CytoSorbents™

HELPING REDUCE DEADLY UNCONTROLLED INFLAMMATION IN HOSPITALIZED PATIENTS WORLDWIDE

NASDAQ: CTSO

Jefferies Presentation

June 3, 2020
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CytoSorbents is a Leader in Critical Care Immunotherapy

Leading the Prevention or Treatment of Life-Threatening Inflammation in the ICU and Cardiac Surgery using CytoSorb® Blood Purification
CytoSorbents At a Glance (NASDAQ: CTOS)

- CytoSorb® is E.U. approved and commercialized in 58 countries as an extracorporeal cytokine adsorber to help treat hyperinflammatory conditions where cytokines are elevated (e.g. “cytokine storm”) with more than 88,000 cumulative treatments.

- Received FDA Emergency Use Authorization for use in critically-ill COVID-19+ patients and has been used in more than 800 COVID-19 patients in 20 countries.

- Granted FDA Breakthrough Designation for removal of ticagrelor in cardiothoracic surgery. Approved in E.U. to remove ticagrelor and rivaroxaban in cardiothoracic surgery as well.

- Q1 2020 sales grew 78% over Q1 2019 to $8.2M, with $26.3M in trailing 12-month product sales (3/31/20) and 76% blended gross margins in Q1 2020.

- 156 employees with international footprint across two wholly-owned subsidiaries:
  - CytoSorbents Medical, Inc: Headquarters - New Jersey, USA
  - CytoSorbents Europe GmbH: International sales office - Berlin, Germany

- Strategic Partnerships with major players including Fresenius Medical Care, Terumo, & Biocon.

- Strong government support with ~$30M in grants, contracts, other non-dilutive funds.

Uncontrolled Inflammation is Deadly

Millions Die Of Uncontrolled Deadly Inflammation Each Year

- Influenza
- Sepsis
- Trauma
- Burn Injury
- Covid-19
- Lung Injury
- Cytokine Release Syndrome
- Liver Failure
- Surgical Complications
Massive Inflammation Causes Organ Failure

Organ failure occurs when vital organs stop working, causing nearly half of all deaths in the ICU.

Little can be done to prevent or treat organ failure today.
No Ideal Options to Treat Severe Inflammation

**Anti-Inflammatory (too weak)**
- NSAIDs
- Aspirin
- Anti-cytokine antibodies
- Anti-integrin antibodies
- Anti-oxidants

**Immunosuppressive (too strong)**
- Corticosteroids
- Chemotherapy
- Organ transplant
- Anti-rejection drugs
- Radiation
- Immune system ablation
- Anti-leukocyte Abs
CytoSorb Bridges the Gap

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CytoSorb® Reduces the Fuel to the Fire

• CytoSorb® targets the $20+ billion opportunity in critical care and cardiac surgery

• Approved in the European Union as the first specifically approved extracorporeal cytokine adsorber. CytoSorb has received FDA Emergency Use Authorization for use in COVID-19+ critically-ill patients.*

• Broad indication for use where cytokines are elevated

• Removes cytokines and many other inflammatory mediators such as free hemoglobin, bacterial toxins, myoglobin, and activated complement

• Safe and well-tolerated: 88,000+ cumulative treatments delivered, up from 61,000 a year ago

*CytoSorb has received Emergency Use Authorization for use in COVID-19 patients, however, it has not received formal approval or clearance for COVID-19.
Patented Blood Purification Technology

The underlying blood purification technology is based on biocompatible, highly porous polymer beads that act like tiny sponges to remove harmful substances from blood.

- Proprietary patented technology with multiple patents pending worldwide
- Manufactured at our ISO 13485 certified facility in New Jersey
- One of the highest grade medical sorbents on medical market today
CytoSorb is “Plug and Play”

Compatible with Existing Dialysis, CRRT, ECMO, and Heart-Lung Machines

- Place a temporary dialysis catheter in a major vein
- Connect the device to a standard dialysis, ECMO, or heart-lung machine found in hospitals worldwide
- Pump blood out of the body and through the cartridge
- The polymer beads directly contact blood and remove unwanted or toxic substances
- “Purified” blood is pumped back into the patient
- Can treat 70+ total blood volumes per 24 hour treatment
- Each treatment uses a new cartridge
Goal: To Prevent or Treat Organ Failure

Improve Patient Outcome and Survival

Decrease Costs Of ICU and Patient Care

The Potential to Revolutionize Critical Care Medicine
Refactory Septic Shock

Prospective, single arm study in 20 patients with refractory late-stage septic shock using CytoSorb aggressively every 12 hours with a new cartridge

- Patients had refractory shock despite high doses of vasopressors, respiratory failure requiring mechanical ventilation, oligo-anuric kidney failure requiring dialysis, and lactate > 8 mmol/L

- Results from the CytoSorb Greifswald Study
  - Resolution of shock in 65% of patients treated with CytoSorb
  - 28-day survival was 45%, a 30-40% absolute improvement over expected (0-10%)
  - Reduction of IL-6 from an initial average of 87,000 pg/mL to below 10,000 pg/mL after 24 hours of treatment

- A similar population (n=16) receiving standard of care but no CytoSorb therapy, where shock could not be reversed, also on mechanical ventilation with an initial lactate level of 6.1 ± 4 mmol/L, and 75% requiring renal replacement therapy had a mortality of 100% at 28 days.*

CytoSorb and COVID-19

- CytoSorb has now been used to treat 800+ critically-ill COVID-19 patients in 20 countries
  - Reduction of cytokine storm and inflammatory mediators such as IL-6, ferritin, CRP, and others
  - Improved respiratory function in ARDS and weaning from mechanical ventilation and ECMO
  - Improved hemodynamic stability and reversal of shock

- CytoSorb is now specifically recommended in the Italy and Panama COVID-19 treatment guidelines, with blood purification to treat cytokine storm in the China COVID-19 guidelines

- CytoSorb has now received U.S. FDA Emergency Use Authorization, enabling CytoSorb to be commercially sold to all hospitals in the U.S. for use in critically-ill, COVID-19+ patients, 18 years of age or older with imminent or confirmed respiratory failure.*

- CytoSorb has received a comparable approval in India for COVID-19

- We are currently shipping CytoSorb to dozens of hospitals throughout the U.S. with the intent of collecting data under our COVID-19 treatment registry

- Our goal is to help save lives, while demonstrating the value of CytoSorb as one of the broadest treatments for cytokine storm

* Although CytoSorb has received FDA EUA, CytoSorb is not cleared or approved for the treatment of COVID-19
A COVID-19 Play but NOT a COVID-19 Company

Of All Deaths
Sepsis Kills
1 in 5

America Has a $27 Billion Sepsis Crisis
CytoSorbents Has a Strong Hybrid Sales Model

58 Countries Worldwide and 88,000+ treatments

Critical Care and Cardiac Surgery

Direct Sales

Distributor and Partner Sales

Direct sales in 10 countries:
Germany, Austria, Switzerland, Belgium, Poland, Netherlands, Denmark, Norway, Sweden, Luxembourg

Distributor and Partner sales in 48 countries
Recently added Mexico and South Korea with partner, Fresenius Medical Care
Also added Brazil, Colombia, and Costa Rica
CytoSorb Initial Commercialization Focus

By Market

- Critical Care 67%
- Cardiac Surgery 33%
- Sepsis 50%
- Other Critical Care 17%

- Acute Respiratory Distress
- Reversal of Shock
- Trauma
- Acute Liver / Pancreatic

By Geography

- 20 – 30% Distributor / Partner
- 10 – 15% Other Direct
- 60 – 65% Germany – Direct

Validating Partners

- FRESENIUS MEDICAL CARE (Critical Care)
- TERUMO (Cardiac Surgery)
- Biocon (India – Cardiac / Critical Care)
CytoSorb® Is a High Margin “Razorblade”

- High margin “razorblade” fully compatible with existing installed base of “razor” blood pumps: Dialysis/CRRT, ECMO machines (ICU), heart-lung machines (OR)

- Blended gross margins were 80% in Q4 2019, driven by volume production from our new manufacturing facility and manufacturing efficiencies. Q1 2020 gross margins were down slightly to 76% as we incurred increased costs of ramped production in response to COVID-19

- Average Direct Selling Price is approximately $1,000 per cartridge

- Approximately 1 - 10 cartridges are typically used per patient
  - Open heart surgery: 1-2 cartridges
  - Sepsis: 3-5 cartridges or roughly 1 day in the ICU
  - Severe acute pancreatitis: 5-10 cartridges

- In Germany, 400 hospitals have >400 beds. Each hospital typically sees 300-600 sepsis patients per year. At 3-5 cartridges per patient:
  - Revenue per patient = ~$3,000-5,000
  - Potential revenue per hospital = $1-3M for sepsis alone

- Previously disclosed one German hospital has already achieved sales >$1M, validating revenue model
Quarterly Product Sales

Q1 2020 product sales were a record high of $8.2M.
Product sales and gross margin continues to grow over the years.

CytoSorb Sales
Blended Product Gross Margin
Formula For High Margin Growth

New Clinical Data

Direct Sales

New and Existing Applications

Global Expansion

Scaled Manufacturing
Expanded Headcount by 50% in 2 Years

Increases in headcount focused heavily on commercialization and manufacturing

June 2018

June 2020
Direct Sales Focus on Germany

- Germany is the largest medical device market in the E.U. and the third largest in the world. The German market alone represents a $1.0-1.5 billion total addressable market for CytoSorb

- CytoSorb has a strong foundation for growth in Germany
  - Outstanding sales team, including sales reps, product, technical, and clinical support
  - Strong key opinion leader support
  - Dedicated reimbursement supported by major medical societies
  - Penetration into hundreds of hospitals throughout the country
  - Multiple promising therapeutic applications
Sales of CytoSorb in Germany

- Subdivided Germany to shrink territories to allow maximization of revenue opportunity: Enables focus and growth of key accounts, increased efficiency due to shorter travel, and ability to detail small and mid-sized hospitals better.

- For 2020, we have more than doubled Germany sales reps/specialists from 8 to 18. We expect productivity to increase from existing sales reps by focusing and growing key accounts, and rapid productivity for new reps, as they will start in active territories with sales.

* Preliminary, unaudited financials
Removal of Ticagrelor and Rivaroxaban During Cardiothoracic Surgery

- CytoSorb is now E.U. approved for the removal of two well-known blockbuster “blood thinners”, or anti-thrombotics, during cardiothoracic surgery. These agents are used in millions of patients to reduce risk of stroke and heart attacks
  - Ticagrelor (Astra-Zeneca – Brilinta®, Brilique®) is a blockbuster P2Y$_{12}$ anti-platelet agent (“blood thinner”) with more than $1.6$ billion in worldwide sales, used primarily in patients with acute coronary syndrome and those undergoing percutaneous coronary intervention (PCI) for stent placement
  - Rivaroxaban (Xarelto® – Bayer, Jansenn/J&J) is a blockbuster Factor Xa inhibitor and novel oral anticoagulant (NOAC) agent (“blood thinner”) with more than nearly $7$ billion in 2019 global sales used as lifelong therapy in patients with atrial fibrillation.
- The problem is that in patients that require emergent or urgent cardiothoracic surgery on these blood thinners, they can develop potentially serious and life-threatening perioperative bleeding
- CytoSorb also received FDA Breakthrough Designation in April 2020 for the removal of ticagrelor during cardiopulmonary bypass in emergent or urgent cardiothoracic surgery
# CytoSorb Reduces Bleeding Complications

<table>
<thead>
<tr>
<th>Patients</th>
<th>Description</th>
<th>Procedure duration (min; mean ± SD)</th>
<th>Red blood cell transfusion (%)</th>
<th>Platelet transfusion (%)</th>
<th>Chest tube drainage volume/24hrs (ml; median [IQR])</th>
<th>Re-thoracotomy (%)</th>
<th>Days in intensive care (median [IQR])</th>
<th>Total length of stay (days; median [IQR])</th>
</tr>
</thead>
<tbody>
<tr>
<td>43</td>
<td>Emergency surgery with ticagrelor</td>
<td>288 ± 63</td>
<td>21.9% (n=7)</td>
<td>34.4% (n=11)</td>
<td>350 [300 - 450]</td>
<td>0% (n=0)</td>
<td>2 [1 - 3]</td>
<td>11 [9 - 12]</td>
</tr>
<tr>
<td>11</td>
<td>Control without CytoSorb</td>
<td>353 ± 84</td>
<td>45.5% (n=5)</td>
<td>100% (n=11)</td>
<td>890 [630 - 1025]</td>
<td>36.4% (n=4)</td>
<td>3 [2 - 4]</td>
<td>14 [10 - 16]</td>
</tr>
<tr>
<td>55</td>
<td>Total patients</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>12</td>
<td>Emergency surgery with rivaroxaban</td>
<td></td>
<td></td>
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<tr>
<td>7</td>
<td>Control without CytoSorb</td>
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<td>CPB + CytoSorb (n=32)</td>
<td>CPB alone (n=11)</td>
<td>CPB + CytoSorb (n=7)</td>
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<td>CPB alone (n=5)</td>
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</table>

### Procedure duration** (min; mean ± SD)
- CPB + CytoSorb: 288 ± 63
- CPB alone: 353 ± 84
- CPB + CytoSorb: 184 ± 77
- CPB alone: 309 ± 50

### Red blood cell transfusion
- CPB + CytoSorb: 21.9% (n=7)
- CPB alone: 45.5% (n=5)
- CPB + CytoSorb: 14.3% (n=1)
- CPB alone: 100% (n=5)

### Platelet transfusion
- CPB + CytoSorb: 34.4% (n=11)
- CPB alone: 100% (n=11)
- CPB + CytoSorb: 28.6% (n=2)
- CPB alone: 100% (n=5)

### Chest tube drainage remove volume/24hrs (ml; median [IQR])
- CPB + CytoSorb: 350 [300 - 450]
- CPB alone: 890 [630 - 1025]
- CPB + CytoSorb: 390 [310 - 430]
- CPB alone: 600 [590 - 1000]

### Re-thoracotomy
- CPB + CytoSorb: 0% (n=0)
- CPB alone: 36.4% (n=4)
- CPB + CytoSorb: 0% (n=0)
- CPB alone: 40% (n=2)

### Days in intensive care (median [IQR])
- CPB + CytoSorb: 2 [1 - 3]
- CPB alone: 3 [2 - 4]
- CPB + CytoSorb: 2 [2 - 3]
- CPB alone: 6 [5 - 6]

### Total length of stay (days; median [IQR])
- CPB + CytoSorb: 11 [9 - 12]
- CPB alone: 14 [10 - 16]
- CPB + CytoSorb: 11 [10 - 13]
- CPB alone: 18 [18 - 20]

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CytoSorb Reduces Bleeding Complications

| Procedure duration** (min; mean ± SD) | 288 ± 63 | 353 ± 84 | 184 ± 97 | 309 ± 50 |
| Red blood cell transfusion | 21.9% (n=7) | 45.5% (n=5) | 14.3% (n=1) | 100% (n=5) |
| Platelet transfusion | 34.4% (n=11) | 100% (n=11) | 28.6% (n=2) | 100% (n=5) |
| Chest tube drainage remove volume/24hrs (ml; median [IQR]) | 350 [300 - 450] | 890 [630 - 1025] | 390 [310 - 430] | 600 [590 - 1000] |
| Re-thoracotomy | 0% (n=0) | 36.4% (n=4) | 0% (n=0) | 40% (n=2) |

In a separate analysis done in the U.K., this has translated into a projected cost savings to the hospital of approximately $5,000 per patient, including the cost of CytoSorb.
## Ticagrelor Removal Opportunity

### Ticagrelor US – Annual Estimates

**Acute Coronary Syndrome** ~ 1.4 million cases per year in the U.S. alone
- Patients are pre-loaded with dual anti-platelet therapy. Ticagrelor has ~50% market share\(^1\)
- 70-75% will undergo PCI (stent), 15-20% medical management, 5-10% urgent/emergent CABG
  - Urgent/emergent CABG not amenable to PCI
  - 3% of patients undergoing PCI with complications requiring urgent/emergent CABG
  - Total urgent/emergent CABG

- Of the 100-170K that require emergent/urgent CABG, 50-85K will be on ticagrelor
  - Assuming a $3-5K per device ASP, U.S. TAM is in a range of $150-425M
  - If ticagrelor displaces clopidogrel (Plavix) and prasugrel (Effient) as the only reversible platelet inhibitor because of CytoSorb, the TAM would increase
  - A strong case can be made for rapidly becoming standard of care
  - Estimated EU market is $50-100M in sales due to lower established price point

### U.S. Total Addressable Market: $150-450M initially, potentially double over time

### E.U. Total Addressable Market: $50-100M initially, potentially double over time

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## Dual Path to U.S. Regulatory Approval

### Prevention of AKI Following Cardiac Surgery

REFRESH 2 – AKI Pivotal Trial
- 400 patient RCT in 25 US centers in valve replacement or aortic surgery with hypothermic cardiac arrest
- Primary endpoint: Reduction in the severity or incidence of AKI 48 hours after surgery
- MOA: Intraoperative reduction of free hemoglobin, complement and cytokines by dual CytoSorb cartridges
- 153 patients enrolled
- Have temporarily paused enrollment to improve data collection and quality at the request of the DMSB
- Expect to resume enrollment in mid-2020 and get to the interim analysis at 200 patients by Q4 2020-Q1 2021

### Removal of Anti-Thrombotics During Cardiac Surgery

Ticagrelor Removal in Emergent/Urgent Cardiac Surgery
- Acute coronary syndrome patients, dissecting aortic aneurysm, infective endocarditis, etc that requires emergent or urgent cardiothoracic surgery
- Granted Breakthrough Designation for removal of ticagrelor during cardiopulmonary bypass during emergent or urgent cardiothoracic surgery
- We expect to have more clarity on the path forward soon
**REMOVE Endocarditis Trial Data Read in Mid-2020**

- Infective endocarditis (heart valve infection) occurs when bacteria seeds a heart valve from IV drug abuse and dirty needles, or from dental procedures.

- The incidence of endocarditis is rising in the US due to the opiate crisis and use of dirty needles.

- Patients often require open heart surgery valve replacement but are very hemodynamically unstable before, during, and after surgery due to a combination of sepsis and heart valve destruction.

- Outcomes are generally poor with hemodynamic instability, high mortality (~15%), many adverse events, and high cost ($150-250,000 per case). Intraoperative CytoSorb has been used to help stabilize such patients peri-operatively with good success.

- The German Federal Ministry of Education and Research has funded a 250 patient, multi-center, randomized, controlled study (REMOVE) using CytoSorb during valve replacement open heart surgery in patients with infective endocarditis.

- Primary endpoint is improvement of SOFA score.

- Trial completed in Jan 2020 with 288 patients enrolled. Data analysis is expected in 1H 2020, with data release in mid-2020.
Riding Many Macro Trends in Healthcare

SEPSIS BY-THE-NUMBERS

48.9
MILLION CASES

11
MILLION DEATHS

1 IN EVERY 5 DEATHS WORLDWIDE ARE ASSOCIATED WITH SEPSIS

85% OCCUR IN LOW- OR MIDDLE-INCOME COUNTRIES

2 OUT OF EVERY 5 CASES ARE IN CHILDREN UNDER 5

Blood Thinners

What you need to know

coumadin
heparin
lovenox
xarelto
eliquis
pradaxa
plavix
brilinta
aggrenox
aspirin
TPA

straightnursingstudent.com
Investment Summary

- We believe we are a unique company in the medical device space with a high margin razorblade in another’s razor business model.

- Expecting strong growth driven by many factors including greater awareness of our treatment of cytokine storm due to COVID-19.

- We have extensive validation from physicians around the world, leading strategic partners, U.S. government agencies, and the media.

- Near-term catalysts could include REMOVE data, clarity on U.S. regulatory path under Breakthrough Designation, COVID-19 cases, and many others.

- Have guided that Q2 2020 product sales will exceed Q1 2020 product sales of $8.2M.