of DLRPN “Diabetic Polyradiculopathy”

- Bastron and Thomas; Mayo Clinic Proceedings, 1981
 - Diabetic polyradiculopathy is distinct from diabetic sensorimotor polyneuropathy
 - 105 cases involving the foot, leg, thigh, buttock, back, and abdomen or chest wall
 - Symptoms begin focally and become more widespread
 - Lumbar and thoracic denervation are common
 - Not just a lower limb “pelvifemoral” syndrome

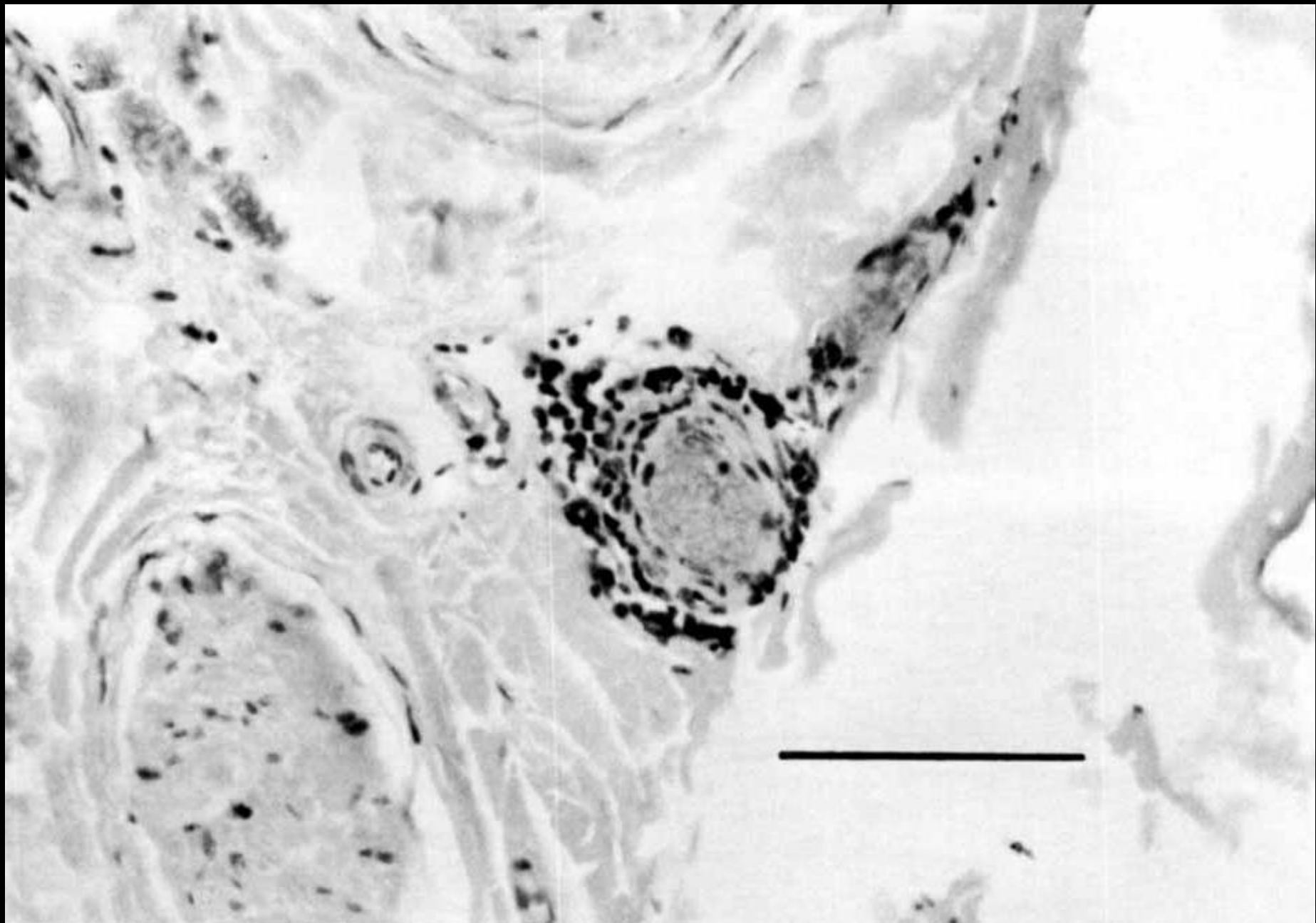
Diagnostic Criteria for DLRPN

- Subramony and Wilbourn; Journal of Neurological Sciences, 1982.
- Inclusion criteria:
 - Diabetes mellitus
 - Proximal lower limb weakness
 - A neurologist diagnosis of diabetic amyotrophy (DLRPN)
 - Exclusion of other causes of neuropathy

Pathophysiology of DLRPN

“Painful Lumbosacral Plexopathy”

- Bradley et al; Ann Neurol, 1984
 - Included painful lumbosacral plexopathy and elevated ESR
- Pathology
 - 6 biopsied cases - 3 with DM and 3 without DM
 - Cuffs of perivascular inflammatory cells
 - Multifocal fiber loss (ischemic injury)
 - Concluded that it may be an inflammatory/ischemic condition
 - Made a distinction between cases with high ESR and those without



Bradley et al, 1984



Bradley et al, 1984

Diagnostic Criteria for DLRPN “Bruns – Garland Syndrome”

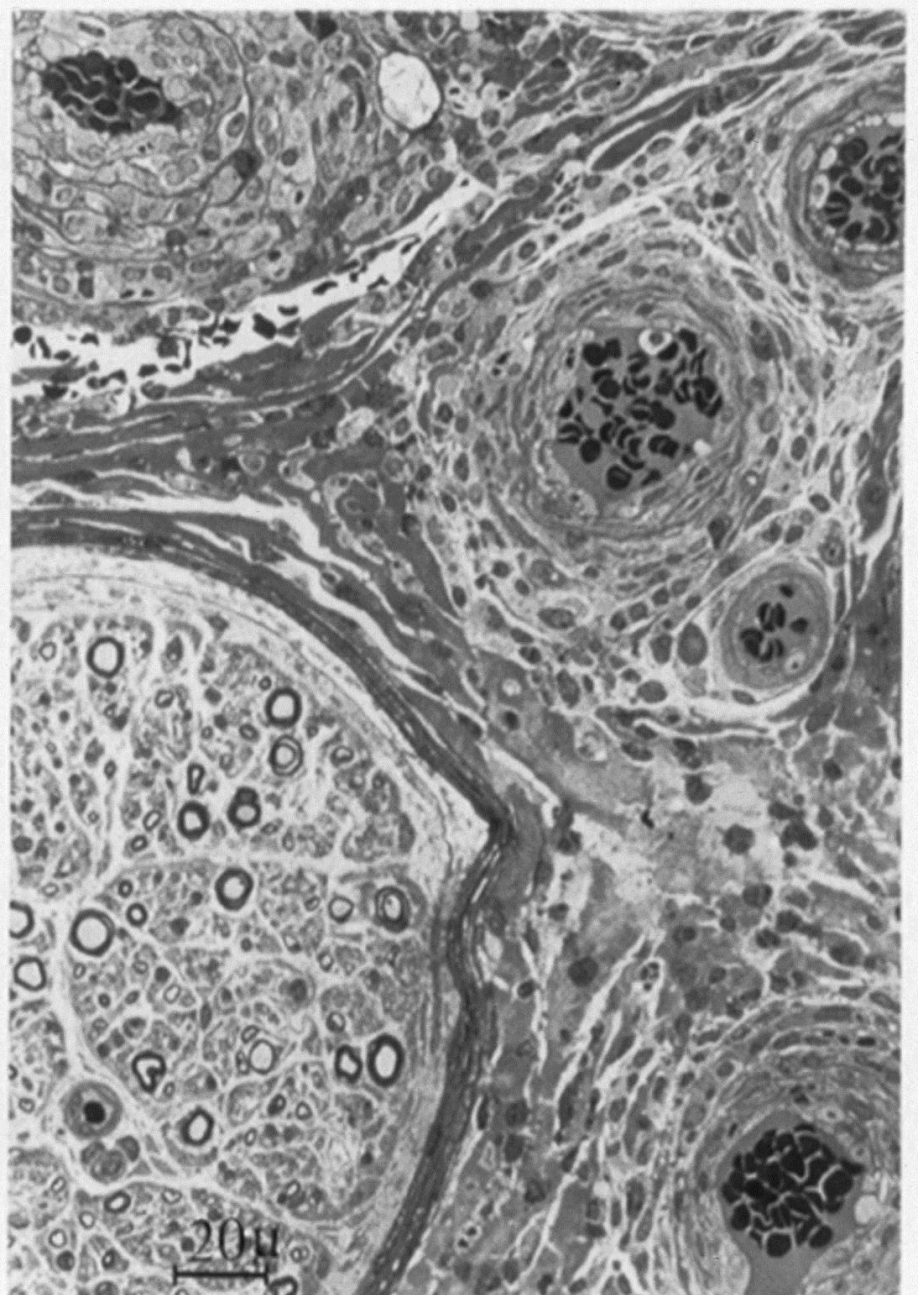
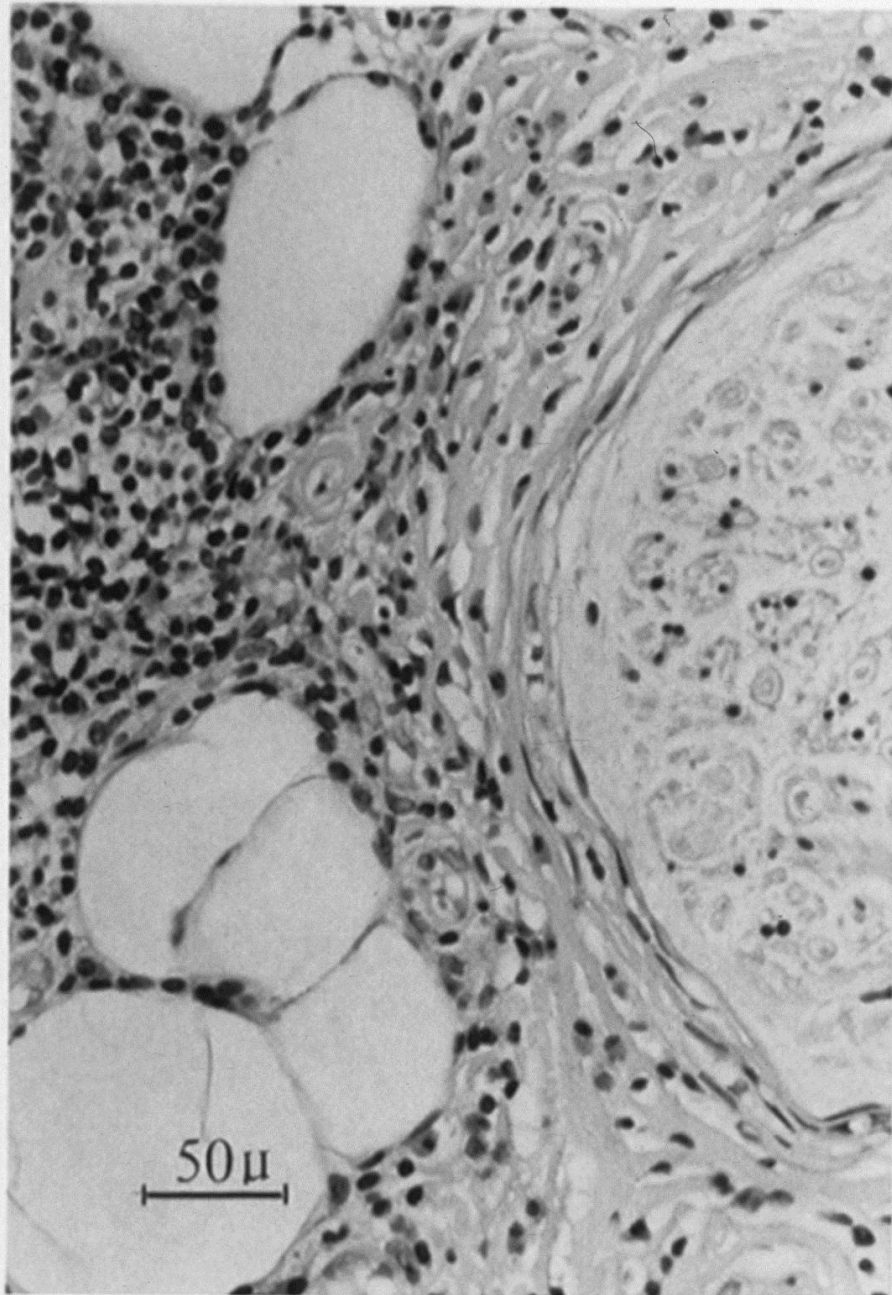
- Barohn, R.; Sahenk, Z.; Mendell, J.; Arch Neurol 1991.
- Inclusion criteria:
 - Diabetes mellitus
 - Abrupt onset of hip, back or leg pain, unilaterally or bilaterally
 - Lower limb weakness proximally or proximally and distally; unilaterally or bilaterally
 - EMG showing neurogenic not myopathic abnormality
 - Imaging excluded structural cause

Diagnostic Criteria for DLRPN “Proximal Diabetic Neuropathy”

- Said et al; Ann Neurol, 1994 and 1997.
- Inclusion criteria:
 - Diabetes mellitus
 - Painful proximal neuropathy of lower limbs
 - Other causes excluded through imaging

Pathophysiology of DLRPN “Proximal Diabetic Neuropathy”

- Said et al; 1994
 - 10 patients with proximal diabetic neuropathy and nerve biopsy of the intermediate cutaneous nerve of the thigh
- Two forms
 - In severe cases (n=2), ischemic injury and vasculitis
 - In mild cases (n=8), metabolic factors (demyelination)



Said et al., 1997

Diagnostic Criteria for DLRPN

- Pascoe, M.; Low, P.; Windebank, A.; Litchy, W.; Mayo Clinic Proceedings, 1997.
- Inclusion criteria:
 - Diabetes mellitus
 - Bilateral lower limb weakness coming on within 2 months of unilateral weakness
 - Progressive course
 - Reduced lower limb reflexes
 - Other causes (including structural) excluded

Diagnostic Criteria for DLRPN

- Llewelyn, G.; Thomas, P.K.; King, R.; Journal of Neurology, 1998.
- Inclusion criteria:
 - Diabetes mellitus
 - Motor neuropathy
 - Pain, weakness, muscle wasting of lower limbs
 - Usually a subacute onset with an asymmetrical pattern
 - Other causes of neuropathy are excluded by CSF studies and spine imaging

Diagnostic Criteria for DLRPN

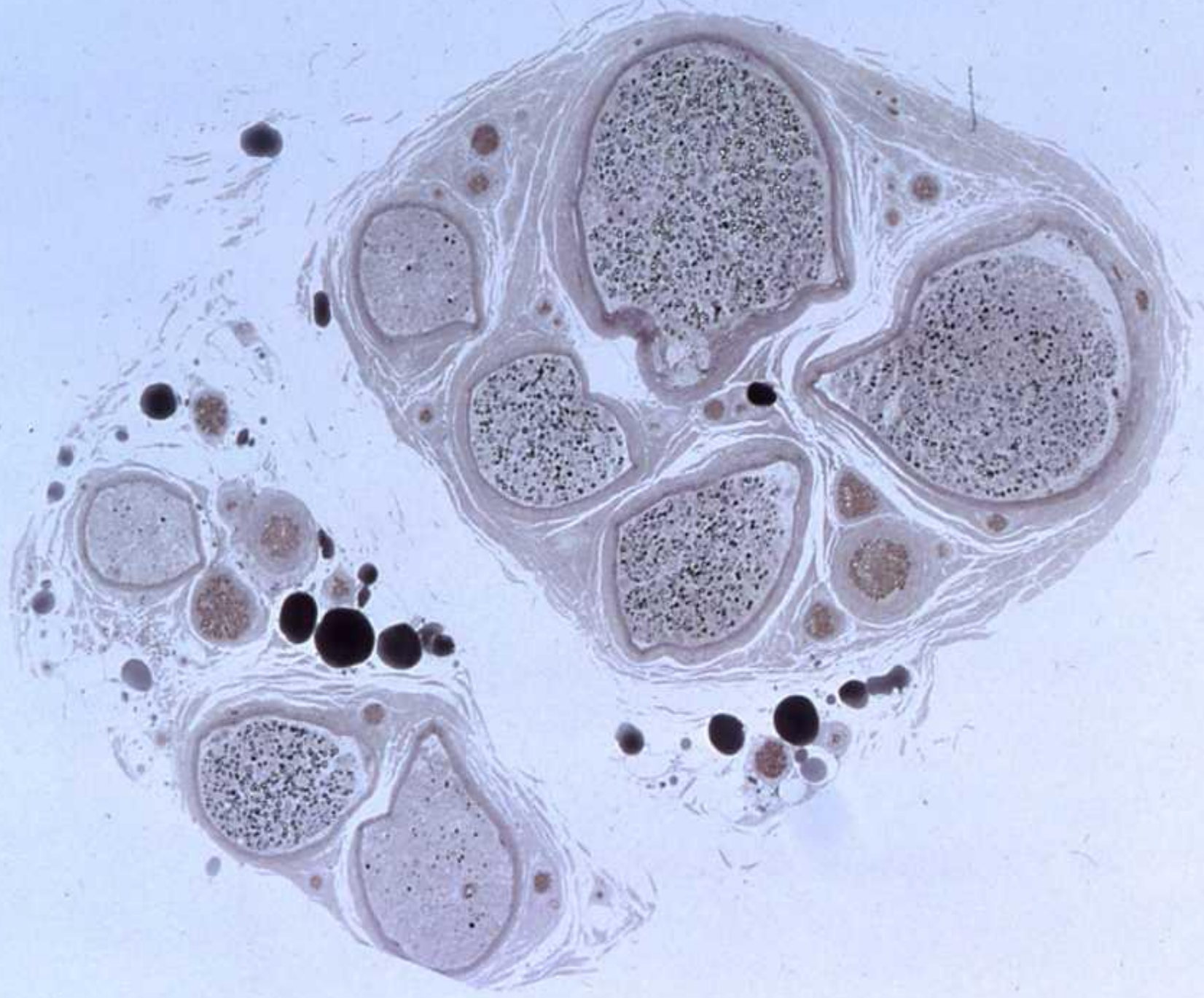
“Diabetic Lumbosacral Radiculoplexus Neuropathy”

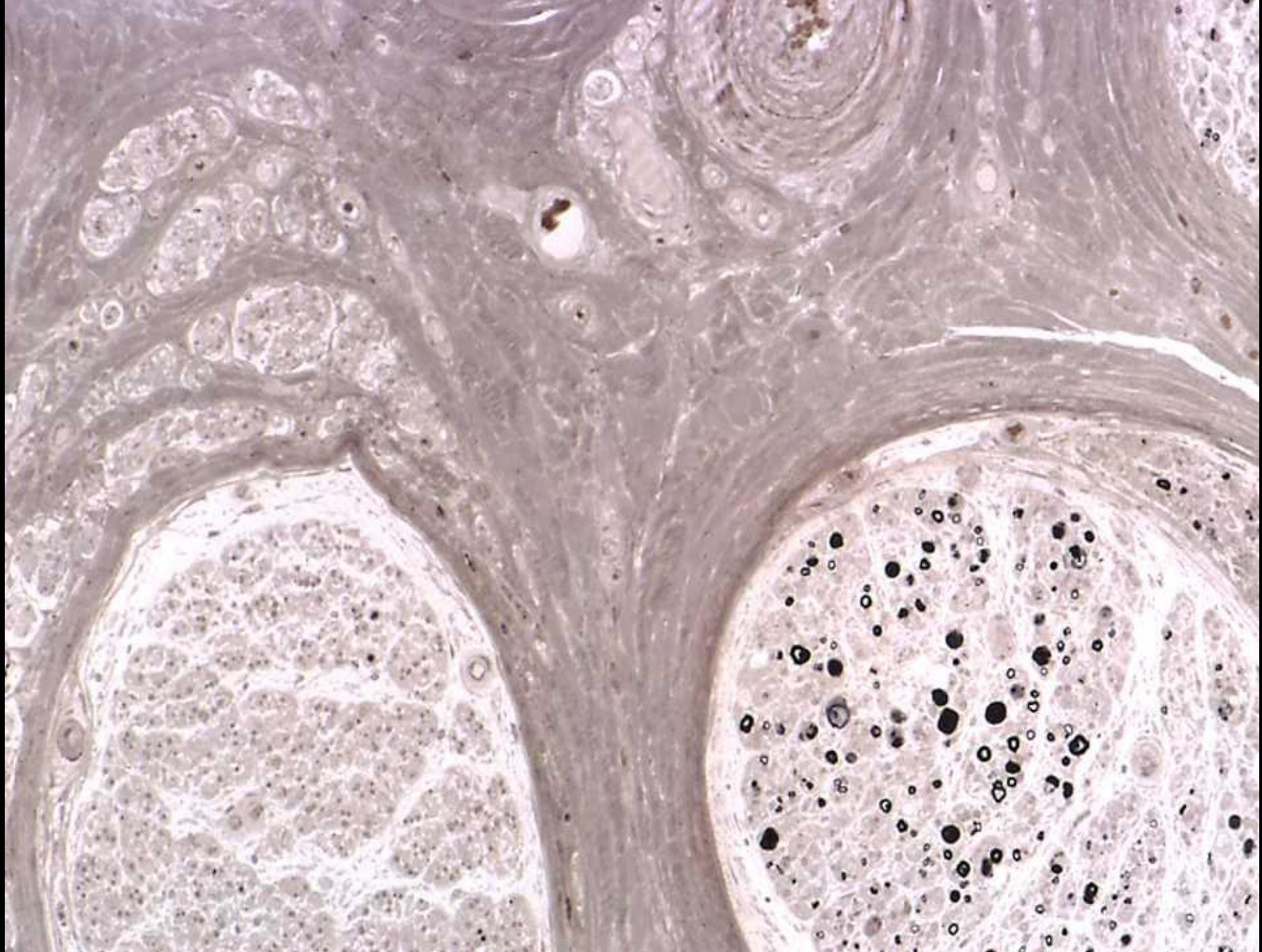
- Dyck, P.J.B.; Norell, J.; Dyck P.J.; Neurology, 1999.
- Inclusion criteria:
 - Diabetes mellitus
 - Subacutely developing unilateral or asymmetric lower limb neuropathy
 - Involving buttock, thigh, leg or foot but upper limb (cervical radiculoplexus) or thoracic radiculopathy may also be present
 - MRI or CT myelography used to exclude structural disease
 - NCS/EMG abnormalities not confined to one peripheral nerve or one nerve root segment
 - Typically pain, weakness and numbness are present

Dyck et al, Neurology 1999

Pathology of DLRPN - Ischemic Injury

	<u>DLRPN</u> (n = 33)	<u>DPN</u> (n = 21)	<u>p</u>
Multifocal fiber loss	19	2	<0.001
Perineurial degeneration	6	0	NS
Perineurial thickening	24	2	<0.001
Neovascularization	21	1	<0.001
Injury neuroma	12	0	<0.01





Dyck et al, Neurology, 1999

Pathology of DLRPN

Inflammation and Microvasculitis

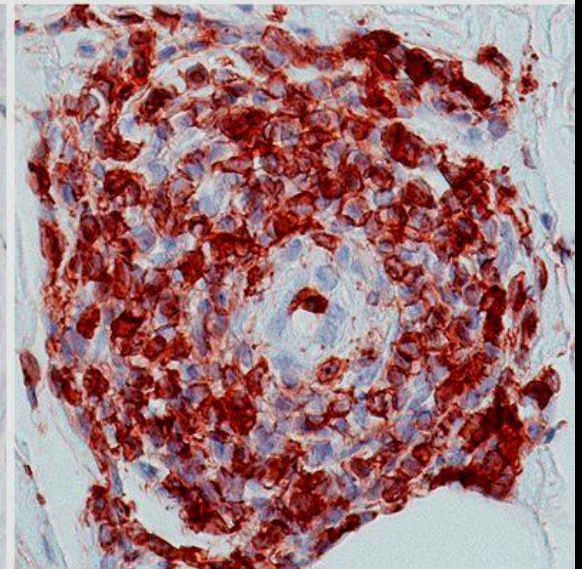
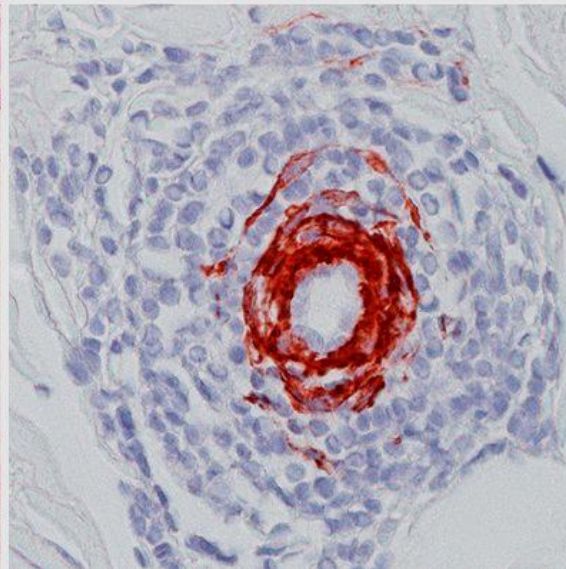
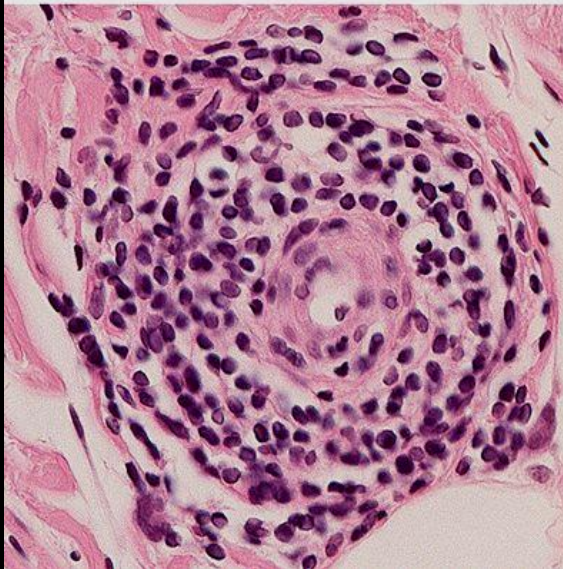
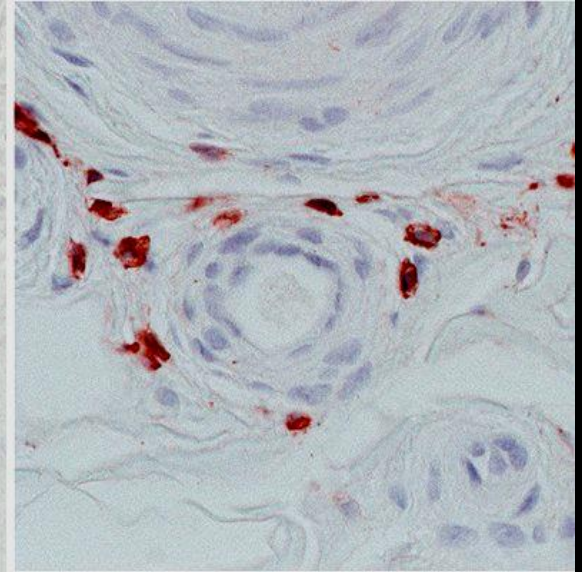
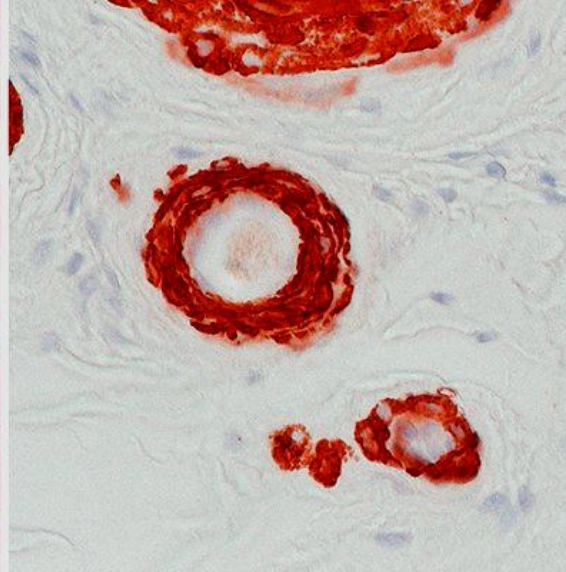
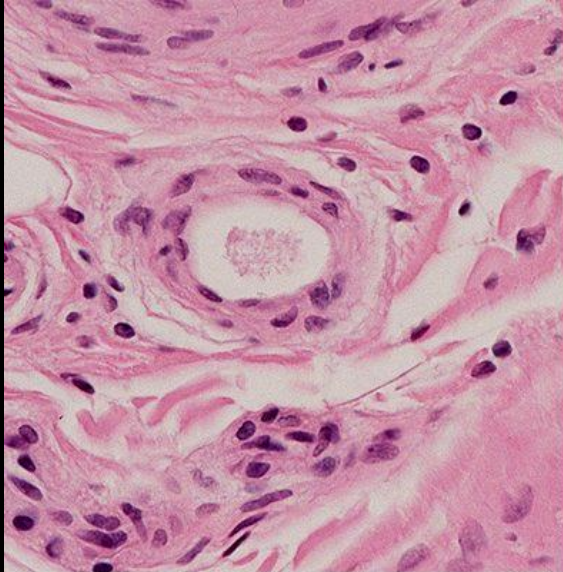
	<u>DLRPN</u> (n=33)	<u>DPN</u> (n=21)	<u>p</u>
Perivascular Inflammation	33	6	<0.001
Individual cells	0	5	
Small collections	21	1	
Moderate collections	7	0	
Large collections	5	0	
Inflammation of vessel wall	15	0	<0.001
Diagnostic of microvasculitis	2	0	NS
Hemosiderin in macrophages	19	0	<0.001

Microscopic Vasculitis in DLRPN

H&E

SMACTIN

CD45



Dyck et al, Neurology, 1999

DLRPN Conclusions

1. DLRPN is a subacute, painful neuropathy beginning unilaterally in leg or thigh but progressing to become widespread and bilateral.
2. It is not just a proximal or motor neuropathy (sensory and autonomic fibers are involved).
3. Ischemic injury best explains the clinical and pathological findings.
4. The cause of the ischemic injury is altered immunity and microvasculitis.

Diagnostic Criteria for DLRPN

- Kelkar, P.; Masood, M.; Parry, G.; Neurology, 2000.
- Inclusion criteria:
 - Diabetes mellitus
 - Progressive, painful, asymmetrical, proximal lower limb weakness
- Concluded that the pathology showed a PMN predominant vasculitis

Diagnostic Criteria for Painless DLRPN

- Garces-Sanchez et al; Ann Neurol, 2011.
- Inclusion criteria:
 - Diabetes mellitus (established or new)
 - Neuropathic pain was excluded
 - Weakness of one or both lower limbs
 - Presence of sensory symptoms or signs
 - NCS/EMG abnormalities from at least 2 peripheral nerves and 2 root levels (lumbosacral plexopathy)
 - Findings could be demyelinating or axonal
 - Patients could have upper limb or thoracic involvement

Core Diagnostic Criteria for DLRPN

- No consensus core criteria for DLRPN exists.
- Generally agreed upon diagnostic features:
 - Diabetes mellitus (usually type 2)
 - Lower extremity predominant, usually asymmetrical peripheral neuropathy
 - Motor predominant
 - Severe neuropathic pain is usual
 - Can be unilateral or bilateral
 - Reduced lower limb reflexes
 - Need to exclude other structural causes (spine) with imaging (MRI)

Differential Diagnosis of DLRPN

- Lumbosacral radiculopathy (structural)
- Lumbosacral radiculitis (inflammatory)
- Lumbosacral spinal stenosis
- Peripheral nerve sarcoidosis
- CIDP
- Neurolymphomatosis
- Necrotizing vasculitis

Differential Diagnosis of DLRPN (continued)

- Amyloidosis
- Infiltrating neoplasm into the lumbosacral plexus (prostate, colorectal, bladder, uterine, perineurioma).
- Radiation plexopathy
- Vasculopathies (aneurysm, vascular malformation, infarct)
- Retroperitoneal hemorrhage
- Retroperitoneal abscess

Core Diagnostic Criteria for DLNPN

Controversial Issues

- **Pure motor syndrome** – (Garland, Chokroverty, Llewelyn) whereas others (Dyck) emphasize that there are sensory and autonomic involvement.
- **Proximal neuropathy** – (Garland, Chokroverty, Said) whereas others emphasize widespread, patchy distribution (buttock, thigh, leg, foot or combination) (Bastron and Thomas, Dyck).
- **Rapidly progressive vs. insidious** – Asbury wrote that it is a spectrum with an insidious slowly progressive symmetrical (metabolic) form at one end and a rapidly progressing, asymmetrical form (ischemic) form at the other end.

Core Diagnostic Criteria for DLRPN

Controversial Issue

Pain

- Do all cases require pain?
- More than 90% of DLRPN cases have severe neuropathic pain (burning, lancinating, contact allodynia).
- Garces-Sanchez (Ann Neurol, 2011) described a cohort of painless DLRPN that was more insidiously progressing, was more symmetrical and had more upper limb involvement.

Garces-Sanchez et al; Ann Neurology, 2011

Painless Motor Predominant Diabetic Neuropathy

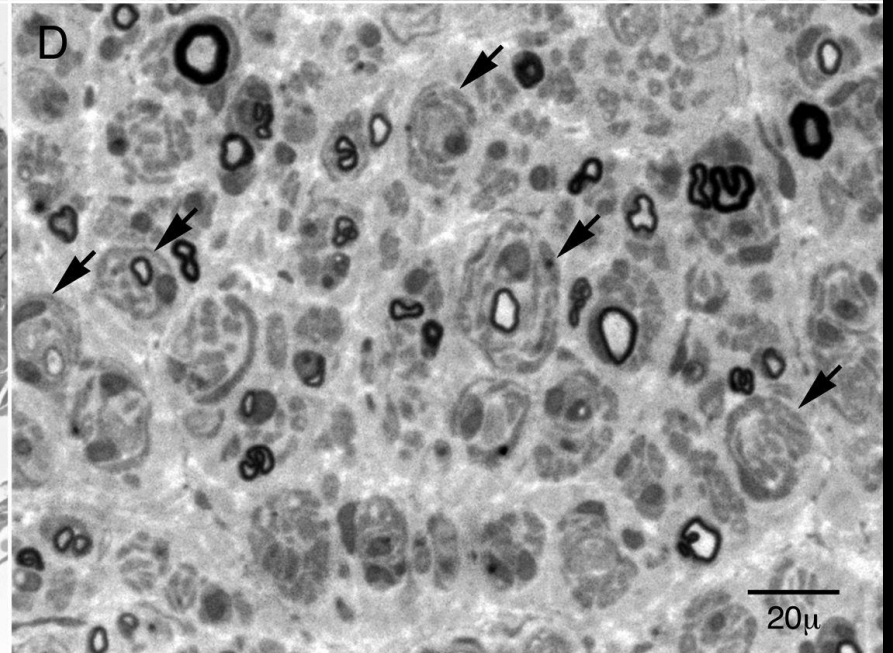
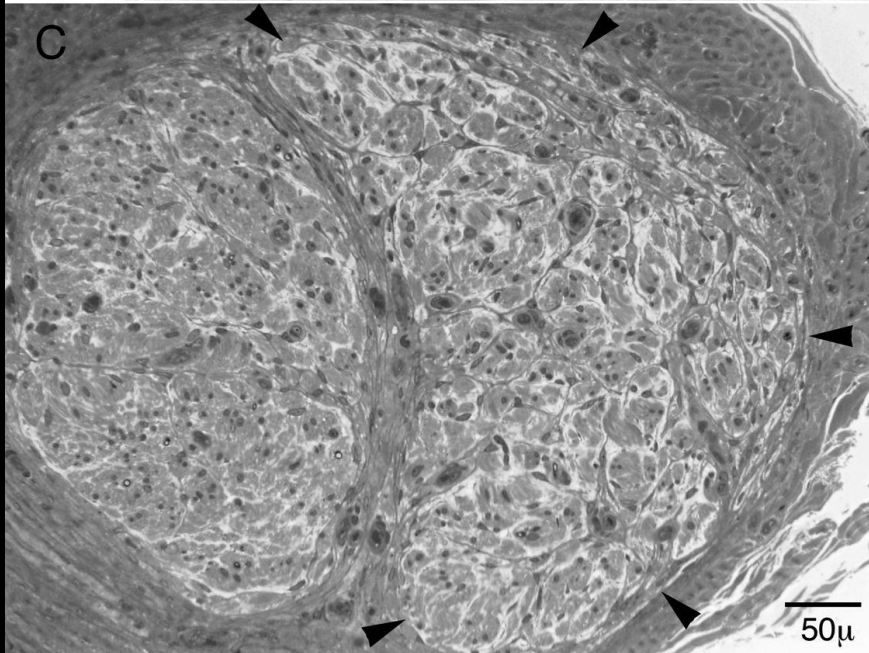
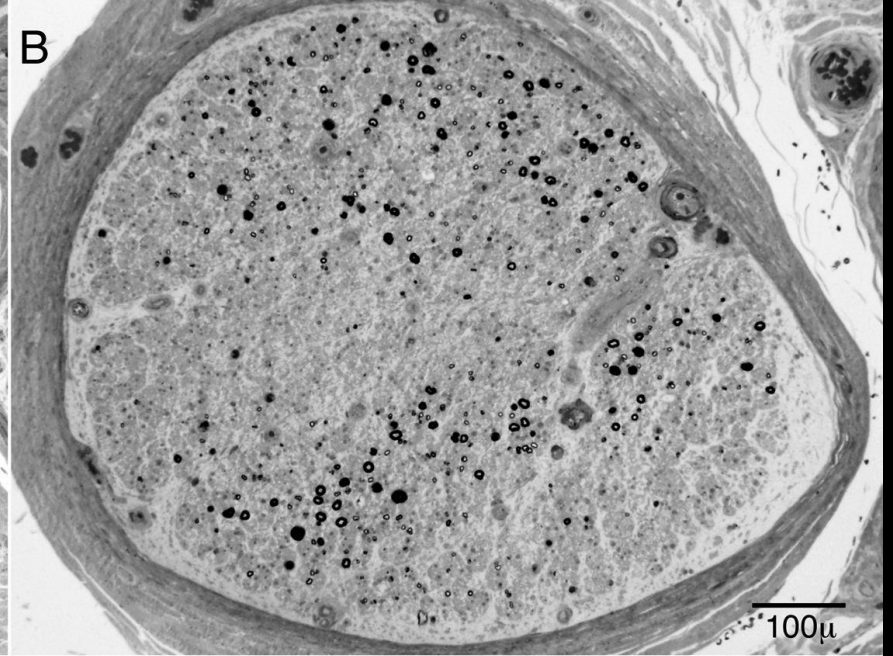
Neuropathy Characteristics

	<u>PMPDN</u> (n = 23)	<u>DLRPN</u> (n = 33)	<u>p</u> *
Onset			
Acute	0	10	0.002
Subacute	21	23	
Chronic	2	0	
Presentation			
Bilateral	15	4	<0.001
Unilateral	8	28	
Most Involved Site			
Distal (leg)	13	14	0.001
Proximal (thigh)	4	19	
Equal	6	0	
Median Age	62.2	65.4	NS

Pathology of PMPDN - Ischemic Injury

	<u>PMPDN</u> (n = 23)	<u>DLRPN</u> (n = 33)	<u>p</u>
Multifocal fiber loss	11	19	NS
Perineurial degeneration	3	6	NS
Perineurial thickening	18	24	NS
Neovascularization	17	21	NS
Injury neuroma	11	12	NS
Onion-bulbs	2	1	NS

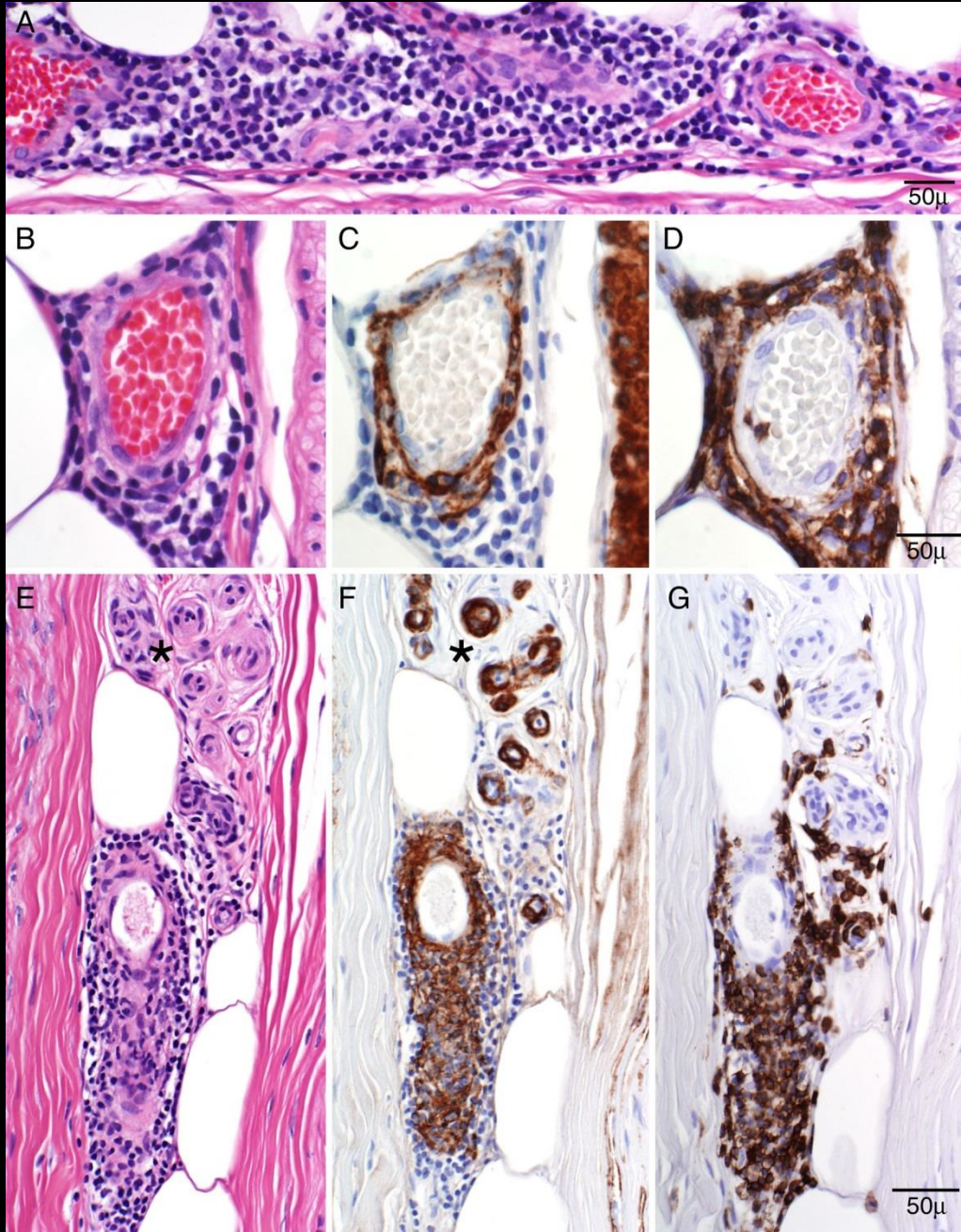
Ischemic Injury - PMPDN



Pathology of PMPDN Microscopic Vasculitis

	<u>PMPDN</u> (n=23)	<u>DLRPN</u> (n=33)	<u>p</u>
Perivascular Inflammation	23	33	NS
Individual cells	2	0	
Small collections	16	21	
Moderate collections	3	7	
Large collections	2	5	
Inflammation of vessel wall	15	15	NS
Diagnostic of microvasculitis	3	2	NS
Hemosiderin in macrophages	11	19	NS

Microvasculitis - PMPDN



Garces-Sanchez et al; Ann Neurology, 2011

Conclusions

1. The painless lower limb and motor predominant neuropathy occurring in diabetic patients is painless DLRPN.
2. The findings confirm that there is a clinical spectrum of DLRPN (as proposed by Asbury).
3. The underlying pathological mechanism of both painful and painless DLRPN is ischemic injury and microvasculitis.

Core Diagnostic Criteria for DLRPN

Controversial Issue

Pattern of Involvement (focal vs. multifocal)

- Should EMG involvement of 2 peripheral nerves and 2 nerve root levels be required?
- This would increase specificity but decrease sensitivity.
- An isolated radiculitis (pain and weakness in one nerve root distribution) may be a form of DLRPN does not meet these electrophysiological criteria.

Core Diagnostic Criteria for DLNPN

Controversial Issue

Pathological conformation

- Should we require nerve biopsy to be performed for the diagnosis of DLNPN?
- Should we require inflammatory infiltrates on the nerve biopsy?
- Other forms of vasculitis have required pathological conformation to make a diagnosis.
- The clinical syndrome in most cases is typical and so nerve pathology may not be necessary for the diagnosis of DLNPN.

Core Diagnostic Criteria for DLRPN

Controversial Issue

Lower Limb Syndrome vs. Whole Body

- Diabetic Lumbosacral Radiculoplexus Neuropathy (DLRPN) vs. more generalized Diabetic Radiculoplexus Neuropathy (DRPN).
- Most of the published literature has focused on the lower limb form (DLRPN).
- Lower limb, upper limb, thoracic and cranial neuropathies can occur together in the same patients (DRPN)(Bastron and Thomas, Dyck et al, Katz et al).
- May be best to think of this disease as DRPN and it is made up of DLRPN, DCRPN and DTRN.
- Should the criteria be written for DLRPN, DCRPN and DTPN individually or for DRPN overall?
- Does isolated DCRPN exist (separate from neuralgic amyotrophy)?

Massie et al; Brain 2012

DCRPN – Clinical Features

Presenting Symptoms

	<u>DCRPN</u> (n = 85)	<u>DLRPN</u> (n = 33)	<i>p</i>
• Presenting Symptom			0.02
Pain	53 (62)	27 (82)	
Weakness	22 (26)	6 (18)	
Sensory	15 (17)	0 (0)	
• Unilateral at onset	68 (81)	29 (88)	NS
• Eventually bilateral	39 (46)	32 (97)	<0.001
• Temporal profile			<0.001
Acute onset	52 (61)	10 (30)	
Subacute and chronic onset	23 (27)	23 (70)	
Unclear	10 (12)	0 (0)	

Percentages in parenthesis.

DCRPN

Neuropathic Features

	<u>DCRPN</u> (n=85)	<u>DLRPN</u> (n=33)	<u>p</u>
• Pain	69 (81%)	33 (100%)	NS
– hurting or aching	23		
– burning	14		
– shooting	19		
– allodynia	15		
• Weakness	84 (99%)	33 (100%)	NS
• Sensory symptoms	56 (66%)	31 (94%)	0.002
• Recurrent episodes	18 (21%)	8 (17%)	NS

DCRPN – Clinical Features

Other nerve segment involvement

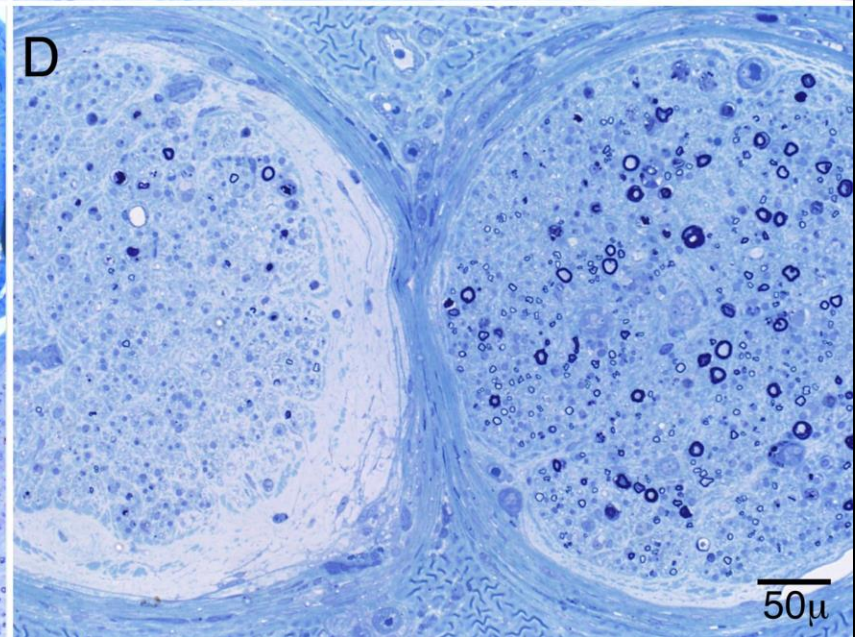
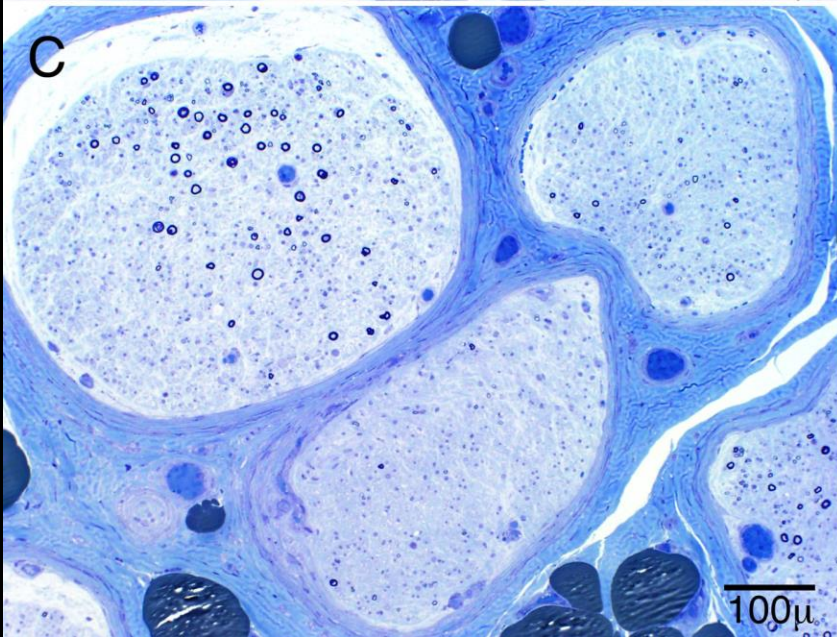
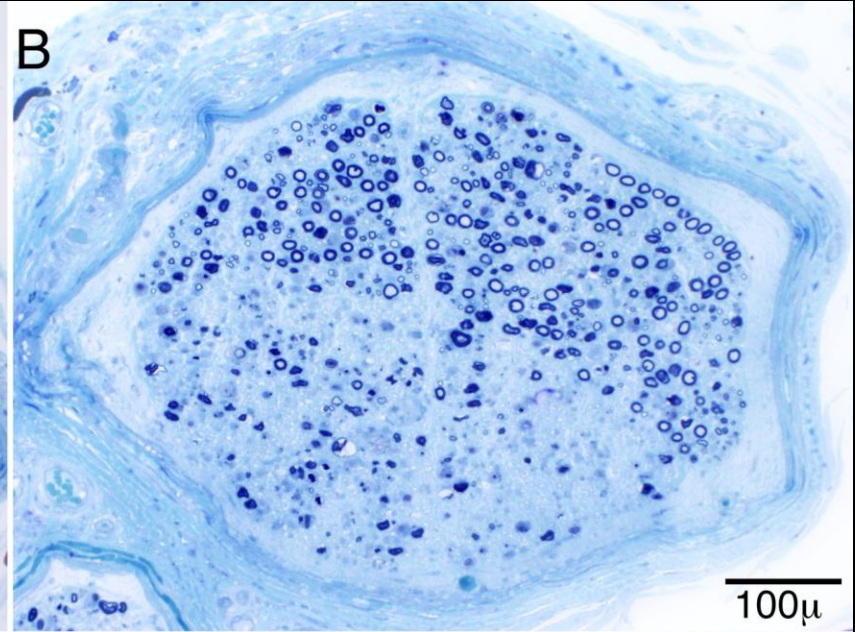
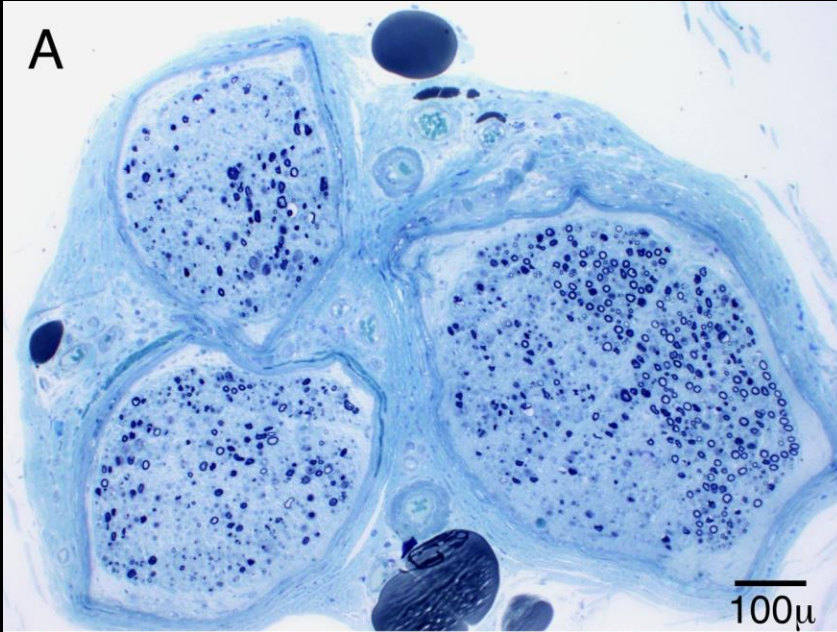
	<u>DCRPN</u> (n = 85)	<u>DLRPN</u> (n = 33)	<u>p</u>
• Any other segment	44 (52%)	32 (97%)	<0.0001
– Contralateral limb	40 (47%)	32 (97%)	
– Cervical		3 (9%)	
– Thoracic	16 (19%)	4 (12%)	
– Lumbosacral	20 (24%)		
– Other	8 (9%)		

Pathology of DCRPN

Ischemic Injury

	<u>DCRPN</u> (n = 11)	<u>DLRPN</u> (n = 33)	<u>p</u>
Multifocal fiber loss	7	19	NS
Perineurial degeneration	6	6	0.05
Perineurial thickening	8	24	NS
Neovascularization	7	21	NS
Injury neuroma	1	12	NS

Ischemic Injury - DCRPN

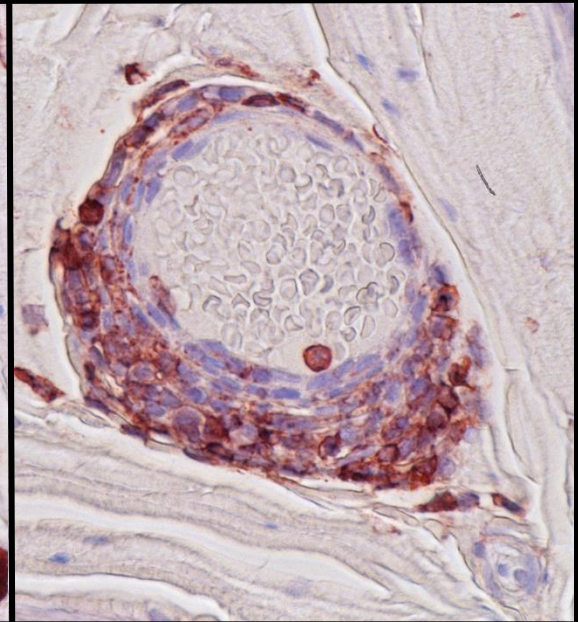
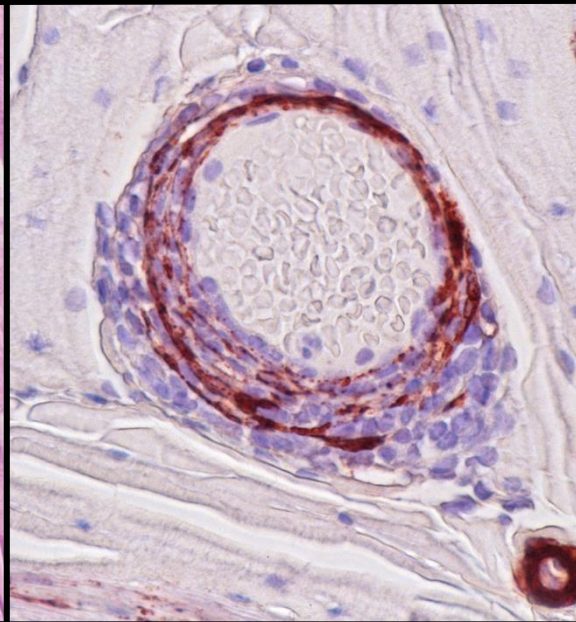
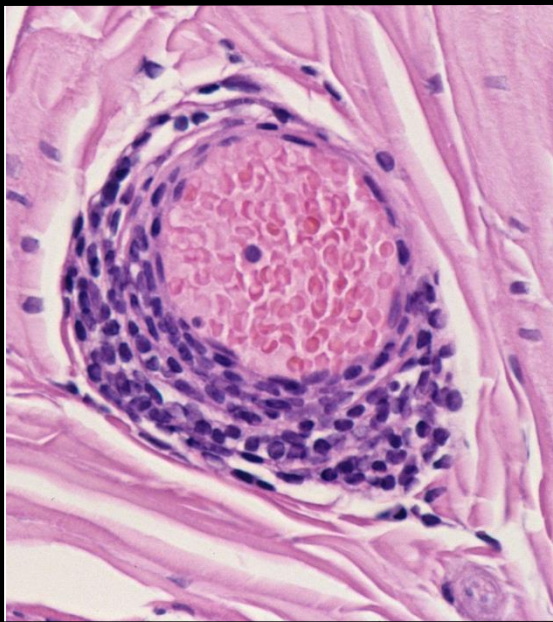
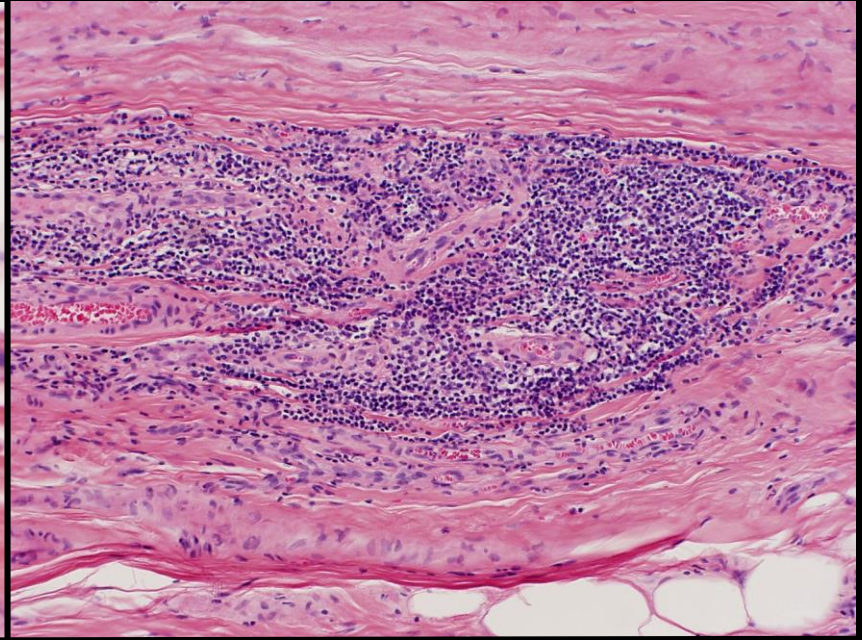
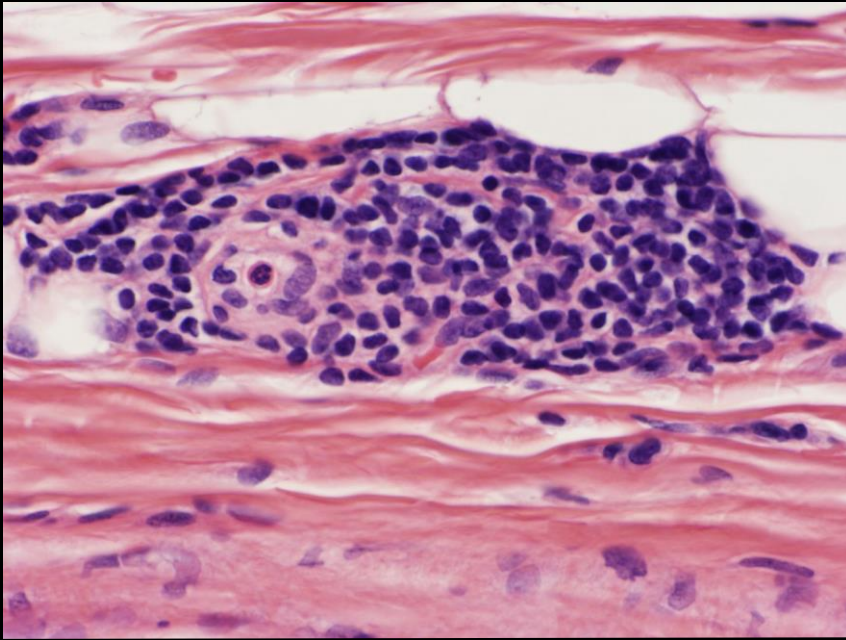


Pathology of DCRPN

Inflammation and Microvasculitis

	<u>DCRPN</u> (n=11)	<u>DLRPN</u> (n=33)	<u>p</u> *
Perivascular Inflammation	11	33	NS
Individual cells	1	0	
Small collections	5	21	
Moderate collections	2	7	
Large collections	3	5	
Inflammation of vessel wall	8	15	NS
Diagnostic of microvasculitis	5	2	0.007
Hemosiderin in macrophages	3	19	NS

Inflammatory Collections - DCRPN



Massie et al; Brain, 2012

DCRPN Conclusions

1. DCRPN is a subacute, monophasic, painful neuropathy beginning unilaterally in upper limb and sometimes becoming bilateral.
2. It has many clinical features similar to DLRPN. It is not a pure motor syndrome (sensory and autonomic fibers are involved).
3. The pathological basis is ischemic injury from microvasculitis occurring in roots, plexus and nerves.
4. DCRPN is part of the clinical spectrum of diabetic radiculoplexus neuropathies.

Core Diagnostic Criteria for DLRPN

Controversial Issue

Role of Diabetes Mellitus

- DLRPN and DRPNs are thought to be forms of diabetic neuropathies.
- However, non-diabetic LRPN and non-diabetic brachial plexopathy (neuralgic amyotrophy) occur.
- Diabetes does seem to be a risk factor in the development of these neuropathies but its precise role is unknown.
- Should we classify these neuropathies as forms of diabetic neuropathies?

Proposed Core Diagnostic Criteria

DLRPN alone
or
DRPN

Proposed Core Diagnostic Criteria for DLRPN

1. Lower limb, motor predominant neuropathy primarily involving back, buttock, thigh, leg or foot either unilaterally or bilaterally.
2. Presence of diabetes mellitus (ADA criteria).
3. Usually rapidly developing neuropathy in a subacute fashion in an asymmetrical distribution with a monophasic course. May be insidious or recurrent.
4. Weakness and pain almost always present and sensory loss is typical.
5. NCS/EMG show neuropathic involvement in distribution of two peripheral nerves from two lumbosacral roots (upper lumbar plexopathy counts as two root levels).
6. Other neurogenic conditions are excluded through spine and plexus imaging (MRI, CT myelography), NCS/EMG and laboratory evaluation (CSF examinations).

Proposed Core Criteria for DRPN

1. Diabetic radiculoplexus neuropathy (DRPN) is a motor predominant syndrome of weakness, pain and sensory loss occurring in lower limbs (DLRPN), upper limbs (DCRPN) or thoracoabdominal levels (DTRN).
2. DRPN can presents as isolated DLRPN, DCRPN or DTRN or as combinations of these syndromes.
3. Presence of diabetes mellitus.
4. Usually the neuropathy is rapidly developing in a subacute fashion and an asymmetrical distribution with a monophasic course. May be insidious or recurrent.
5. NCS/EMG show neurogenic abnormality and for DLRPN and DCRPN it is in the distribution of 2 peripheral nerves and 2 nerve roots.
6. Other causes of RPN are excluded through imaging, electrophysiology and laboratory (including CSF) evaluation.

Common Features of DLRPN Not Part of Diagnostic Criteria

- Weight loss
 - Weight loss before or during the development of DLRPN is common. In our study, 28 of 33 lost 10 lbs. or more (median 30 lbs.)
- Type 2 diabetes mellitus
 - Most cases have type 2 DM
 - 32 of 33 (Dyck et al, 1999) had DM type 2
- Compared to population cohort of typical DM patients, DLRPN has:
 - More type 2 DM (but can occur in type 1 DM)
 - Less insulin use
 - Less retinopathy
 - Less cardiovascular disease

Common Features of DLRPN Not Part of Diagnostic Criteria

- What is the role of elevated blood sugar and diabetes mellitus in DLRPN?
- A non-diabetic LRPN occurs with essentially the same clinical, electrophysiological and pathological findings (Dyck, PJB et al, Brain 2001).
- Should these illnesses be classified as forms of diabetic neuropathy or as inflammatory neuropathies?

Epidemiology of DLRPN

- To date, no epidemiological data exists of DLRPN or DRPN neuropathy.
- We do not know if diabetes mellitus (DM) is a risk factor for DLRPN.
- We (Peng-Soon Ng, Peter Dyck, and P. James B. Dyck) are doing a study of incidence of LRPN in Olmsted County MN to determine if DM is a risk factor.
- This data is not yet published.

Life-span Considerations of DLRPN

- No data exists about the life expectancy of DLRPN patients.
- It is a disease of middle and old age.

DLRPN

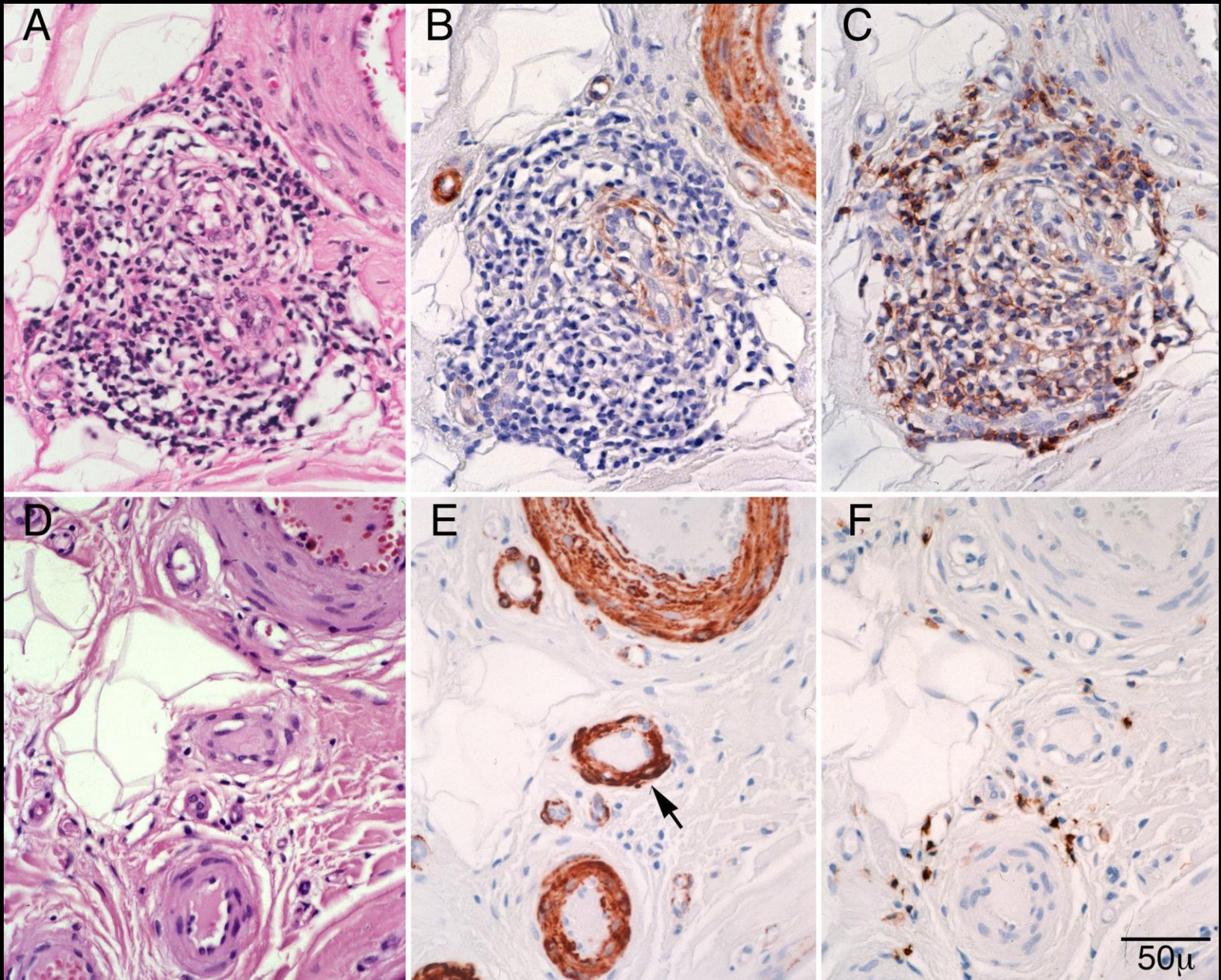
Common Medical Co-Morbidities

- Diabetes Mellitus
 - The diabetes in DLRPN patients tends to have been present for shorter time than for community diabetics
 - There are less complication of diabetes than in a population cohorts and diabetics.
- Little data exists on other illnesses that are associated with DLRPN.

Neurobiological and Risk Factors for DLRPN

“Triggers” of DLRPN

- Ironically, attempts to lead a more healthy life often will precipitate attacks of DLRPN.
- Triggers include:
 - Over-zealous correction of hyperglycemia
 - Over-zealous exercise routine
 - Over-zealous weight loss program
 - Post-surgical reaction
- Staff et al (Brain, 2010) reported 21 cases of biopsy confirmed post-surgical inflammatory neuropathy of which 7 (33%) could be classified as DRPN.
 - All biopsies showed inflammatory infiltrates



DLRPN

Functional Consequences

- The usual belief has been that DLRPN is a monophasic illness and that most patients have complete recovery within one year.
- This is not the case however; in our prospective cohort of 33 patients most were improved but not recovered over time.
 - Initially, 16 used wheelchairs, 14 used walkers, canes or braces
 - At 2 years, 3 used wheelchairs, 16 used aids and 12 walked independently
 - Falls are common
- Some patients have ongoing neuropathic pain from DLRPN.
- So long-term morbidity from weakness, pain and ongoing need for walking aids is common.

DLRPN

Conclusions

1. No established criteria for the diagnosis of DLRPN exist.
2. Controversial areas include: is DLRPN pure motor?; role of pain; rapidity and symmetry of DLRPN; need for nerve biopsy and whether inclusion should be limited to lower limb disease.
3. Propose diagnostic criteria for both DLRPN and DRPN that are easily defined and usable.
4. Diabetes mellitus is a risk factor for the development of DLRPN and DRPN is a common inflammatory neuropathy.
5. DLRPN may be precipitated by over-correction of blood sugars, exercise or weight loss – similar to treatment induced diabetic neuropathy.
6. Long-term morbidity from pain and weakness in DLRPN is common.

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