**Indication**

This Cascadefe EC is designed for use in double-lumen perivascular catheter (DPFF) to facilitate the placement and bracing of the catheter in various clinical settings.

**Features of Cascadefe EC**

- Wide application of selection of optimal holes
- Multiple holes in patient available perivascular catheter existence, e.g., subclavian
- No need for patient selection and replacement of holes
- Helps prevent patient allergy and replacement risk

**Sharp Cut-off Curve**

- Homogeneous distribution of pore sizes provides sharp cut-off feature

**Clinical Experiences of DPFF**

- **Metabolic Disorders**
  - Focal hyperperfusion/ethanolism (FH)
    - LDH: lactic dehydrogenase (LDH) application for FH patients who have either ineffective or non-tolerated maximum medication therapy and ineffective sodium lactate
    - LDH: lactic dehydrogenase (LDH) can be removed from plasma by adsorption, precipitation, or filtration devices or from whole blood. LDH: lactic dehydrogenase (LDH) methods are effective in reducing LDH levels (3). A study compared three forms of LDH: lactic dehydrogenase (LDH) columns to date: LA-18, LA-36, and EC-30M, with respect to side effects (SE) in three cases with FH who underwent six treatments with each of the aforementioned methods, finding a significant fewer SE with Cascadefe EC-30M after LDH dose (3).

  - La3+ (hypoperfusionist)
    - La3+ is a circulating substance that resembles LDH-2. Increasing levels of La3+ increase in risk of myocardial infarction (MI). Beneficial effect of LDH: lactic dehydrogenase (LDH) in the incidence of major adverse coronary events (MACE) was observed in the retrospective study (4). Incidence of MACE in patients who have already La3+ before admission evaluated for two years before and after commencement of LDH: lactic dehydrogenase (LDH) in the prospective observational multicenter study, 301 cases with DPFF were enrolled. Incidence of MACE was significantly decreased from 12% in the last year before commencement of DPFF to 3.3% in the first year of DPFF treatment (3).

- **Organ Transplant**

  - HLA/ABO incompatible kidney transplant
    - DPFF is an established modality of anti-CD4 antibody and anti-CD20 lymphocyte removal from HLA incompatible and ABO incompatible kidney transplant. Antibody mediated rejection (AMR) is an important cause of acute and chronic allograft dysfunction and graft loss. Decontamination protocol including HLA and HLA antibodies before transplant was performed in 60 cases with HLA incompatible kidney transplant. The incidence of acute rejection was significantly lower in patients who did not receive desensitization. The graft survival rate was improved compared to HLA compatible cases (3).

- **Neurological Disorders**

  - Systemic lupus erythematosus (SLE)
    - DPFF is effective for altering pathogenic molecules such as anti-DNA antibody and immune complexes in SLE patients. Clinical benefit of sLeA (DPFF) or immunoadsorption was evaluated in lupus nephritis (LN) patients in three groups: (a) patients treated with SR, intravenous cyclophosphamide pulse therapy (ICP) group (20 cases), cyclophosphamide induction therapy and cyclophosphamide pulse therapy (ICP) group (15 cases). Complete remission rate was comparable in sLeA and ICP cycles, while combination therapy had higher complete remission rate. Combination therapy may be useful in achieving the complete remission of LN, and in minimizing the risk of side effects.

  - Autoimmune hemolytic anemia (AIHA)
    - DPFF is effective for correcting the coexistence of autoimmune hemolytic anemia and thrombocytopenia by reducing the number of antibodies and platelets, showing an evident improvement of adenoidal antibodies and platelet activity (3).

- **Dermatological Disorders**

  - Pemphigus, Pemphigoid
    - Pemphigus is an autoimmune skin blistering disease in which desmoglein, an epithelial cadherin molecule is targeted by autoantibodies. Pemphigus is an autoimmune skin blistering disorder caused by antidesmoglein antibodies. Medication in Pemphigus and Pemphigoid includes the administration of corticosteroids, immunosuppressants and IgG. DPFF is applied for patients who are resistant to medication or patients suffering from complications of medication. 2 cases in pemphigus and 3 cases in pemphigoid (10) of series of DPFF, resulted in an improvement in clinical remission and remission.

**Microvasculitis Disorders**

- Peripheral arterial disease (PAD)
  - By eliminating LDH particles and high molecular weight proteins, DPFF decreases plasma viscosity and thereby improves two hemodynamic microcirculation (3). H 1 cases suffering from PAD and cerebral, these cases experienced a complete remission of ulcers and the other two cases had a partial remission of ulcers after a cycle of 10DPFF sessions, without manifesting any adverse effects (3). 3 cases with coronary heart disease ulcers caused by severe ischemic diabetic heart syndrome underwent DPFF assistance. Wound healing was accelerated in 4 cases in 3 weeks and unchanged in 2 cases, but with an increase in trophic ulcer allowed small minor angioplasty (3).

**Examples of Applications**

(Based on Japanese health insurance coverage and references 5 and 14 to 17)

- **Metabolic Disorders**
  - Focal hyperperfusion/ethanolism (FH) ***
  - Systemic lupus erythematosus (SLE) ***
  - Pemphigus, Pemphigoid (3)
  - Autoimmune hemolytic anemia (AIHA) ***
  - Pemphigus (10)
  - Autoimmune hemolytic anemia (AIHA) (10)

- **Organ Transplant**

  - HLA/ABO incompatible kidney transplant (KID) ***
  - Antibody mediated rejection (AMR) (10)
  - Uremic toxins removal (URE) ***
  - Acute kidney injury (AKI) (3)

- **Neurological Disorders**

  - Systemic lupus erythematosus (SLE) ***
  - Guillain-Barre syndrome (GBS) (3)
  - Chronic inflammatory demyelinating polyradiculoopathy (CIDP) (3)
  - Multiple sclerosis (MS) (3)
  - Neuromyelitis optica (NMO) (3)

- **Hematological Disorders**

  - Thrombocytopenia (3)
  - Chronic kidney disease (CKD) ***
  - Acute kidney failure (AKF) ***
  - Anemia (3)

- **Other**

  - Periperal arterial disease (PAD) (3)
  - Age-related macular degeneration (AMD) (3)
  - Severe type 2 diabetes uncontrolled pregnancy (3)