Convalescent Plasma

A Review of Pertinent Information for SARS-CoV-2

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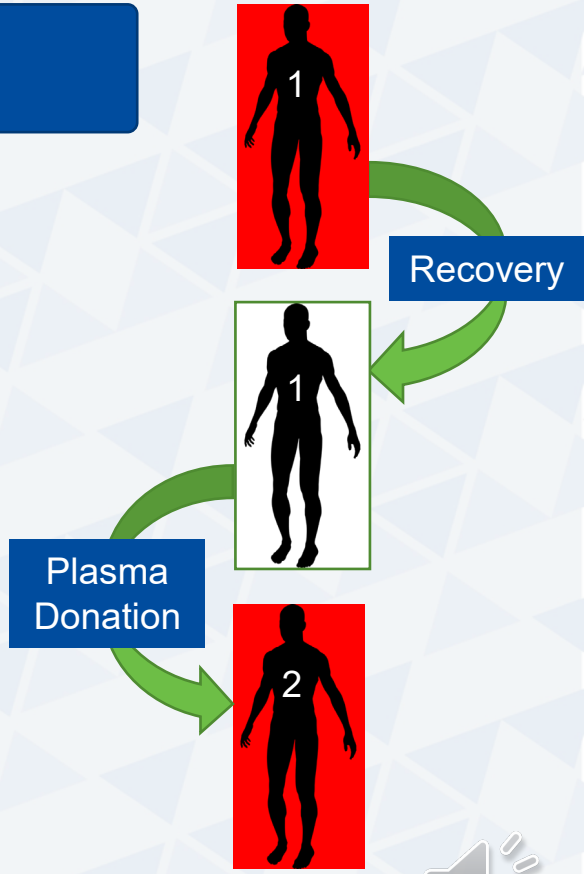
Data as of August 31th, 2020

Mechanism of Action

- Adaptive (humoral) immunity:
  - Host development of pathogen-specific antibodies allowing for immune-mediated neutralization and clearance of pathogen
  - Accomplished via: Active infection vs. vaccination
    - *Note: Seroconversion in SARS-CoV-2 = 8-21 days after symptom onset*
- Convalescent plasma therapy:
  - Harvest of antibodies (in plasma) of recovered patient for administration to acutely ill patient
  - Adaptive immune transfer resulting in passive immunity
  - Thought to confer immunity for weeks to months



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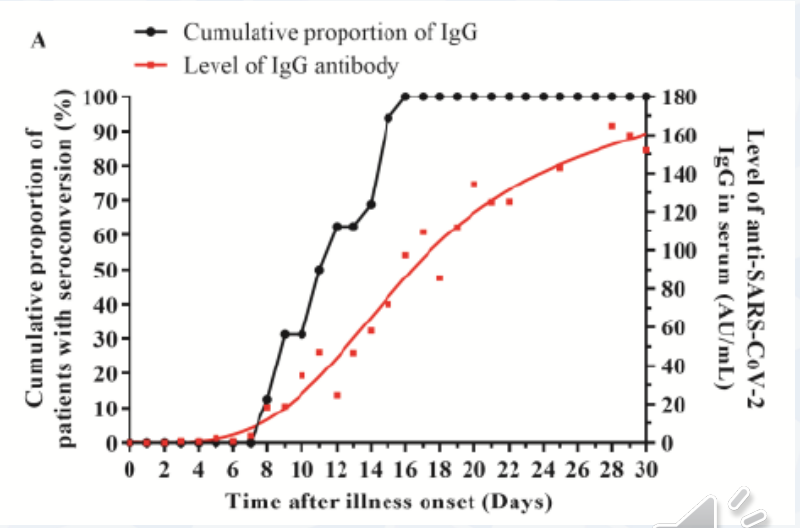
Casadevall A, Pirofski LA. J Clin Invest. 2020;130(4):1545-1548. http://doi.org/10.1172/JCI138003.

Seroconversion in COVID-19

5/21/2020 Update

- Serologic profile analysis of 41 patients:
  - Stratified analysis by disease severity.
  - IgG Seroconversion:
    - Median = 11 days (range 8-16 days)
    - Peaked on day 30
    - Steeper slope of IgG response in critically ill population
  - IgM Seroconversion:
    - Median = 14 day (range 8-28 days)
    - Peaked in 18 days then declined
  - Confirms:
    - Previously demonstrated seroconversion profile of IgG
    - Potential low utility of IgM profile in tracking disease/immunity



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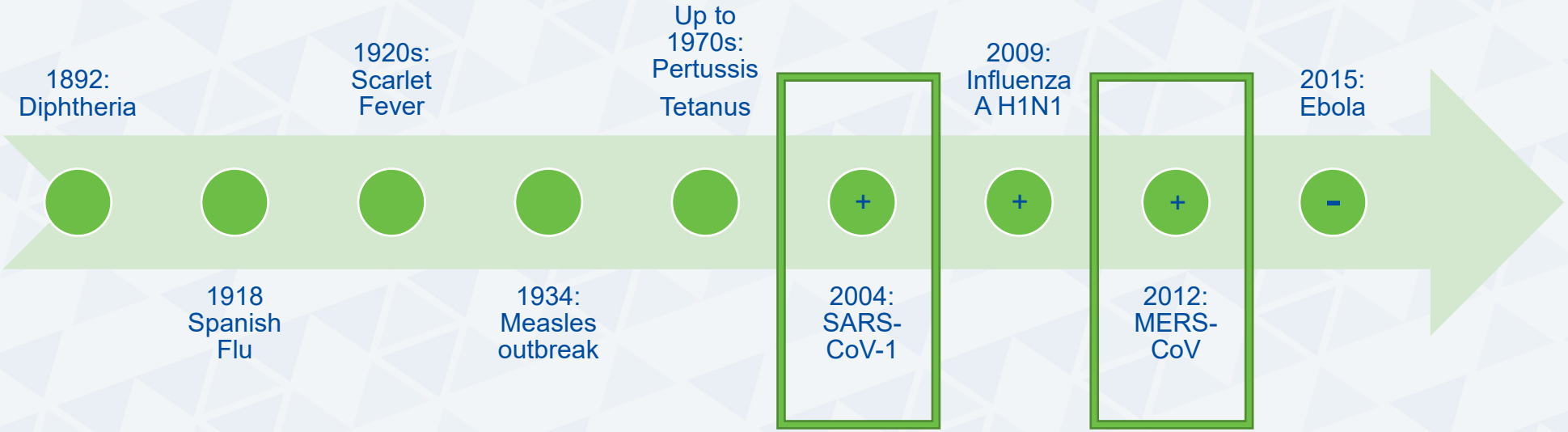
Qu J, et al. Clin Infect Dis 2020. April 27th, 2020. http://doi.org/10.1093/cid/ciaa489.

History



Murray S. ContagionLive. April 4th, 2020. Available at: https://www.contagionlive.com/news/new-life-for-an-old-therapy-convalescent-plasma.

Gallagher JR. Am J Public Health Nations Health. 1935;25(5):595-8. http://doi.org/10.2105/ajph.25.5.959.

Cheng Y, et al. Eur J Clin Microbiol Infect Dis. 2005;24(1):44-6. http://doi.org/10.1007/s10096-004-1271-9.

Hung IF, et al. Clin Infect Dis. 2011;52(4):447-59. http://doi.org/10.1093/cid/ciq106.

Ko JH, et al. Antivir Ther. 2018;23(7):617-622. http://doi.org/10.3851/IMP3243.

Van Griensven J, et al. N Engl J Med. 2016;374:33-42. http://doi.org/10.1056/NEJMoa1511812.

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History

SARS-CoV-1

Population/Intervention: 80 patients with SARS-CoV-1 (2003 Hong Kong) given 1-3 units (160-640 mL IV of convalescent plasma)

Primary Outcome: Discharge by day 22 post-infusion

Results: 33/80 (41.3%) patients met primary outcome

- Median time from symptom onset to receipt of convalescent plasma: 14 days (range 7-30)
- Factors associated with good outcomes:
  - Receipt of convalescent plasma within 14 days of symptom onset.
    - 56% good outcome vs. 15.6% poor outcome patients had admin ≤14 days ($p<0.001$)
  - PCR positivity with seronegativity at the time of treatment.
    - 61% good outcome vs. 21% poor outcome patients had PCR positive/serology negative ($p<0.001$)

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Cheng Y, et al. Eur J Clin Microbiol Infect Dis. 2005;24(1):44-6. http://doi.org/10.1007/s10096-004-1271-3

History

MERS-CoV

Population/Intervention: 3 patients in respiratory failure secondary to infection with MERS-CoV given 1-2 IV infusions of convalescent plasma

Primary Outcome: Recipient seroconversion following convalescent plasma administration

Results:

- All recovered
  - Only 1/3 (33%) patients experienced successful seroconversion following therapy
    - Patient who seroconverted was the only patient that received plasma with a neutralizing antibody ratio of ≥1:80

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Ko JH, et al. Antivir Ther. 2018;23(7):617-622. http://doi.org/10.3851/IMP3243

Available Evidence

Duan K, et al.

Population/Intervention: 10 adult patients with severe COVID-19 without end organ dysfunction

Intervention: 200 mL of convalescent plasma with neutralizing antibody titers of >1:640

(Note: all 10 received antiviral therapy and 6/10 received methylprednisolone)

Results:

- Improvement in all symptoms within 1-3 days
- Varying degrees of absorption of pulmonary lesions
- Tendency towards declined inflammatory markers
- No deaths

Shen, et al.

Population/Intervention: 5 adult, critically ill patients with severe COVID-19

Intervention: 400 mL of convalescent plasma (2 x 200 mL infusions) – Donor requirements = IgG >1:1000 / neutralizing antibodies >1:40.

(Note: all 10 received antiviral therapy and methylprednisolone)

Results:

- Normalization of body temperature within 3 days
- Decreased SOFA / increased PaO2:FiO2 w/in 12 days.
- Viral loads decreased then became negative in all
- Increases in recipient neutralizing antibody titers
- No deaths

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Duan K, et al. PNAS. 2020. http://doi.org/10.1073/pnas.2004168117/-/DCSupplemental.
Shen C, et al. JAMA. 2020. http://doi.org/10.1001/jama.2020.4783.

Available Evidence

- Case Series: Zhang B, et al.

	Patient 1	Patient 2	Patient 3	Patient 4
Demographics	69 y/o Female	55 y/o Male	73 y/o Female	31 y/o Female
Total administered Convalescent Plasma Volume	900 mL (3 infusions)	200 mL (1 infusion)	2400 mL (8 infusions)	300 mL (1 infusion)

  - No discussion of antibody titers of donors
  - All experienced positive clinical and virologic outcomes

- All 3 studies should be interpreted cautiously given lack of control groups.

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Zhang B, et al. Chest. 2020. http://doi.org/10.1016/j.chest.2020.03.039.

Available Evidence

7/31/2020 Update

Clinical efficacy of convalescent plasma for treatment of COVID-19 infections – results of a multicenter clinical study

- Prospective, multicenter observational study of CPT vs. standard care
- Dosing 500 mL x 1 followed by a second dose at physician discretion if not clinical improvement within 24 hours
  - Had to be administered within 3 days of admission
- Inclusion: Age >18, confirmed COVID-19, presence of symptoms, SpO2 <93% on room air, and ≤7 days since illness onset
- Exclusion: Intubated patients, severe liver or kidney disease, septic shock, physician discretion, and patients with improving clinical condition who meet discharge criteria

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Abolghasemi H, et al. J Tran Sci 2020. http://doi.org/10.1016/j.transci.2020.102785.

Available Evidence

7/31/2020 Update

Outcome	Plasma (n = 115)	Control (n = 74)	P-value
All cause mortality	14.8%	24.3%	0.09
Length of Stay (Mean +/- SD)	**9.54 +/- 5.07**	**12.88 +/- 7.19**	**0.002**
Length of Stay ≤ 5 days	**28.1%**	**8.9%**	**0.01**
No intubation	**93%**	**79.7%**	**0.006**

- Limitations:
  - Lack of randomization
  - Concomitant use of antivirals was permitted

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Abolghasemi H, et al. J Tran Sci 2020. http://doi.org/10.1016/j.transci.2020.102785.

Available Evidence

7/31/2020 Update

Effect of convalescent plasma therapy on time to clinical improvement in patients with severe and life-threatening COVID-19

- Design: Open-label, multicenter, randomized clinical trial
- Setting: 7 hospitals in Wuhan, China
- Time Course: Feb 14 – April 1, 2020
- Enrollment: 103 adult inpatients with severe/life-threatening COVID-19 not enrolled in other clinical trials
  - 52 Convalescent plasma
  - 51 Control group (standard care)

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- Exclusion criteria:
  - Pregnancy
  - Immunoglobulin allergy
  - IgA deficiency
  - High risk of thrombosis
  - Life expectancy <24 hours
  - Disseminated intravascular coagulopathy
  - Severe septic shock
  - PaO2/FiO2 <100
  - Severe CHF
  - SARS-CoV-2 IgG antibody ≥1:640
  - "other contraindications" as determined by the patient's physician

Li L, et al. JAMA. 2020. http://doi.10.1001/jama.2020.10044. .

Available Evidence

7/31/2020 Update

- Donors:
  - 18-55 years of age
  - Lab confirmed COVID-19
  - Recovery (i.e. asymptomatic for 14 days)
  - Measured IgG antibody titers ≥ 1:640
- Dosing: 4-13 mL/kg of recipient body weight
- Primary Outcome: Time to clinical improvement within a 28 day period
- Secondary Outcomes:
  - 28 day mortality
  - Discharge by day 28
  - Conversion of PCR at 24, 48, and 72 hours.

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- Outcomes:
  - **Clinical improvement**: No differences (HR 1.4 [95% CI 0.79-2.49])
    - Better effect in severe vs. life-threatening disease
      - By both percentage with improvement by day 28 and time to improvement (4.94 days faster [95% CI -9.33 to -0.54 days])
  - **28 day mortality**: No difference (OR 0.65 [95% CI 0.29-1.46])
  - **Discharge by day 28**: No difference (HR 1.61 [95% CI 0.88-2.93)
  - **Rates of negative PCR conversion:** Higher in CPT group at all points
    - 24 hours: 44.7% vs. 15%, p = 0.003
    - 48 hours: 68.1% vs. 32.5%, p = 0.001
    - 72 hours: 87.2% vs. 37.5%, p <0.001

Li L, et al. JAMA. 2020. http://doi.10.1001/jama.2020.10044. .

7/31/2020 Update

Available Evidence

Cochrane Review of Convalescent Plasma Therapy in COVID-19:

20 Studies
5443 Patients

Overall Risk of Bias: High

- Efficacy – Mortality: Included 4 studies
  Very uncertain whether CPT has an impact on all cause mortality
- Efficacy – Symptomatic Improvement: Included 2 studies
  Very uncertain whether CPT has an impact on improvement in clinical symptoms
- Efficacy – Time to Death: Included 2 studies
  Very uncertain whether CPT prolongs time to death
- Safety – Serious Adverse Events: Included 14 studies
  Very uncertain whether or not CPT is associated with serious adverse effects.

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Piechotta V, et al. Cochrane Database of Systematic Reviews 2020;7. http://doi.org/10.02/14651858.CD013600.pub2.

Available Evidence

8/31/2020 Update

Effect of Convalescent Plasma on Mortality Among Hospitalized Patients with COVID-19: Initial Three-Month Experience

- 3 month summary of data from National Expanded Access Program (EAP)
- Study design: Open-label (not randomized or blinded)
- Evaluated impacts of time from diagnosis to transfusion and antibody levels and on mortality (both 7-day and 30-day)
  - Time to diagnosis: ≤3 days vs. >3 days
  - SARS-CoV-2 specific IgG antibody levels: High = Signal to cutoff ratio (S/Co) >18.45, medium = S/Co 4.62-18.45, low = S/Co <4.62
- Inclusion: >18 y/o, hospitalized with (+) SARS-CoV-2 PCR, severe/life-threatening illness (or risk of progression to)
  - For antibody analysis: Only patients who received one unit of plasma with known antibody titers
- Exclusion: Enrolled but not transfused or missing data

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Joyner MJ, et al. medrxiv 2020. August 12, 2020. http://doi.or/10-1101-2020.08.12.20169359.

Available Evidence

8/31/2020 Update

- Total patients enrolled in EAP: 47,047
- Total patients transfused: 36,226
- Patients with adequate data for follow-up: 35,322
  - April 4th – May 1st, 2020: 6,990 patients
  - May 1st – June 4th, 2020: 14,846 patients
  - June 4th – July 4th, 2020: 13,486 patients
- Patients with known transfusion antibody titers who received one unit of plasma: 3,082
  - April 4th – May 1st, 2020: 775 patients
  - May 1st – June 4th, 2020: 1,949 patients
  - June 4th – July 4th, 2020: 358 patients

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Joyner MJ, et al. medrxiv 2020. August 12, 2020. http://doi.or/10-1101-2020.08.12.20169359.

Available Evidence

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- Early Administration:
  - Mortality:
    - Lower mortality rates observed if plasma transfused ≤3 days from diagnosis

Outcome	Admin ≤3 days	Admin >3 days	P-value
7-Day Morality	8.7% (95% CI 8.3-9.2%)	11.9% (95% CI 11.4-12.3%)	<0.0001
30-Day Mortality	21.6% (95% CI 12-22.3%)	26.7% (95% CI 26.1-27.3%)	<0.0001

    - Held true for each period in the study

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Available Evidence

8/31/2020 Update

- SARS-CoV-2 Specific IgG Antibody levels
  - Mortality:
    - Mortality benefit observed with administration of higher antibody plasma

	High (S/Co* >18.45)	Medium (S/Co* 4.62-18.45)	Low (S/Co* <4.62)
7-Day Morality	8.9% (95% CI 6.8-11.7%)	11.6% (95% CI 10.3-13.1%)	13.7% (95% CI 11.1-16.8%)
30-Day Mortality	22.3% (95% CI 18.9-26.1%)	27.4% (95% CI 25.5-29.4%)	29.6% (95% CI 26-33.5%)

*S/Co = Signal to cutoff ratio (tested on Ortho-Clinical Diagnostics VITROS Anti-SARS-CoV-2 IgG Chemiluminescent immunoassay (CLIA))

    - Held true when accounting for time to transfusion
      - Specifically between extremes

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Joyner MJ, et al. medrxiv 2020. August 12, 2020. http://doi.or/10-1101-2020.08.12.20169359.

Available Evidence

8/31/2020 Update

Strengths	Limitations
Large (n = 35,322)	No control group
Multicenter (n = 2,807)	No randomization
Built in blinding regarding antibody levels in plasma transfusions	Did not allow for assessment of the presence of pre-transfusion antibodies
Continues to add to evidence regarding early transfusion and higher antibody levels	Differences in baseline characteristics of group
	Use of signal to cutoff ratio as antibody assessment

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Joyner MJ, et al. medrxiv 2020. August 12, 2020. http://doi.or/10-1101-2020.08.12.20169359.

Available Evidence

8/31/2020 Update

- What we know:
  - Convalescent plasma has been historically used as a therapeutic in several other viral infections including other coronaviruses.
  - Data pertaining to the efficacy of convalescent plasma in COVID-19 is currently mixed and derived from small case series, a few small studies, and some open-label, uncontrolled, observational data.
  - Signals exist that plasma may be most beneficial if administered as high antibody level transfusions early in the course of disease.
- What we don't know:
  - If convalescent plasma is definitively effective when compared to placebo or other standards of care
  - How a recipient's baseline antibody titers may impact the efficacy of convalescent plasma
  - Optimal timing of transfusion with regards to symptom onset
  - Optimal dosing with regards to donor antibody titers and number of units to transfuse

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Patient Selection

8/31/2020 Update

Obtaining Approval for Convalescent Plasma

Enrollment in Clinical Trial

-Prophylaxis

-Mild/Moderate

-Severe

Emergency Use Approval

-Convalescent plasma therapy for COVID-19 was granted emergency use approval by the US FDA on 8/23/2020 for use in hospitalized patients with COVID-19

-National expanded access program discontinuing enrollment after 8/28/2020

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Status of Trial Protocols. National COVID-19 Convalescent Plasma Project website. 3/29/2020. Available at: https://ccpp19.org/status.html

Recommendations for investigational use COVID-19 convalescent plasma. FDA website. 8/23/ 2020. Available at: https://www.fda.gov/vaccines-blood-biologics/investigational-new-drug-ind-or-device-exemption-ide-process-cber/recommendations-investigational-covid-19-convalescent-plasma.

COVID-19 expanded access program. National COVID-19 Expanded Access Program Website. 8/24/2020. Available at: https://www.uscovidplasma.org/

Patient Selection

8/31/2020 Update

- EUA Directed Patient Selection: “For use in hospitalized patients”
  - Notes:
    - Expanded access program specifically evaluated severe/life-threatening disease (or risk of progression to severe/life threatening disease)
    - Optimally administered within 3 days of diagnosis
  - Special populations:
    - Not evaluated in: pediatrics, pregnancy, nursing mothers
    - Geriatrics: Not specifically evaluated, but included in EAP safety analysis
- EUA Requirements (with administration a health care provider must):
  - 1) Provide Fact Sheet for Patients/Caregivers
  - 2) Notify the patient of emergency approval of biologic (not formally FDA approved)
  - 3) Notify the patient they have the right to refuse administration
  - 4) Explain the known risk and benefits and the extent of with risk/benefit is unknown
  - 5) Provide information on the availability of alternative treatments and their risk/benefit

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Joyner MJ, et al. medrxiv 2020. August 12, 2020. http://doi.or/10-1101-2020.08.12.20169359.
Fact Sheet for Health Care Providers. Emergency Use Authorization (EUA) of COVID-19 Convalescent Plasma for Treatment of COVID-19 in Hospitalized Patients. FDA Website. 8/23/2020. Available at: https://www.fda.gov/media/141478/download

EUA Requirements

8/31/2020 Update

1. Adverse effects
   - Hospitals of health care providers must maintain records and conduct an investigation of adverse reactions observed after transfusion
   - Serious adverse events related to administration of convalescent plasma should be reported to the FDA
     - EUA specifies that fatalities related to transfusion must be reported, as required under 21 CFR 606.170.
2. Record keeping
   - Blood establishments must keep records of collection, process, and distribution
   - Hospitals must maintain records regarding the receipt, storage, and administration of convalescent plasma

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Emergency Use Authorization Approval Letter for Convalescent Plasma in Patients Hospitalized with COVID-19. FDA website. 8/23/2020. Available at: https://www.fda.gov/media/141477/download

Donors

8/31/2020 Update

- Donations/processing through American Red Cross or other participating blood bank
  - The FDA EUA requires determination of antibody levels from donors prior to release of product
    - Approved for testing using the Ortho VITROS SARS-CoV-2 IgG test with a signal to cutoff ratio ≥12
      - S/Co <12 can be used, but must be labeled as "COVID-19 Convalescent Plasma of Low Titer"
    - If alternative testing methodology to be used blood center must contact the Center for Biologic Evaluation and Research (CBER)
- Requirements:
  - Proven disease (i.e. positive nasopharyngeal PCR or serologic test for SARS-CoV-2)
  - Recovery:
    - 1) Complete resolution of symptoms at least 14 days prior to donation
  - Eligible to donate blood products and HLA antibody negative
  - 300-1000 mL of plasma collected per donation / may donate every 28 days.
- Refer potential donors to: ccpp19.org or FDA or American Red Cross websites

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Emergency Use Authorization Approval Letter for Convalescent Plasma in Patients Hospitalized with COVID-19. FDA website. 8/23/2020. Available at: https://www.fda.gov/media/141477/download

Donate plasma. National COVID-19 Convalescent Plasma Project website. 3/29/2020. Available at: https://ccpp19.org/status.html

Emergency Use Authorization for Convalescent Plasma in Patients Hospitalized with COVID-19. FDA website. 8/23/2020. Available at: https://www.fda.gov/media/141480/download.

Dosing

8/31/2020 Update

- Considerations:
  - Plasma infusion volume
  - Antibody titers
- Optimal regimen unknown
- Current COVID-19 studies/cases series = wide variety of volumes/titers
- Duration of activity = weeks-months

Treatment:

1-2 units (~200-500 mL) of high antibody plasma

Infusion Rate: 500 mL/hr

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Bloch EM, et al. J Clin Invest. 2020. http://doi.org/10.1172/JCI138745.

Status of Trial Protocols. National COVID-19 Convalescent Plasma Project website. 3/29/2020. Available at: https://ccpp19.org/status.html

Emergency Use Authorization Approval Letter for Convalescent Plasma in Patients Hospitalized with COVID-19. FDA website. 8/23/2020. Available at: https://www.fda.gov/media/141477/download

Safety

Various Infection Risks

- Antibody-dependent infection enhancement
- Transmission/transfusion of SARS-CoV-2
- Transmission of SARS-CoV-2 to healthcare personnel
- Transmission of other infectious pathogens (e.g.* HIV, HCV, HBV)

*Abbreviations: HIV, human immunodeficiency virus; HCV, hepatitis C virus; HBV, hepatitis B virus

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Halstead SB. Microbiol spectr 2014;2(6). http://doi.org/10.1128/microbiolspec.AID-0022-2014.
Bloch EM, et al. J Clin Invest. 2020. http://doi.org/10.1172/JCI138745.
Pandey S, et al. Transfusion. 2012;52(Suppl 1):65S-79S. http://doi.org/10.1111/j.1537-2995.2012.03663.x.

Adverse Reactions

- Similar to other human plasma administration:
  - Infusion reactions:
    - Life Threatening:
      - Transfusion-related acute lung injury (TRALI)
      - Transfusion-associated circulatory overload (TACO)
      - Allergic/anaphylactic transfusion reactions
    - Non-life threatening:
      - Febrile non-hemolytic transfusion reactions
      - Urticarial transfusion reactions

Available study protocols recommend stop infusion if:

- Any signs of anaphylaxis
- Respiratory compromise
- Hypotension
- Tachycardia/bradycardia
- Provider clinical judgement

Consider:

- Pretreatment with acetaminophen/diphenhydramine
- Slowing infusion

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Bloch EM, et al. J Clin Invest. 2020. http://doi.org/10.1172/JCI138745.
Pandey S, et al. Transfusion. 2012;52(Suppl 1):65S-79S. http://doi.org/10.1111/j.1537-2995.2012.03683.x.
Status of Trial Protocols. National COVID-19 Convalescent Plasma Project website. 3/29/2020. Available at: https://ccpp19.org/status.html

Adverse Reactions

5/21/2020 Update

National Expanded Access Program: April 3rd – May 11th, 2020:

- 14,288 patients enrolled with 8932 transfused
  - Safety data from first 5000 patients:
    - Serious adverse events with 4 hours:
      - 36 Events:
        - 15 Deaths
        - 21 non-deaths:
          - 7 – Transfusion associated circulatory overload (0.14%)
          - 11 – Transfusion associated lung injury (0.22%)
          - 3 – Severe allergic transfusion reactions (0.06%)
    - Mortality at 7 days: 602 (14.9%)
      - ICU: 456 (16.7% of total ICU admitted patients)
      - Non-ICU: 146 (11.2% of total non-ICU admitted patients)

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Joyner MJ, et al. medRxiv 2020. http://doi.org/10.1101/2020.05.12.20099879.

Drug-Drug Interactions

- Theoretical reduction in INR for patients on warfarin
  - Convalescent plasma = Fresh frozen plasma from patient previously infected with SARS-CoV-2.
  - INR reduction related to:
    - Baseline INR
    - Volume of FFP administered
  - Recommendation: Carefully monitor INR in patients receiving convalescent plasma in conjunction with warfarin

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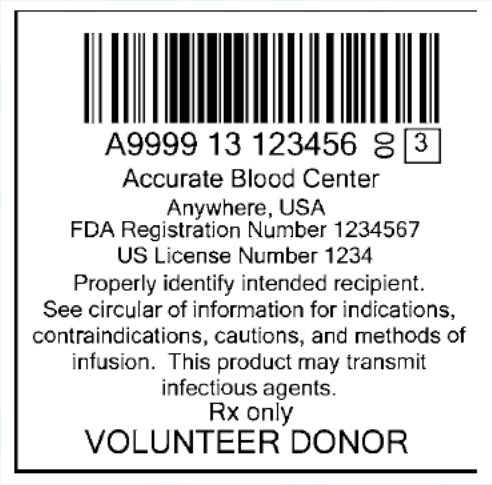
Rashidi A, et al. Mayo Clin Proc. 2013;88(3):244-250. http://doi.org/10.1016/j.mayocp.2012.12.011.
Thigpen JL, et al. Pharmacotherapy. 2013;33(11):1199-1213. http://doi.org/10.1002/phar.1270.
Goldstein JN, et al. Lancet. 2015;385(9982):2077-87. http://doi.org/10.1016/S0140-6736(14):61685-8.

Labeling and Expiration

- Labeling should be uniform
  - FDA recommends use of International Society of Blood Transfusion (ISBT) format outlined in the United States Industry Consensus Standard for the Uniform Labeling of Blood and Blood Components.
- Expiration date: Similar to other plasma products.
  - Frozen within 8 hours after collection and stored at -18°C or colder
  - Expires 1 year from the date of collection
  - Once thawed, can be refrigerated for up to 5 days prior to transfusion



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United States Industry Consensus Standard for the Uniform Labeling of Blood and Blood Components Using ISBT 128. FDA Website. 5/15/2019. Available at: https://www.fda.gov/regulatory-information/search-fda-guidance-documents/united-states-industry-consensus-standard-uniform-labeling-blood-and-blood-components-using-isbt-128

Revised information for investigational COVID-19 convalescent plasma. FDA website. 4/8/2020. Available at: https://www.fda.gov/vaccines-blood-biologics/investigational-new-drug-ind-or-device-exemption-ide-process-cber/revised-information-investigational-covid-19-convalescent-plasma.

Resources

- FDA Release:
  - Methods for enrollment
  - Donor requirements
  - Labeling requirements
- Ccpp19.org:
  - Donor requirements/registration
  - Study protocols
  - Guidance on non-trial use

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- American Red Cross:
  - Information for Potential Donors
- Uscovidplasma.org
  - US expanded access program website
- Key Reviews:
  - Casadevall A, et al. J Clin Infest. 2020;130(4):1545-1548. http://doi.org/10.1172/JCI138003.
  - Bloch EM, et al. J Clin Invest. 2020. http://doi.org/10.1172/JCI138745.

Summary

- **Mechanism**: Transfusion/transfer of passive immunity
- **Data**: Limited evidence from other coronaviruses, small studies/case series, and experience from the National Expanded Access Program
- **Donors**: Confirmed infection with recovery prior to donation
- **Recipients**: Clinical trials or emergency use authorization
- **Dosing**: 1-2 units (200-500 mL) of (ideally) “high antibody” plasma
- **Safety/Adverse Reactions**: Infection risk and typical blood product concerns
- **Drug-drug Interactions**: Theoretical lowering of INR for patients on warfarin

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Convalescent Plasma

A Review of Pertinent Information for SARS-CoV-2

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Data as of August 31th, 2020