sistem imun dan dapat mengakitbatkan kegagalan multiorgan. Pengukuran CRP pun harus dilakukan secara berkala agar pemantauan kondisi pasien lebih komprehensif dan jika perlu perawatan ICU segera (Zhang et al, 2020b).

Beberapa penelitian menunjukkan semakin tingginya kadar CRP, semakin beratnya inflamasi yang terjadi. Hal ini terkait dengan keberadaan CRP yang merupakan protein fase akut pada kondisi inflamasi, infeksi dan kerusakan jaringan (Zeng et al, 2020). Dan ada penelitian lain yang mengatakan terjadi peningkatan kadar CRP pada pasien dengan gejala berat dibanding gejala ringan dan pada *non survivor* lebih tinggi dibanding *survivor*. Hal ini menunjukkan semakin tinggi kadar CRP pasien maka semakin berat pula keadaannya yang mengindikasikan terjadinya inflamasi dan kegagalan multiorgan berat pada pasien (Ji et al, 2020).

Peningkatan CRP terjadi akibat adanya inflamasi berat sistemik sebagai respon akut. Peningkatan CRP berkaitan dengan perawatan ICU dan prognosis yang buruk (Bao et al, 2020).

Terdapat penelitian yang menyatakan meski terdapat peningkatan CRP pada pasien Covid-19 tetapi peningkatan CRP tidak berkorelasi dengan perawatan ICU (Zhang et al, 2020a).

CRP cenderung lebih sensitif dibandingkan marker laboratorium lain terhadap infeksi Covid-19 bergejala terhadap tidak bergejala, bergejala ringan terhadap bergejala berat, perawatan ICU terhadap tidak perawatan ICU, mortalitas dan kepulangan. CRP meningkat lebih tinggi sejalan dengan keparahan penyakit dan sangat berhubungan dengan prognosis (de Souza et al,

2020; Diriba et al, 2020; Ghayda et al, 2020; Henry et al, 2020; Huang et al, 2020; Izcovich et al, 2020; Ji et al, 2020; Kermali et al, 2020; Li et al, 2020; Liguoro et al, 2020; Ludvigsson, 2020; Sahu et al, 2020; Soraya & Ulhaq, 2020; Terpos et al, 2020; Zaigham & Anderson, 2020; Zhang et al, 2020a, Zhang et al, 2020b; Zeng et al, 2020).

Nilai CRP pada infeksi Covid-19 konsisten meningkat dengan variasi nilai sensitivitas dan spesifitas. Pada umumnya peningkatan >20 mg/L memberikan gambaran keparahan gejala, prognosis buruk, dan mortalitas. Kerusakan jaringan akibat inflamasi pada infeksi Covid-19 yang berat dapat diprediksi dengan nilai CRP (Akbari et al., 2020; Elshazli et al., 2020; Ghahramani et al., 2020; Ghayda et al., 2020; Gidari et al., 2021; Huang et al., 2020; Ji et al., 2020; Kermali et al., 2020; Ou et al., 2020; Soraya & Ulhaq, 2020; Zaigham & Andersson, 2020; Zeng et al, 2020).

Nilai *risk ratio* dari CRP menunjukkan risiko prognosis buruk, penyakit berat dan perawatan ICU meningkat. Hal ini terkait semakin beratnya respon inflamasi yang terjadi maka akan semakin banyak organ target yang rusak (Henry et al., 2020; Huang et al., 2020; Terpos et al., 2020).

Nilai *odds ratio* pada peningkatan nilai CRP juga meningkat dengan signifikan dan bermakna. Sehingga, nilai CRP dapat menjadi prediktor terutama pada kasus berat dan prognosis buruk (Bao et al., 2020; Elshazli et al., 2020; Figliozzi et al., 2020; Izcovich et al., 2020; Yamada et al., 2020; Zhang et al., 2020).

Peningkatan CRP juga dipengaruhi oleh keadaan pasien saat masuk rumah sakit, utamanya superinfeksi bakteri, keadaan penyerta yang menjadi komorbid dan beratnya gejala (Ghayda et al, 2020).

BAB 7

KESIMPULAN DAN SARAN

A. Kesimpulan

Berdasarkan literature yang telah dianalisis, maka kesimpulan yang dapat ditarik adalah:

1. Infeksi Covid-19 lebih parah pada laki-laki, usia tua, dan adanya komorbid.
2. Gejala yang paling sering muncul pada pasien dengan infeksi Covid-19 adalah demam dan batuk, gejala gastrointestinal, sesak, malaise, myalgia, dan nyeri kepala.
3. Semakin tinggi kadar CRP, menunjukkan kondisi inflamasi yang semakin berat.
4. Pada gambaran *outcome* pada pasien dengan infeksi Covid-19 memberikan gambaran *discharge rate* lebih tinggi pada anak dibandingkan pada dewasa. Terdapat pula *case fatality rate* yang lebih tinggi pada dewasa dibandingkan anak, dan angka mortalitas ibu rendah.
5. Hubungan CRP dengan keparahan infeksi Covid-19 signifikan pada semua tolok ukur dan konsisten pada semua kondisi. Infeksi Covid-19 dengan gejala ringan memberikan gambaran hasil pemeriksaan CRP pada range 12,1 mg/L-41,78 mg/L, dan untuk gejala berat 43,8 mg/L-57,90 mg/L.

B. Saran

Dengan adanya beberapa penelitian mengenai hubungan peningkatan kadar CRP terhadap tingkat keparahan pasien COVID-19 diharapkan agar tenaga medis dapat menjadikan kadar CRP sebagai salah satu biomarker untuk mengetahui tanda prognosis yang buruk, mencegah terjadinya tingkat keparahan lebih lanjut, komplikasi berat dan kematian pasien.

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